
(Not Just) Open For Business
Redefining the value of university knowledge exchange

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Summary

Existing literature on university knowledge exchange, whether approving or critical, tends to assume that it is the *economic* value of knowledge that produces opportunities for exchange. Taking as a starting point the contention that this need not be the case, this study examines afresh the nature of knowledge exchange and its value to society. In doing so, it makes reference to the policies of the UK, Welsh Assembly and Scottish Governments, to the approaches of the Universities of Leeds, Cardiff and Edinburgh, and to the experiences of academics engaged in social and scientific knowledge exchange projects. Whilst each Government is shown to prioritise economic ends, academics value making a difference to others, increasing personal or institutional kudos and engaging in interesting and exciting projects more highly. Although it remains possible for academics to carry out knowledge exchange with this broad range of outcomes, the mismatch between academic and governmental priorities is problematic. Failure to redefine the value of knowledge exchange to encompass a broader range of outcomes is liable to have implications for Government, for academia and for society: a lack of alignment between policy drivers and academic motivations makes it less likely that policy will achieve its desired ends; universities that fail to accommodate a broader value set risk losing academics to institutions that do; and in failing to provide sufficient space for the conduct of a broad-based knowledge exchange, policy makers will prevent the benefits of academic knowledge to society from being maximised. Universities are shown to be well placed to effect a change in the way that 'value' is defined. However, certain structural issues militate against such a change, and academics and their universities will therefore need to be bold in asserting alternative values.

Education ("to lead out") is the opposite, in spirit and etymology, of inculcation ("to trample in").

– Engell and Dangerfield, *Saving Higher Education in the Age of Money*

To the memory of Mr Burton, who understood the true meaning of education.

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Section I

Rationale and Structure

Chapter 1: Introduction

1.1 Knowledge exchange in twenty-first century Britain

I shall not dare to think my self a true naturalist till my skill can make my garden yield better herbs and flowers, or my orchard better fruit, or my field better corn, or my dairy better cheese, than theirs that are strangers to physiology. (Robert Boyle, quoted in Hunter 1981: 91)

So stated Robert Boyle in the seventeenth century, exhibiting a view common to his time that the value of new knowledge lay in its applicability. As Livingstone (1992: 66) has written of the 'Scientific Revolution' of the sixteenth and seventeenth centuries, 'there was among many a concern to demonstrate the social utility of mathematical equations and the public value of apparently esoteric science'. The process of sharing knowledge for practical ends, known as 'knowledge transfer' (Major and Cordey-Hayes 2000) or, more recently, reflecting recognition that knowledge rarely flows linearly but is shared and developed iteratively among individuals or groups, 'knowledge exchange', is thus evidently not a recent phenomenon. Commonly understood to describe intra- and inter-firm knowledge sharing activities and processes, knowledge exchange has also come to be widely used in reference to the use by non-academic audiences of knowledge generated within universities. It is in this latter sense that knowledge exchange has assumed a particular importance in British political circles during the first years of the twenty-first century.

That this is so is evidenced by the focus of a number of policy documents emanating from Whitehall, as well as from the UK's devolved administrations, in recent years. Many of these – such as Richard Lambert's 'Review of Business-University Collaboration' (HM Treasury 2003), the Government's 'Science and Investment

Framework 2004-2014' (HM Treasury et al. 2004), and Lord Sainsbury's review of science and innovation policy, 'The Race to the Top' (Lord Sainsbury 2007) – make significant reference to higher education, but take as their focus science, innovation, and the commercial environment existing around these, although 'The Future of Higher Education', 'Reaching Higher' and 'A Framework for Higher Education', published by the English, Welsh and Scottish administrations respectively in 2002 and 2003, have higher education as their direct focus.

In the introduction to his Review of Business-University Collaboration (HM Treasury 2003: 9). Richard Lambert notes that '...there could be significant opportunities for UK business to sharpen its competitive edge through these new partnerships [with universities]'. The point is yet more strongly stated in the Government's response to Lambert. the Science and Investment Framework, in which ensuring that scientific knowledge is 'used by business to create wealth' is described as nothing less than an 'economic imperative' (HM Treasury et al. 2004: 69). Three years later, with the publication of 'The Race to the Top', Lord Sainsbury felt able to report that the agenda for university collaboration with business in the UK 'has become increasingly important [since the publication of the Lambert Review] as our future international competitiveness rests more than ever on the development, dissemination and application of knowledge and ideas' (Lord Sainsbury 2007: 57).

It is clear that. for the Treasury, the higher education sector is expected to play an integral role in fulfilling the Government's economic objectives, but what of the overall vision for the future of higher education in the UK, and specifically of its knowledge exchange capabilities? Here too an economic rationale features

prominently. In its 2003 white paper, 'The Future of Higher Education', the then Department for Education and Skills set out its strategy for developing English universities. Alongside chapters on research excellence, teaching and learning, and expanding the size of and access to the sector, one chapter is devoted to 'Higher education and business – exchanging and developing knowledge and skills'. Whilst a broader role for knowledge exchange, beyond simply the economic, is acknowledged, the centrality of the economy as a driver of universities' knowledge sharing activity is always apparent. Thus the Secretary of State, Charles Clarke, writes in his foreword that 'we have to make better progress in harnessing knowledge to wealth creation' (Department for Education and Skills [DfES] 2003: 2).

Following restructuring of government departments in June 2007, the newly created Department for Innovation, Universities and Skills reinforced this message. The Department has clarified its new role on its website with a six point mission statement. Of these six points, one relates to sustaining a world-class research base in the UK, three to raising participation and skills levels, and another to increasing the supply of people undertaking STEM (science, technology, engineering and mathematics) subjects, but it is the second point which covers knowledge exchange. This reads: 'the Department will work to maximise the exploitation of the research base to support innovation across *all sectors of the economy*' (Department for Innovation, Universities and Skills 2007, emphasis added).

The Welsh Assembly Government's 2002 higher education strategy, 'Reaching Higher', and the Scottish Executive's 2003 'Framework for Higher Education in Scotland' both also devote attention to what in Wales is 'knowledge exploitation' and

in Scotland is termed 'knowledge transfer'. As in 'The Future of Higher Education', a range of possible roles for universities in relation to knowledge sharing activity is alluded to. 'Reaching Higher' suggests that fulfilling the Welsh Assembly's responsibility for sustainable development could be used as a rationale for research, and the Scottish Executive notes the potential for the social sciences to 'help improve social justice and the quality of life' (Scottish Executive 2003: 46). This notwithstanding, specifically in terms of universities' 'third' mission of knowledge exchange the administrations display a tendency to equate knowledge exchange with broadly economic goals. For example, although 'science' is defined as 'literally "knowledge"' in the Welsh Assembly's 'Science Policy for Wales' (2006b: 45), and an accordingly broad range of applications for 'scientific' research is explored, the 'third mission' activities of universities are described narrowly with reference to 'productivity growth' and 'commercialisation of the science base' (2006b: 16-17). The significance of this university-economy relationship was comprehensively demonstrated in Wales by the 2004 publication of 'Knowledge Economy Nexus: Role of Higher Education in Wales', which sets out 'the economic development role of higher education in Wales' (Welsh Assembly Government 2004a: 2).

1.2 Thesis structure

At all levels of Government, across the UK, there is therefore consensus that higher education has an increasingly important part to play in the nation's economy. Because this is having, and will increasingly have, an impact on the direction taken by British higher education, the implications of this policy direction are worthy of further study. Only once this has been concluded can we begin to understand whether current policy objectives are to the ultimate detriment or benefit of higher education, and by

extension of the nation. However, the political coupling of higher education's knowledge generating capacity with national wealth creation objectives has not emerged on a collective whim, but is itself a response to deep-seated changes in the structure of the economy in developed nations. It will therefore be instructive, before examining the development of knowledge exchange policy and practices in some detail, to explore these transformations and the part played by knowledge in the new economic structure.

In **Chapter 2**, four broad literature sets of relevance to the knowledge transfer debate in the UK are reviewed. An understanding of the current interest in knowledge as a valuable resource would be incomplete without reference to the historical importance of knowledge and to the more recent emergence of a 'knowledge economy' discourse that fetes knowledge as a factor of crucial importance for economic growth. Together with a tracing of attitudes towards knowledge throughout modern history, discussion of what is commonly understood by the 'knowledge economy' forms the first subject of review.

Although the relationship between knowledge and the economy is a long-standing one, much current thinking on the purpose of knowledge production has been shaped within the context of successive Governments' neoliberal ideological standpoints; the impact of neoliberalism in Britain, and on British academia in particular, therefore constitutes the second focus of the literature review.

Having established the ideological underpinnings that inform the knowledge transfer debate, the knowledge transfer literature itself will be explored. A reading of this

literature sheds light on the specific rationales, and associated mechanisms, that have been advanced for the conduct of knowledge exchange activity.

The growth of this activity in universities has not been without controversy, and accordingly the fourth literature set to be reviewed is concerned with the commercialisation of higher education, and the impact of this on university missions. Together, these four literature sets contribute to an understanding of knowledge exchange practices and debates, in the United Kingdom and more widely, at present. They also highlight where gaps in existing research on knowledge exchange lie, and hence provide inspiration for further avenues of research.

Having established in Chapter 2 where these gaps exist and the form that research to address them might take, **Chapter 3** sets out a structure for the research that informs this thesis. **Chapter 4** presents the methods employed in undertaking this research. These include the methods used to formulate the research structure, to select the institutions, knowledge exchange projects and individuals that formed the subjects of investigation, and to design schedules for and undertake the interviews. Methods for treating the data following collection are also discussed.

The rationale for and structure of the research having been dealt with in Section I, Section II presents the research findings. The data are divided into four chapters. **Chapter 5** examines government policy on knowledge exchange, as set by the UK, Welsh Assembly and Scottish Governments. Following a reading of the relevant policy documents, and to illuminate how policy is being interpreted in practice, the views of senior civil servants from each administration will be explored.

As non-departmental public bodies, the Higher Education Funding Councils for England, Wales and Scotland are given significant autonomy to develop strategies for the implementation of government policy. Their approaches are consequently addressed separately, in **Chapter 6**. Reference is made to the nature of the Funding Councils' knowledge exchange funding streams, to respondents' understanding of the purpose of knowledge exchange and to the Councils' role in managing differing priorities for its outcomes.

In **Chapter 7**, attention turns to the visions for knowledge exchange held by the Universities of Leeds, Cardiff and Edinburgh. The specifics of each institution's strategy are set out, and fundamental similarities in approach are drawn out. University respondents' attitudes towards government policy are also explored.

Chapter 8 sets against discussion of policy an exploration of knowledge exchange in practice. With reference to social and scientific projects being conducted at the study institutions, the chapter presents academics' views on the nature and purpose of knowledge exchange, and their attitudes to university and government policy.

The data are synthesised in Section III. **Chapter 9** highlights the economic value system employed by the three Governments in their knowledge exchange policies, and discusses alternative value systems. A case is made for a redefinition of the value of knowledge exchange that accords parity of esteem to economic and non-economic ends. Although certain structural issues militate against such a redefinition, it is argued that it is essential if an adequate 'space' is to be created for knowledge exchange. It is concluded that creating a space for a broad-based knowledge exchange

will benefit Government, academia and society. Finally, **Chapter 10** reviews the research and its findings, and presents some potential future avenues of research.

Chapter 2: Literature review

2.1 The historical importance of knowledge

The twentieth century proved to be a period of rapid and wholesale change in the social and economic lives of the developed world. That this is the case is not only evident with hindsight, but was apparent to many commentators even as these upheavals were taking place. Although their meanings remain the subject of fierce debate, terms which are now synonymous with this period of upheaval, such as postmodernism and post-industrialism, were first coined in the midst of the change that they were designed to describe. To fully understand this changing social and economic environment, however, it is first instructive to examine the impact of the Enlightenment period in the eighteenth century. It is the Enlightenment which, Harvey (1990) informs us, forms the root of the project of modernity, and it is this project that sets the pattern for the transformations of the twentieth century. The modernist project sought the emancipation of human life from the often destructive forces of nature, and subsequently its enrichment, through the scientific domination of the natural world. To this end, the accumulation of knowledge became paramount.

The title of Berman's (1982) text 'All that is solid melts into air', itself a quotation from Marx, neatly captures the central consequence of the modernist project. Modernity offered the promise of an understanding of the true state of things that would set us free, but its means of achieving this was the source of contradiction and uncertainty. An active break with tradition and history was espoused, since only by pursuing the unknown could the truth be sought. It was, said Berman, a unity of disunity, where the known is no longer sufficient and all that is solid melts into air.

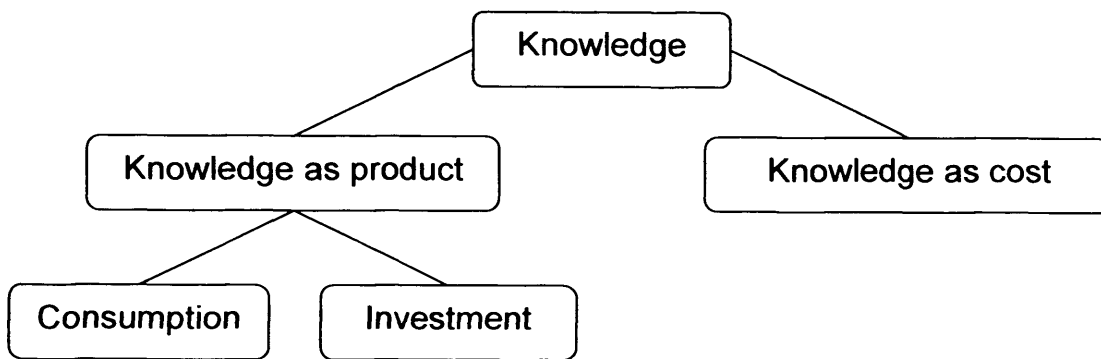
Yet as long as the modernist project prevailed, discontinuity was regarded as merely a means to an end and, despite the continued destruction and reformulation of what was known, a certain stability could be said to have prevailed. The modernist project was, however, to a certain extent a victim of its own success. Throughout the eighteenth and nineteenth centuries, not only the volume of knowledge but also the pace of knowledge creation consistently grew, as existing knowledge both spawned more questions and created the means to answer them. By the early twentieth century observers were becoming aware that this growth represented a significant sea change, as for example witnessed by the contemporary reflection of Henry Adams, grandson of John Quincy Adams, that the pace of change in the sciences was far beyond the simple arithmetic progressions of previous times (Bell 1973).

Whilst study of the sciences produced both new questions and answers, it was the former that multiplied most rapidly. The discovery of the extent of the universe, for example, opened up a new line of enquiry for which answers could not readily be found (Bell 1973). This situation clearly presents problems for the modernist project, which is concerned with the solution of problems for the attainment of an absolute understanding of our world. Simultaneous to these scientific leaps, the early 1900s also witnessed a series of major social upheavals across the Western world. The fragmentation of the prevailing social structure brought about particularly by two world wars gave voice to the experiences of many previously unnoticed groups; with different world views competing for recognition, it became increasingly difficult from a social viewpoint for the concept of a single reality to be supported.

2.2 Knowledge as a source of value

Knowledge from a variety of epistemological perspectives, in the scientific and social realms, was accumulating at an increasing rate. It was not only gaining in volume, however, but was also becoming increasingly important to society, particularly for its economic value. Knowledge has always been of importance to the economy, although it reaches particular prominence only periodically, its influence being described by a series of Kondratiev waves (Lane 1966; Park 2001). The question of what 'knowledge' is, although at first sight an apparently straightforward one, has nevertheless generated numerous answers, one of which gives particular insight into the reasons behind the close relationship between knowledge and economic performance.

Machlup (1962) defined knowledge as both 'that which is known' and the 'state of knowing', but argued that the classification of knowledge is of more use than its definition. The dichotomy between basic and applied knowledge superficially appears beneficial in distinguishing between knowledge of immediate economic value and that which has no obvious current economic purpose. Certainly there are circumstances in which this distinction is instructive, as will be shown with respect to the production of knowledge in universities. On closer inspection, however, as a detailed classification the basic-applied distinction is overly crude and fails to distinguish knowledge that lies in the grey area between the two. Machlup's own five-fold categorisation of practical, intellectual, pastime, spiritual and unwanted knowledge goes some way to rectifying this deficiency although, as with any classification, the necessary element of abstraction ensures that subtleties are lost. Of more interest is Machlup's distinction between types of knowledge based upon the way in which it is used, which is shown in Figure 2.1.

Figure 2.1 Machlup's typology of knowledge

Source: Machlup (1962)

The knowledge creation process has as its goal either the generation of knowledge for its own ends, in which case knowledge is the 'product', or the use of knowledge in the production process of another product, in which case knowledge creation is a cost in that process. The use of economic terminology in this categorisation does not preclude the creation of knowledge for non-economic ends. Where knowledge is created as a 'product' in its own right, it can either be for consumption or investment. The latter case describes, for example, research, which contributes to the stock of available information on a topic. This information can be drawn upon at a later date, be it by the business community for economic ends, or philosophers with more social goals in mind. Other knowledge is made available for immediate consumption, in books, films and other media. What this classification serves to highlight is that knowledge is the source of value in society; the economic terminology employed further demonstrates that this value is often of a monetary kind.

That knowledge is the source of value was also proposed by Drucker in the late 1960s, and the theme has subsequently been developed by, among others, Castells (1989; 1996), Keeble (1988) and Park (2001). Moreover, their principal contention is not only that knowledge is a source of value, but that during the course of the

twentieth century it has risen to prominence as the single most important source of value in developed economies. Drucker (1969) theorised that the waning importance of 'old' industries in these economies was inevitable; noting the role of competition from the developing nations in declining steel production, the impact of market saturation in the automotive industry, and the fact that mature sectors such as agriculture could not provide the boost necessary to create a dynamic economy, Drucker argued that these examples indicated the declining power of the old order. Instead, he envisaged the rising importance of new industries in creating dynamism. Four of these – the information industries, exploration and exploitation of the oceans, materials science, and technological advances to support the needs of the new megalopolises – were already apparent to him at the time of writing, although he envisaged that others might also rise to prominence.

Of particular interest here is that knowledge is envisaged as both an industry in its own right and as an input into the other industries of the new order. In 1969 Drucker regarded information industries as a certainty if not yet a reality, thanks to advances in computing technology from the 1940s onwards. The future industries would be based on the availability of readily and quickly available cheap, reliable information, which was also expected to revolutionise methods of learning and teaching. Although the computer industry would form a large part of this, computing technology would not be essential to all knowledge-producing industries. The production of knowledge for immediate or future consumption, in Machlup's (1962) terms knowledge as 'product' or 'investment', is only one source of value. Knowledge can also be a cost in the production process of other products. Of the three remaining industries cited by Drucker, each is dependent on an expanding knowledge base to become possible.

Drucker (1969: 36) claims that the age of experience-based technological advancement is being replaced by an increasing reliance on 'systematic, purposeful, organised information'.

In further exploring the significance of knowledge in the economy, subsequent theorists have argued that knowledge has an important role to play in all aspects of the economy. For Park (2001), knowledge has become the fundamental source of comparative advantage in the industrialised world. Although the changing economic composition of industrialised countries in the late twentieth century has been theorised, by Bell (1973) among others, as a transition from the production of goods to service provision, this is not the most radical shift in the economy to date (Castells 1989). Castells argues that what we have witnessed since the 1970s is a transition from industrialism to informationalism, the latter being a state in which:

information processing [is] the core, fundamental activity conditioning the effectiveness and productivity of all processes of production, distribution, consumption, and management. (1989: 17)

Keeble's (1988) assessment that technological innovations need not only be in terms of product generation but can also affect production *processes* gives credence to this view, since new production processes can be taken up by both existing and new industries. The twenty-first century is predicted to be the period where investment in intangible factors of production outgrows physical investment (Park 2001). Thus the post-industrial age can be theorised not as an era in which the tertiary sector replaces the primary and secondary sectors, but rather as one in which information replaces the physical means of production as the key to productivity.

The fact that knowledge has economic significance as product and as factor of production has made defining 'knowledge industries' (Machlup 1962) or 'information industries' (Drucker 1969) a difficult target. Machlup, even as he theorised the existence of knowledge industries, recognised that they were hard to define. Should one, for example, categorise them according to industry sector, in which case knowledge production in non-knowledge industries will be overlooked whilst all employees of a knowledge industry firm will be categorised as knowledge workers, regardless of their specific occupation? An alternative approach would be to make any classification occupation-based, but this too presents problems. Knowledge production is always partly reliant on non-knowledge producing industries for success; increasing production of knowledge can be achieved without increasing the number of knowledge producers, by making improvements to the working practices of non-knowledge producers. Recognising the complications of adhering exclusively to either of the approaches for defining knowledge industries, Machlup settled on an approach that combined both.

2.3 The knowledge economy

Controversy over the definition of what has come to be known, since Drucker's use of the term in 1969, as the 'knowledge economy' has, however, by no means been resolved. In 2004, the Local Futures Group, an economic geography research consultancy, published a report into the knowledge economy based on responses from an academic panel comprising twenty leading British economic geographers (Hepworth et al. 2004). The wide range of responses from the panel when questioned about the definition of the knowledge economy demonstrates the concept's contested nature. A general consensus emerged that the knowledge economy is a new

phenomenon, whereby the pace and importance to the economy of knowledge creation and uptake have increased. However, specific definitions ranged from the inclusive, focusing on the prevalence of learning regions and partnerships, to the exclusive, which characterised the knowledge economy as the high value, skills- and information-intensive portion of the economy. It is clear from this report that, firstly, there is agreement that something new is taking place to alter the shape of the economy and, secondly, no single agreed-upon definition of this 'knowledge economy' can be found. Nevertheless, if any sense is to be made of the impact of these changes, an attempt must be made to outline what the knowledge economy is or does.

There are broadly two competing explanations for what the knowledge economy is. An understanding of both is important because each provokes policy responses that impact upon economic development, including at the regional level and in relation to university-industry interactions. The first definition explains the knowledge economy as that section of the economy occupied by high-technology industry, which requires large volumes of knowledge and technological innovation to be productive. Knowledge is the principal input to these industries, and often also constitutes the greatest part of their output. This definition is favoured by Drucker, who proposed in 1993 that the previous forty years had seen the rise of 'information capitalism', in which the dominant industries in the economy are those concerned with the production of knowledge and information. The creative industries, as well as industries in the information technology (IT) sector and at the forefront of scientific research and development, are all included in this definition. Certainly it is easy to see how Drucker singles out the health and, especially, education sectors as being structurally different from those industries that produce and distribute tangible

objects, but Drucker's assertion that the pills produced by the pharmaceutical industry are in fact only packaging for knowledge raises questions about the utility of his definition of the knowledge economy. If firms engaged in the knowledge economy, as well as those outside it, can produce goods, then drawing the dividing line between the knowledge economy and non-knowledge economy becomes virtually impossible. Drucker gives no indication as to how one is to decide whether a product is a product or merely packaging.

Whilst his description of information capitalism feeds into one definition of the knowledge economy, Drucker (1969) also accepts the widely-held view that knowledge has become one of the most significant factors of production in many industries. This fact is central to the second definition of the knowledge economy, and that Drucker acknowledges it can be seen as evidence that the two definitions need not be mutually exclusive. Although there is a risk of creating further confusion, there is some advantage to be had from distinguishing between 'knowledge industries' and 'the knowledge economy'. Defining the former as the high-technology and knowledge-intensive industries already referred to in the first definition above, the term 'knowledge economy' can be retained to explain the broader importance of knowledge. Lane's (1966) description of a 'knowledgeable society' as one in which the collection, interpretation and utilisation of knowledge are prized to a greater degree than in other societies suggests that, for a knowledge economy to develop, knowledge creation must first be an important social goal; in north-western Europe this came to pass as a result of the Enlightenment project. The long-established recognition that knowledge carried economic value ensured that the growing volumes of knowledge were employed for the benefit of the economy. As other factors of production have

eroded as sources of comparative advantage, so knowledge has increasingly come to the fore. Here we again see the utility of Castells' (1989) theorisation of the transition from industrialism to informationalism, which argues that information processing has become the critical factor in the production, distribution and consumption of goods.

This theorisation of the growing importance of knowledge as a factor of production has arisen through observation of the changing nature of spatial interaction and its effect on comparative advantage. Many of the factors of production that have historically been the source of comparative advantage have become ubiquitous, such that their advantage is lost (Maskell et al. 1998). One of the principal reasons for this is the compression of space and time through the application of information and communications technologies (ICTs). Harvey (1990) explains the concept of time-space compression as the combination of a speeding-up of the pace of life and the overcoming of spatial barriers. This has been achieved through improvements not only in transport links, but also in other forms of communications; networking technologies such as the Internet and tele-conferencing allow increasingly fast and cheap contact between physically distant places, thus shrinking both spatial and time horizons. For the knowledge industries, which are less reliant in locational terms on the availability of tangible raw materials than on knowledge, this in turn has allowed for a flexible location policy and significant mobility. Time-space compression has also contributed to the changing geography of more established industries in the primary and secondary sectors. Global trade has a long-standing role in the economies of many nations, but fast, reliable and, above all, cheap global transport links now facilitate the worldwide shipment of goods on a hitherto unprecedented scale. The

consequent enlargement of their markets places producers in constant direct competition with each other.

This apparent rootlessness of production processes does not, however, signal the 'death of geography' (Malecki 2001). Instead, a new geography is emerging in this networked global economy. Certainly there is an element of decentralisation, as companies relocate routine activities – particularly in the service sector – into economically peripheral areas, often to capitalise on cheap labour. Yet high-end functions of companies, both knowledge industries and the non-knowledge producing industries of the knowledge economy, continue to be centralised in metropolitan areas. A distinction can be drawn between the elimination of geography, which ICTs have not brought about, and the elimination of distance, to which ICTs have contributed, although even this latter phenomenon has been subject to exaggeration: distance remains a significant barrier to connectedness for those unable to access the Internet; because the necessary infrastructure is not universally distributed, the distance between two streets can mean the difference between connection into the global network and exclusion from it (Malecki 2001).

For those connected to the network distance has undoubtedly been diminished, but geography has nevertheless not been annihilated. According to Castells (1989), there is a new 'space of flows' that defines the geography of the global informational economy. Neither centralisation nor decentralisation is predominant, but rather it is the structure of the information flows within and between organisations that is the defining factor. These flows are determined by the infrastructure by which they are transmitted and by the hierarchical characteristics of the companies that transmit

them, and consequently exhibit a geographical pattern. For Castells (1996), this can be defined according to three constituent parts. The first is a circuit that connects places in a single network. All places can be defined only with reference to the way in which they connect into this network, and to their subsequent relationship to the other places in it. The second important element within the space of flows is its nodes and hubs. Nodes are defined as the locations of strategically important functions such as political or economic decision making, and hubs are the places that coordinate the flow of information between all other places. Specific locations become nodes and hubs only because they have been designated as such, usually by a dominant managerial elite, and thus the spatial organisation of these elites constitutes the third element of the space of flows. Malecki (2001) similarly proposes the continued importance of geography in the use of ICTs. Real-world space remains important because it shapes the geography of ICT distribution: this is not only in purely physical terms, resulting from the impact of topographical features on distribution, but is also a result of the make-up of society creating spatial patterns of demand and supply that affect distribution patterns.

Castells (1989: 1996) and Malecki (2001) argue persuasively that geography is not dead, but that it continues to matter for the location of strategically important functions. One reason for this not clearly developed by Castells or Malecki, but widely treated elsewhere in the literature, is the importance to firms of knowledge-sharing practices, which have been theorised as being fundamentally place-dependent or 'sticky' (Maskell et al. 1998). Not all knowledge represents a source of competitive advantage. The codification of knowledge, which makes it explicit and standardised (Morgan 2004), allows it to be transported with greater ease across long distances and

between parties, and reduces the ability of that knowledge to convey a comparative advantage to its user. By contrast, tacit knowledge is not written down or otherwise codified, and hence depends on transmission between individuals for its dissemination. In some circumstances knowledge is absolutely tied to a specific location, such as where a particular arrangement of inter-firm networking and personal contacts leads to synergistic effects (Lawson and Lorenz 1999). In other situations, the process of knowledge transmission between regions is possible, but has been shown to be aided by face-to-face contact between parties. Whilst electronic forms of communication have aided standardised transactions, the quality of interaction is less than in face-to-face communication (Morgan 2004). Complex concepts are therefore less readily transmitted, and professional relationships less easily maintained.

The importance of such relationships to a firm's effectiveness has been theorised in the literature on collective learning, clusters, and communities of knowledge creation. Collective learning describes the process by which knowledge is shared within and between organisations for the purpose of generating new knowledge and improving performance. As Lawson and Lorenz (1999) note, the concept of collective learning has much in common with those of the learning region and the regional innovation system. Each of the concepts has in common the fact that it emphasises the region as the principal scale for organisational learning. The term 'cluster' is often applied in a sector-specific sense to refer to a spatially proximate group of firms that produce similar outputs. However, it also has a wider applicability to any group of firms located in close proximity that achieve a critical mass of resources and competences which can be shared between the group. The synergistic effects of this cooperation

convey a regional comparative advantage over firms outside the cluster that outweighs the competitive losses to any one firm from sharing knowledge with the rest of the cluster. Because clusters are often clearly defined in terms of a geographical region or sector, they have been criticised for excluding firms that contribute to the effectiveness of the regional economy but do not fall within the given definition of the cluster (Amin and Cohendet 2004). For this reason Amin and Cohendet prefer the more loosely defined concept of a 'community' as the basic unit of knowledge formation. This has the benefit also of encompassing the role played in the process by the higher education sector.

That knowledge-sharing between firms that are in competition with one another can prove beneficial is the central theory of the 'open innovation' paradigm. The principle of open innovation recognises that valuable ideas exist both inside and outside the boundaries of an individual company. As knowledge has become a significant source of competitive advantage in the latter part of the twentieth century, it has become less viable to ignore this fact. For firms that appreciate this, the innovation process develops an increasingly outward-looking focus, drawing on expertise and resources available in the wider research community; by contrast, those that do not adhere to the principles of open innovation operate a closed policy in which all research and development is conducted within the company (Chesborough 2003). The resulting interactions between firms, and also with the research base, create what Amin and Cohendet (2004) refer to as a varied 'ecology of knowledge'. The development of such an ecology is an important factor in the strength of the regional economy; each company within the network is no longer entirely self-reliant, but can draw on the strengths of surrounding network members for support.

2.4 Neoliberalism

Such, then, is the importance of knowledge within today's economic system. But what precisely is the underlying logic that currently ties knowledge creation to the economic sphere? What are the economic assumptions that have led to the emergence of the knowledge economy and what ideological standpoint lies behind those assumptions? Vital to our comprehension of the rise not only of the knowledge economy, but of the entire direction that economic and also, critically, social policy has taken since the late 1970s, is an understanding of the neoliberal project. Perhaps better understood as a series of projects, since it encompasses different variants and contains 'multiple and contradictory aspects' (Larner 2003: 509), neoliberalism nevertheless exhibits a number of commonly occurring features.

Contrary to frequent characterisations of neoliberalism, the latter cannot simply be expressed as a shrinking of the nation state in favour of a more central role for the market (Peck 2004). However, the liberal roots of neoliberalism posit as their ideological starting point the fact that, economically, politically and socially, relations are best structured around allowing freedom of choice to individuals to pursue their own interests (Jessop 2002). In practice, this tends to endorse the expansion of the market as a means of free interaction whilst, to preserve individuals' freedom of choice, limiting the extent to which the state can intervene in social and economic life. This is not to suggest that the state cannot, and does not, intervene. O'Neill (1998: 4) defines the market as 'a set of institutional arrangements for the transfer of property rights', through which property rights over goods – be they material or, as in the case of skills and knowledge, non-material – are exchanged for money. These 'institutional arrangements' are described by O'Neill in a broad sense as all those institutions

necessary for exchange to be possible: they include, for example, those that facilitate the transportation of goods, that foster the necessary social conditions of trust for contractual arrangements to operate successfully, or that constitute the legal arrangements that define property rights and the conditions for their legitimate transfer. According to Peck (2004), the state acts as a crucial element in such institutional arrangements, both in managing and policing markets and, more fundamentally, in creating and regulating the optimal conditions for them.

The principal reason why neoliberalism often appears self-contradictory and can be explained using only relatively abstract definitions (Larner 2003; Peck 2004) is that it is not a fundamental reality, but rather is the result of an inherently political project (Peck and Tickell 2002) and is therefore subject to change. This is particularly apparent in respect of the shifting role of the state evident in the neoliberalisation of the United States and United Kingdom from the late 1970s to the present. The latter part of the 1970s was a period of macroeconomic crisis in Atlantic Fordism, during which growth, productivity and profitability slowed and mass unemployment gathered pace (Jessop 2002; Peck 2004); blame was targeted firmly at the Keynesian economic model, with its preference for state ownership, welfare provision, unions and 'overregulation' of financial and labour markets and, in response to this, a period of 'roll-back' neoliberalism (Peck and Tickell 2002: 388) began. Marketisation and deregulation heralded the withdrawal of the state from economic and, increasingly, social control (Larner 2003). This process was initiated in the United Kingdom under the Conservative Thatcher Government, and in the United States by the Republican Reagan regime. It is from this period that the characterisation of neoliberalism as a straightforward replacement of the state with the market has arisen.

As the 1980s gave way to the 1990s, further economic shocks hinted at problems with 'narrowly marketcentric' forms of neoliberalism (Peck and Tickell 2002: 388). According to Jessop (2002), consequently, whilst neoliberalism had hitherto tended to involve a decrease in state intervention, as economic transactions were deregulated, state-owned enterprises were privatised and the residual public sector introduced market proxies, the 1990s saw an *increase* in state intervention. This has been rationalised by neoliberals, who claim that renewed state intervention is a temporary measure necessary only to facilitate continued expansion of a liberal market economy. For Peck and Tickell (2002), an interventionist agenda is most notably emerging around social issues, and can be viewed as an attempt to deal with the negative social consequences that 'less government' (Wacquant 1999: 323, quoted in Peck and Tickell 2002: 389) produced during the 1980s. The new policies aimed at correcting these previous failures do not represent a reaction against neoliberalism, but rather an attempt to facilitate its continued dominance. Thus the reach of neoliberal ideals is not limited only to the economic realm, but increasingly extends into the sphere of social policy making. It is also a testament to the singular power of neoliberal ideology in the United States and United Kingdom that it has continued to be promulgated, from the mid-1990s onwards, by the ostensibly left-wing Democrat and 'New' Labour administrations of Clinton and Blair.

It is in this latter period and as a result of the expanding influence of neoliberalism that, in the United Kingdom, universities have increasingly been brought within the sphere of market forces (although, as will be seen, the economic rationale for knowledge creation was one that began to take hold in earnest as early as the 1980s). This situation has resulted from the convergence of several factors. Neoliberal

ideology, in foregrounding economic forces as the principal means to facilitate individuals', and thereby society's, goals, prioritises the logic of the market. In this respect, factors such as freedom of choice (Jessop 2002), competitiveness (McDowell 2004; Peck and Tickell 2002), and profit maximisation (Willmott 2003) are privileged both as means to and indicators of success. As state intervention has deepened to promote these goals, an increasing number of institutions have been subjected to the logic of the market. Combined with the growing importance of knowledge as both factor of production and product, this has led to universities increasingly being regarded as an integral part of the British economy.

The resultant effects on universities are often contradictory, but always serve to further neoliberal aims. On the one hand, the shrinking of the nation state has put pressure on higher education to justify the income that it receives from Government; given neoliberalism's essentialist belief in economic predominance, this is frequently expressed as a requirement for higher education 'to demonstrate its contribution to processes of capital accumulation, normally articulated as national wealth generation' (Willmott 2003: 129). On the other hand, even as the withdrawal of the state is used as a reason to introduce the market into universities, the newly interventionist state legislates to further strengthen the market rationale. Writing of the Government's 2003 white paper 'The Future of Higher Education', McDowell says:

I searched the white paper almost in vain for any inkling that higher education might be about knowledge creation, the search for truth, the pursuit of scholarship or personal growth and self-discovery, let alone the recognition of its role in strengthening democracy though [sic] an educated citizenry. Instead, the dual role of the university proposed in the paper is to advance economic prosperity through utilitarian research and to promote social inclusion through widening access. (McDowell 2004: 158)

Fahey et al. hint at the potentially detrimental effect of this approach on universities in the introduction to a chapter on 'knowledge beyond the knowledge economy', when they state that:

Every presence defines an absence. When knowledge economy policies define worthwhile knowledges, they leave out those knowledges deemed marginal to current economic growth. They legitimise particular kinds of knowledge whilst ignoring and thus diminishing others. (Fahey et al. 2006: 287)

The effects of knowledge economy policies on the higher education mission as a whole are fiercely contested, and will be explored in greater detail below. What is not contested is the plain fact that, in addition to teaching and research, a third mission of knowledge exchange has developed considerably within universities. In large measure, the most frequently stated motivations for, and the concomitant expansion of, knowledge exchange from the early 1980s to the present can be seen in the light of the developments in neoliberalism and the knowledge economy described above.

2.5 Rationales for knowledge exchange

Three principal rationales for university-industry knowledge exchange are commonly employed. The first of these is the financial imperative in universities. Beveridge (1991) notes that, following cuts in University Grants Committee funding in the UK in 1981, industrial liaison and technology transfer gained a new momentum in many institutions: '[b]y the mid-1980s universities in the UK had realised that the need to obtain industrial funding was no polite invitation from Government. It affected their very survival' (1991: 443; see also Shattock 1989). Empirical support for this thesis can be found in Quintas, Wield and Massey's (1992) study of the science park concept, which shows that, of thirty-eight science parks established in the UK

between 1972 and 1988, thirty-six opened after 1981 (see Table 2.1). The authors attribute the growth in part to local government and regional development agency support for science park creation as a means of creating job opportunities in the wake of the 1979-81 recession, but acknowledge that for universities the principal driver was the post-1981 pressure to find alternative funding sources. The validity of citing financial gain as a benefit of knowledge exchange has subsequently been called into question following decades in which universities, even in the knowledge transfer-intensive United States (see Bok (2003), for example), have seen minimal monetary returns for their efforts.

Table 2.1: UK science parks by year of opening

Year	Science park	Number of parks
1972	Cambridge, Heriot-Watt	2
1982	Merseyside	1
1983	Aston, Bradford, Glasgow, Leeds	4
1984	East Anglia, Hull, Loughborough, Manchester, Nottingham, Southampton, St Andrews, Surrey, Warwick	9
1985	Aberystwyth, Clwyd, Durham, South Bank, Sussex	5
1986	Antrim, Birmingham, Bolton, Brunel, Kent, Stirling, Swansea	7
1987	Bangor, Cardiff, Keele, St John's (Cambridge)	4
1988	Aberdeen, Billingham, Salford, Sheffield, Sunderland, Wrexham	6
Total		38

Source: Quintas, Wield and Massey (1992)

In spite of concerns that universities cannot expect to rely on income from knowledge exchange to support themselves, the financial argument for university-industry interaction remains a powerful one within higher education institutions. Outside the confines of the university system a second justification for interaction has become increasingly prominent; this too derives from an economic imperative, and relates to

the role of universities in stimulating regional economic development. The part played by universities in their region through direct and indirect contributions to employment has long been appreciated; this Florax (1992) terms the 'expenditure impact' of universities. Throughout the twentieth century, there has also been growing recognition of the impact of knowledge production on the region, such that an 'overall impression' has now been formed 'that education and research are important in explaining economic growth' (Florax 1992: 277). In arguing that universities' perceived potential contribution to regional economic performance was instrumental in science park creation. Quintas, Wield and Massey (1992) suggest that this 'overall impression' has been translated into policy. Confirmation of this is found in the introduction to HM Treasury's 'Lambert Review of Business-University Collaboration'. Richard Lambert states that '[r]esearch-intensive universities play a central role in the most dynamic economic regions of the UK' (HM Treasury 2003: 9). He continues by citing evidence from the Department for Trade and Industry's 2001 Community Interaction Survey which, he argues, shows that '[c]ompanies that are involved in ... collaborations are more likely to broaden their range of good [sic] or services, open new markets or increase their market share than those that are not' (2003: 9). In policy circles, Florax's (1992) question, 'The University: A Regional Booster?', has become a statement of fact.

Conceicao and Heitor (1999: 41) identify the accumulation of knowledge as 'the most important factor in explaining economic development', echoing Castells' (1989) theorization that the so-called 'developed' economies have undergone a transition from industrialism to informationalism. In spite of this, it is unclear how, and indeed what, our principal knowledge producing institutions – the universities – contribute to their

regional economies. Florax (1992), Florida (1999), and Maskell and Tornqvist (2003) are among those to question the widespread assumption that a linear progression from university research, through commercial uptake, to regional growth can be identified. Florax's (1992) testing of the booster effect theory in The Netherlands determined that only in economically peripheral regions could a knowledge impact from universities be identified. Although he found a correlation between firms' proximity to a university and their investment in equipment in peripheral regions, no such correlation existed for core regions, and no correlation existed for either type of region between proximity and investment in buildings. Florax's reliance on investment in physical infrastructure as the sole indicator of university-derived knowledge's regional impact affects the reliability of his conclusions. As a source of comparative advantage, knowledge has the ability to increase productivity in its own right. It can, for example, contribute to a better understanding of supply-chains, which in turn allows a company to raise profits through more efficient and effective supply-chain partnerships (Cooke and Morgan 1998). Just as knowledge does not necessarily require investment in infrastructure to be effective, nor will it necessarily precipitate such investment. In light of this, Florax's (1992) choice of variables does not allow us to see the full picture with respect to the impact of Dutch universities on their regional economies.

Nevertheless, the assertion that not all regions will respond equally is a powerful one. Drawing on research conducted internationally in areas with large populations, containing large universities or research institutes, and exhibiting high levels of entrepreneurialism in the high-tech sector, Maskell and Tornqvist (2003) have identified two distinct regional environments. In the first, in spite of high concentrations of R&D activity and good access to research intensive universities

there is no clear evidence that entrepreneurial success depends on the local university research base; strong institutional and individual networks are lacking. The authors cite the London-Heathrow-Reading corridor as one example of this environment. In the second type of region, there are substantial synergies between universities and the local business environment. The names of the regions exhibiting type two characteristics include internationally renowned sites such as Silicon Valley and Highway 128 in the US, and Silicon Fen in the UK.

Florida (1999) suggests that, whilst the strong university-industry links found in these high profile locations can tempt us to form a model for regional economic development based on university technology-push, this fails to account for regions' and companies' varying capacity to absorb and exploit university research. The university should consequently be regarded as 'a necessary but not sufficient condition for regional economic development' (1999: 71). This leads Florida to suggest that a more appropriate approach would be to regard universities not simply as innovation generators but, more subtly, as 'mechanisms for generating and harnessing talent' (1999: 72). Although it is clear that the adequacy of the 'booster effect' rationale for university-industry knowledge transfer is subject to certain caveats, particularly in respect of the over-simplification of universities' role (Florax 1992; Florida 1999; Maskell and Tornqvist 2003), a strong case has been made for the incorporation of university research into a more general programme of regional development.

A third rationale given for university-industry interaction is that there are synergies between academia and industry which, if exploited, will generate benefits for both parties that could not be generated by each in isolation. The success of a potential

partnership lies in the ability of each organisation to identify where weaknesses in its own approach can be addressed by the other's strengths. Bok (2003) argues that scientific research is an increasingly collaborative process that requires input from academic and industrial scientists to achieve its full potential. As fields of research become more complex, collaboration allows parties to share resources and expertise. Bok cites databases, libraries of chemical compounds, and sophisticated computer models as being among the resources made available to universities when they collaborate with industry. This is a point also addressed in the 'Lambert Review of Business-University Collaboration' (HM Treasury 2003), which emphasises the benefits to academia of gaining access to industry's financial support and equipment.

The benefits of collaborative activity do not accrue solely to academia, there being also considerable advantages for industry. It was already apparent at the time of publication of the Docksey Report into 'Industry, Science and Universities' (Confederation of British Industry [CBI] 1970), that universities could provide industry with results from research that it was uneconomical for firms to conduct in-house, often as a result of the long time-scales involved. Principally pre-commercial in nature, this research is not of direct and immediate benefit to industry but might either become commercially applicable with the passage of time or provide the ground on which later commercial developments will sit. By staying in touch with developments in research, companies can gain insights into the future of their business (Elliott 1995). Whilst Docksey found that industry recognised the need for 'some' people to engage in research with longer time horizons, more recent changes have created a far greater incentive for industry to engage with universities. The central research laboratory, favoured by successful technology firms throughout much

of the twentieth century, has become, if not obsolete, certainly less viable for many companies as a means of undertaking R&D. Products are now sufficiently complex that companies often lack the breadth of competencies necessary to conduct R&D in isolation; new working practices favour outsourcing over vertical integration because of its flexibility and cost-effectiveness; and the concurrent growth of venture capitalism and the high-technology small and medium enterprise (SME) phenomenon have combined to shift the balance of power in R&D further away from the centralised research laboratory (HM Treasury 2003). In light of this, universities can prove to be attractive sources of research expertise for companies seeking a range of collaborative partners.

2.6 Knowledge exchange mechanisms

Although largely uncontested as a rationale for university-industry interaction, the benefits of exploiting synergies between the two parties have nevertheless failed to provide a sufficient catalyst for increased collaboration. The 2003 Lambert Review (HM Treasury 2003) lists the business sector as the single largest contributor to the decline of UK R&D spending relative to the other G7 nations. Business expenditure on R&D is declining as a proportion of GDP, whilst the statistics on annual average growth rates for expenditure place the United Kingdom near the bottom of the scale when compared with other OECD countries. These findings find support in Tether and Swann's (2003) research into the 'dynamism' of UK industry, as evidenced by firms' competitiveness and innovativeness. This found that only 16.5% of production and 12% of service companies scored more than five 'dynamism points' out of a possible ten. For the vast majority of firms, engagement with the science base, including universities, was poor; only among those firms displaying higher levels of

dynamism, and an associated commitment to innovation, were there significant levels of engagement. In view of such findings, and particularly in the wake of the Lambert Review, there has been renewed interest in the methods currently used to facilitate knowledge exchange, in their efficacy, and in potential alternatives.

The various methods employed can be distinguished in part according to the time period in which they were predominant. Formal mechanisms for knowledge exchange are strongly influenced by the political ideology of the time, and by the consequent way in which government funding for third mission activity is assigned. The actual implementation of strategies, however, is generally instigated predominantly by either universities on the supply side, or by industry on the demand side. In addition to formal mechanisms, individual academics and members of the business community are involved in informal networks that can lead to university-industry interactions taking place. Some universities are now helping to facilitate interactions by creating regular networking opportunities. The Cardiff University Innovation Network has been identified as a successful example of such activity; established in 1996 and with over 2500 people registered on its database, the Network has been instrumental in bringing more than 600 new businesses into contact with the University (Huggins et al. 2008). A temporal categorisation of knowledge exchange mechanisms would, by itself, be imperfect, in that there is overlap in the time periods during which each mechanism has been used; it can nevertheless provide an instructive partial framework for an explanation of the mechanisms for knowledge exchange. The different mechanisms have been classified in various ways, using a variety of terms and groupings (see, for example, Goddard et al. 1994; Brennenraedts et al. 2006; and,

for a particularly practical and succinct classification, Howells et al. 1998), but each classification ultimately identifies the following mechanisms as of central importance.

As previously discussed, the 1980s were a period of rapid expansion in the number of university-founded science parks in the United Kingdom. Science parks were created with the intention of fostering closer links between universities and industry, by encouraging companies to locate on sites near to university campuses, and also to provide a reliable revenue stream to universities from rental income (Howells et al. 1998). Science parks have been characterised as principally 'real estate developments' (Goddard et al. 1994: 26) or 'property-led initiatives' (Howells et al. 1998: 12), in which university-industry collaboration and exploitation of intellectual property play at best a secondary role. Research carried out on British science parks by Quintas, Wield and Massey (1992) suggested that links between universities and companies located on their science parks were no stronger than between universities and off-park firms. Furthermore, the authors argued that the science park model encouraged the separation of firms' R&D functions from their other operations; in promoting a linear model of innovation – in which knowledge is seen to flow unidirectionally from basic research to applied research and thence into development and production – this approach was therefore seriously flawed and likely to hinder innovation efforts.

Universities have continued to embrace the science park concept despite these criticisms, although the parks' fortunes have been varied (House of Lords 1997). Some have remained largely property-led ventures, with limited contact between tenants and academics, but others have sought to encourage greater interaction. One more recent initiative that has explicitly set out to exploit synergies between industry

and academia is the Welsh Technium concept. The original Technium, located in Swansea to take advantage of close proximity to the University of Wales, Swansea campus, was designed as an incubator facility for new firms. More than simply affordable office space, however, the Technium offers access to business and financial advisors as well as academic expertise. Prior to being accepted, companies wishing to locate on the site are assessed according to a stringent set of criteria. Companies must, for example, be intending to conduct research and development activities on site. The popularity of the concept has resulted in the creation of Technium 2, providing grow-on space for the original Technium firms. Subsequently, a range of Techniums has been opened across Wales, some cluster-specific, such as Digital Technium, and others more broadly targeted (Huggins et al. 2008).

In terms of the exploitation of the knowledge generated by interactions between industrialists and academics, intellectual property rights were, until the mid 1990s, most commonly managed by licensing the full rights to industry (HM Treasury 2003); this ensured that commercialisation occurred, whilst protecting universities' commercial interests in the knowledge produced by academics. However, growing concerns about the failure of property-led initiatives to provide a high enough level of university-industry interaction, combined with disillusionment with the complexity of managing relationships with industry, led to a considerable increase in the late 1990s in academics directly founding spinout companies. Goddard et al. (1994: 26) note that spinouts are not a new phenomenon, citing the firm of Barr and Stroud, established by a Glasgow University professor one hundred years ago, as illustration of this. What is new is the rate of company formation. Data presented in the 'Lambert Review of Business-University Collaboration' (HM Treasury 2003) show that, of the spinouts

formed in the five years to 2002, thirty-one percent were created in 2001. Moreover, per billion pounds of research expenditure, in 2002 the United Kingdom created over three times as many spinouts as the United States. By contrast, American licence income as a percentage of research expenditure was far higher than British income, and in the US the ratio of new licences to spinouts for 2001 was 9:1, compared with 4:1 in the UK. This suggests that the latter's high rate of spinout formation during this period was indicative of a preference for spinouts over licensing as opposed to a particularly high level of commercialisation per se.

Increasingly, universities are developing uniform rules to govern spinout formation. Research carried out at the University of Manchester in 1997-8 found that fifty-two percent of British HEIs surveyed had whole or partial stakes in companies for the exploitation of research (Howells et al. 1998). This covered individual companies as well as 'umbrella' organisations – such as University of Leeds Innovations Limited (Goddard et al. 1994) – which are set up as holding companies to manage an HEI's entire IP portfolio. More recently, universities have begun to enter into agreements with third party organisations, in which the latter are charged with managing the exploitation process; in 2007, Cardiff University signed a ten year, multi-million pound deal with Biofusion plc, with the expectation that the company will supervise the creation of five new spinout companies per year (Cardiff University 2007a). Third parties like Biofusion do not solely supervise the creation of new spinouts. They are instrumental in facilitating the protection and exploitation of new intellectual property by whichever means is deemed most appropriate by them, by the academic and any partners involved in the creation of the knowledge, and by the host university. In

policy circles, what is 'most appropriate' is increasingly coming to be seen, once again, as licensing.

The Lambert Review (HM Treasury 2003: 58) stated that there was 'too little licensing and too many unsustainable spinouts' and went on to argue that, although the availability of financing for high-tech start-ups from the late 1990s onwards had positively impacted on university culture vis-à-vis commercialisation, 'the pendulum has swung too far', resulting in the creation of too many unsustainable companies; applying one measure of company quality, Lambert found that almost one third of universities that created spinouts in 2002 did not attract any external private equity for their new companies. The 'familiar criticism' of academia stated in evidence to the House of Lords Select Committee on Science and Technology (1997: 19) that 'too many of its best brains are business-illiterate', if true, goes some way to explaining why many spinouts are of insufficient quality. Following the American model of more licensing and less spinout formation, Lambert recommends licensing as a less resource intensive knowledge exchange mechanism, and one that allows commercialisation to be conducted by the private sector, thus freeing academics to focus on their own field of expertise, research. This should result in a higher success rate in bringing technology to market. Already in 1998 seventy-one percent of universities contacted in the University of Manchester survey stated that they had revenue-sharing agreements in place for licence income (Howells et al. 1998), but it is clear from the Lambert Review that there is a desire to see still greater support, both politically and within HEIs, for licensing.

As the relative significance of science parks, spinouts and licensing as mechanisms for knowledge exchange has waxed and waned, universities have also continued to engage in a range of collaborative research projects. Although the transfer of research in these cases tends also to be governed by licence agreements, the key difference in collaborative research is that the non-academic partner, rather than simply taking ownership of the research results once they have been produced, is involved with the project during the research stage. A continuum can be identified from consultancy, in which the non-academic party requires specific information but where that information is usually pre-existing rather than requiring new research to be conducted, through contract research, in which the partner organisation specifies a particular research topic, to fully collaborative research, where the academic and non-academic parties work as partners to define and conduct a research project (HM Treasury 2003).

The importance of interpersonal contact for the transfer of tacit knowledge has already been stated (see, for example, Cooke 2002; Morgan 2004). Drawing on this, it is clear that the closer the relationship between academics and industrialists, the greater the opportunity for mutual understanding and hence for both parties to reap rewards from that relationship. However, barriers to reaching this level of communication do exist. The cultures of academia and industry are sufficiently different in some key respects to make it complicated for the two to work together. Firstly, although academic research can encompass near-market functions, the high proportion of basic research conducted in universities is not business-oriented and can take years before it is ready for application in the marketplace (Quintas et al. 1992). Secondly, and associated with this, is the fact that academics are more amenable to conducting research over longer time scales, since there is no market imperative, than

are most businesses. The financial value placed on research by universities is, thirdly, often higher than the market rate as understood by their non-academic partners, and academics can be unwilling to relinquish equity (House of Lords 1997). A fourth, related, issue is that creating an intellectual property licence agreement that is to the satisfaction of all parties is a time-consuming and costly process, particularly for smaller companies (HM Treasury 2003). In terms of forming linkages, it has been described as easier to 'tap out' of the university system than to 'tap in' (Quintas et al. 1992: 168). In efforts to rectify this, policy recommendations have covered the need to stimulate demand for research by businesses, as well as making universities and their knowledge exchange processes more accessible to industry (HM Treasury 2003).

Together, science park foundation, spinout creation, licensing and collaborative research have been identified as the four principal mechanisms for the transfer of research to non-academic audiences. It should also be noted that the movement of academic staff and students, as well as the transfer of knowledge through training, are often cited as significant knowledge exchange mechanisms. While this is undoubtedly the case, such forms of exchange are more closely allied to universities' teaching mission than to their research mission. Teaching and research are not, of course, discrete functions, and so it would be impossible to distinguish categorically between knowledge exchange conducted through teaching and that which is a function of research activity. As explained in Chapter 3, however, the focus of this research is on predominantly research-based knowledge exchange, and thus mechanisms relating more explicitly to teaching need not be explored here in greater detail.

2.7 The commercialisation of higher education

During the latter part of the twentieth century, as the range and volume of knowledge exchange activities increased, a particular debate began to emerge about the future role of universities in society. This debate has come in response to changes in academia that, according to Etzkowitz and Webster (1998), represent nothing short of a revolution. The first academic revolution was the introduction of research as a major facet of university life in the late nineteenth century, a move that met with significant opposition from many academics. Research has now become a firmly embedded part of academia, to the extent that a second academic revolution has been made possible. Etzkowitz and Webster argue that the origins of the connection between academic science and economic and political forces can be traced to the seventeenth century, but that two changes witnessed in this respect in the twentieth century are nevertheless revolutionary. Firstly, the extent of corporate investment and involvement in scientific research expanded at an unprecedented rate. Secondly, academia itself experienced internal commercialisation, the result of efforts by universities to exploit research-derived intellectual property themselves. Research commercialisation is now enshrined as a goal of universities to the extent that it has become known as the 'third mission', following teaching and research.

Because the introduction of an explicit third mission to universities is relatively recent, it cannot yet be compared with teaching and research in terms of the esteem in which it is held. This notwithstanding, there is evidence to suggest that making knowledge exchange of comparable worth is a serious goal of governmental and academic policy makers. Not least among this evidence in the UK is the 2003 'Lambert Review of Business-University Collaboration', published by HM Treasury in

the UK. The Review describes various British knowledge exchange success stories, and examines how these could be built upon nationally to improve industrial R&D performance. One of the most significant conclusions is that businesses are dissuaded from interacting with universities because a coordinated approach to knowledge exchange is lacking within academia.

By way of solution to this problem, it is proposed that universities should adopt template research agreements for collaborative projects, and that technology transfer offices should assume a central position in the negotiation of terms. Whereas collaborations have often hitherto occurred on an ad hoc basis, initiated by individuals within a company or academic department, the emphasis of the Lambert Review is firmly on a centralised approach to collaboration. The principal benefit of this approach is expected to be greater ease of relationship management for both parties, and hence an increase in the volume of research finding a commercial application. In spite of the enthusiasm for this approach in policy circles, it is by no means without critics. David (2002) argues that, while a policy consensus has developed in the United States, United Kingdom and, increasingly, in other European states that closer university-industry linkages and more market-oriented research provide the key to successful innovation, improvements to productivity, economic competitiveness and prosperity, this represents a damagingly short-sighted approach. By moving too far in the direction of meeting the *current* needs of industry, research institutions risk 'delaying and curtailing' major innovation gains, because apparently unrelated exploratory research is sidelined and its cumulative contribution to innovation lost (2002: 45). A second concern is that the academic institutions will become increasingly alike as they strive to serve industrial demand. Universities that are at

present best suited to the rapid expansion of knowledge could, claims David (2002: 54), ultimately become 'proprietary research enterprises', designed to maximise the income that can be derived from new knowledge. This is potentially damaging because, as David (2002) and Feldman and Desrochers (2004) agree, it is institutional diversity that represents the great strength of innovation systems. Supporting diverse institutions, and communication between them, allows both for individual specialisation and for the combination of specialised knowledge to achieve innovation.

The formalisation of knowledge exchange processes is not only of concern in terms of its potentially counterproductive effect on the innovation process that it seeks to promote. Considerable disquiet is also being expressed about the effects on universities' other missions, not least because formalisation has been accompanied in many circumstances by commercialisation. The rise of the commercial university has been charted by Derek Bok in the United States, who argues in 'Universities in the Marketplace' (2003) that, in the wake of the 1980 Bayh-Dole Act, academic and industrial science have become more closely intertwined. The Act gives universities the rights to intellectual property generated as a result of federally-funded research, and has therefore allowed universities to capitalise upon commercially applicable research conducted within their walls. Undoubtedly this has brought with it benefits. Non-economic benefits include improvements to living standards resulting from the application of research in society, often most dramatically seen in the application of bioscientific research in the healthcare sector, and increased prestige for academics and institutions involved in such research. In addition, the university's role as a 'regional booster' (Florax 1992) has been advanced, owing to its potential to improve

its region's economic performance. As well as providing employment, the university can achieve this by providing knowledge that acts as a source of comparative advantage in the marketplace.

Making research available for commercial use need not imply that the university will itself benefit commercially. However, an oft-cited benefit of knowledge exchange is its capacity to generate income for often under-funded universities. Although financial reward is only one of the benefits used to promote knowledge exchange activity, an economic imperative can be seen to be the underlying rationale for many of the pro-collaboration arguments: most obviously, the 'regional booster' argument is primarily an economic one; and, whilst measures of academic prestige are not solely financial, the peer-reviewed journal paper being a prime example, the size of grants received or number of licences granted certainly makes an impact. It could be argued that the Research and Assessment Exercise (RAE) in the United Kingdom has traditionally placed little store by economic success, thus disadvantaging the entrepreneurial scholar against his or her counterparts, yet the 2008 round of the RAE will allow HEIs to make submissions regarding strategies for collaborative research, income from such collaborations, and results from ensuing research (HEFCE et al. 2005). It is also anticipated that the Research Excellence Framework (REF), the RAE's future replacement, will set greater store by research project income, including that from commercial sources (University and College Union 2006). This suggests that knowledge exchange is beginning to play a somewhat greater role in the most highly regarded measures of academic prestige. That financial reward plays so significant a part in this, and in arguments in favour of knowledge exchange, is particularly telling when one comes to explore the costs of knowledge exchange.

These costs, although defined by different proponents in different ways, are united, often implicitly, by a focus on how value is assigned to the products of academia. Whilst the benefits of knowledge exchange are often expressed in monetary terms, Bok argues that the costs cannot be similarly expressed. 'More often', he states, 'they have to do with the elusive world of values, and specifically, with the principles that ought to guide academic pursuits...' (Bok 2003: 105-106). The intangible nature of the costs therefore allows them to be more readily discounted when confronted with the tangible financial benefits of university-industry interaction. Before the costs are discussed, it is instructive to examine in closer detail the increasing tendency for universities to seek financial gain from knowledge exchange, since this lies at the heart of many of the criticisms facing knowledge exchange.

Bok's observation that the Bayh-Dole Act prompted a growth in university-industry relations serves to explain the impetus for change in the United States, but it cannot explain a similar growth in the United Kingdom. The timing of the Act is indicative of a period during which the political climate in the US favoured a more market-oriented attitude to university funding. Throughout the 1980s and 1990s, policy was altered to encourage universities to engage in 'academic capitalism'; academics were 'discouraged from pursuing curiosity driven research', and incentives were given to those engaged in research of a more commercial bent (Slaughter and Leslie 1997: 48). Whilst no act similar to Bayh-Dole was passed in Britain, the political philosophy of the Thatcher Government was closely aligned to that of the Reagan regime. Within three days of taking office in 1979, the Conservatives had cut £100 million from university budgets, and by 1984 funding of the University Grants Committee, responsible for providing ninety percent of university operating costs, had been

reduced by seventeen percent (Shattock 1989). The effect of these funding cuts was to create a financial imperative for university-industry interaction for many universities (Beveridge 1991). According to Slaughter and Leslie (1997), from the university perspective this demonstrates resource dependence theory in action: as the principal provider of funds to universities, the Government was in a powerful position; the withdrawal of a proportion of these funds meant that universities were forced to look elsewhere for funding, and legislation to encourage university-industry interaction ensured that the outcome was a growth in academic capitalism.

This imperative has been reinforced by successive governments, as Monbiot (2001) has demonstrated through reference to their science and competitiveness strategies. From references in white papers to the need 'to produce a better match between publicly funded strategic research and the needs of industry' and 'to encourage universities to work more effectively with business', to the moving of the Office of Science and Technology from Cabinet Office to Department of Trade and Industry jurisdiction, there has been a clear mission to promote relationships between industry and academe (Monbiot 2001: 284-285). This goal is apparent also in the more recent 2003 white paper, 'The Future of Higher Education'. The opening to the white paper's chapter on 'research excellence' focuses on the importance of research for the economy through its contribution to growth and productivity. The theme is continued in the following chapter, 'Higher education and business', where reference is made to the need for higher education institutions to become 'increasingly embedded in their regional economies' (Department for Education and Skills [DfES] 2003: 36). David (2002) argues not only that this 'economic instrumentalism' is now the prevailing rationale for the provision of public funds for research, but that the need for research

to display demonstrable benefits is being interpreted increasingly literally. Initial expectations that today's inputs would yield tangible rewards at some point in the future have given way to a system in which research – particularly of a scientific nature – is viewed as part of a 'national innovation system' designed to improve economic performance.

2.8 The impact of commercialisation on university missions

Although many of the arguments against knowledge exchange are in fact targeted at the problems generated by the commercialisation of universities, rather than at knowledge exchange per se, the fact that increasingly the two processes are one and the same often makes any distinction largely academic for the purposes of a critique of knowledge exchange activity. In theory there is a distinction between commercialisation and knowledge exchange, the former being one manifestation of the latter but, in view of the growth of academic capitalism, in practice the two processes are often indistinguishable. It is nevertheless important to appreciate the distinction, as it allows the criticisms to be acknowledged and addressed without the principle of knowledge exchange necessarily being undermined.

In its narrowest sense, the cost to academia at large of the commercial imperative has been described in terms of the threat to non-instrumental science. Florida (1999) argues that universities in the United States have too often been seen merely as a means of generating regional economic development through the leveraging of technology. According to Florida, this has led to an under-emphasis of scientific research with no recognisable economic value, a point supported, albeit more tentatively, by Pavitt's (2004) assessment of the American model. In a similar vein,

Mulvey:(2002) sounds a warning for those attempting to value knowledge prior to its creation as a means of ensuring 'value for money' for the taxpayer. To do so, he argues, is to restrict potentially valuable research. By way of example, he cites research conducted at the University of Cambridge into protein structures in the 1940s and 1950s, which culminated in the foundation of molecular biology as a discipline. The research continued for over twenty years before results of any kind were obtained; Sir John Kendrew, one of the principal researchers on the project, has said that it would be unheard of in today's climate to continue to receive funding for so long in the absence of results. The implication here is that, as competition for research funds has increased, it has become harder to receive funding for activities with no demonstrable (economic) value. It would, however, be difficult to argue against the conclusion that molecular biology, an initially unpromising research strand, has subsequently generated value, both economic and social.

Attempting to value research with foresight appears impossible, but it is no more straightforward to value it with hindsight. Referring to research that emanated from Bell Laboratories in the US in 1965, Mulvey continues by asking us to consider the concept of 'value'. 'Does this contribution [of the discovery of 3K cosmic background radiation] to the fundamental understanding of the universe have a *money-value*?' he asks (Mulvey 2002: 61). It seems that Mulvey poses this rhetorical question precisely because it is obvious to him, and should be to us, that assigning a monetary value to the research is to miss the point of its importance; as Ziman puts it: '...apparently "useless" knowledge is not necessarily valueless' (Ziman 2003: 18). Alternative values, contends Ziman, relate to the non-instrumental, or non-practical, functions of knowledge. Thus, for example, scientific discovery contributes to our developing

world view, allowing us to appreciate our surroundings in a new light. Furthermore, through its methodological use of logic and criticism it provides a framework within which we can also address controversial social and political issues.

The critiques by Mulvey and Ziman contribute to an understanding of differing methods of valuing research, but the question remains as to how the pursuit of economically valuable research can damage non-instrumental knowledge. According to Ziman, the answer lies in the essential difference between instrumental research – the guiding principle of which is that it is 'an instrument of policy' and thus 'a means for achieving societal goals' (2003: 17) – and non-instrumental research – which serves not policy but rather the pursuit of rational, critical debate. The two are not distinguished by a simple pure-applied or science-technology dichotomy, but rather display fundamental differences in the way in which they are pursued. Firstly, instrumental research, being at least potentially commercialisable, tends to be conducted with a degree of secrecy, whereas non-instrumental research is carried out in the traditional spirit of academic research, being made available for peer review through publication. Pavitt (2004) argues that the pressure for universities to privatise hitherto public knowledge harms the rate of scientific and technological progress by stifling opportunities for continuous learning and improvement. Ziman's second stated difference between instrumental and non-instrumental research is that the validity of the former's results is more questionable because, provided that it fulfils the purpose for which it was designed, it is deemed successful; its wider reliability is not called into question. A third distinction between the approaches is that instrumental research is conducted towards specific ends. In serving particular interests, it becomes value laden and the results cannot be considered neutral. Finally, Ziman argues that in

seeking to address existing problems, instrumental science confines itself to the here and now. By contrast, non-instrumental research aims to transcend existing horizons and generate currently unimaginable knowledge. In the context of limited research funding, where the strong imperative to conduct 'valuable' research favours instrumental science, Ziman argues that non-instrumental science is being sidelined. Because the two forms are fundamentally incompatible, society is at risk of losing the benefits brought to it by the latter.

Ziman's position can be criticised in three respects. Firstly, the contention that instrumental research is inherently more value laden than non-instrumental research relies upon a dichotomy between subjective and objective research that in reality cannot be said to exist. Research is shaped by the previous experiences of the researchers, by the facility in which it is conducted, and by the social and political contexts that affect the way researchers think and act. Even where research is conducted specifically to question the existing order, that order remains a point of reference. All research consequently expresses an element of subjectivity.

Secondly, a distinction between a non-instrumental research programme that seeks to transcend existing boundaries and make giant leaps in our understanding, and a programme of instrumental research that is limited by our current horizons, cannot always be defended. Chesborough's (2003) study of research practices in various companies, typically in the fields of computer science and the biosciences, demonstrates that research across a broad spectrum is being undertaken. Although these companies must protect their financial interests, to remain competitive in a fast-changing field they must also look well beyond current technologies. In addition,

many such companies practise what Chesborough terms 'open-innovation', whereby selective sharing of intellectual property benefits the market, and thus the individual firm, to a greater degree than does complete protection. An open approach that facilitates peer review of research findings is not restricted to academia, albeit that in its commercial context the degree of openness is ultimately determined by financial considerations.

The final criticism of Ziman's (2003) contention that a growth in instrumental science is damaging to the pursuit of non-instrumental science can be found in Bok's (2003) work 'Universities in the Marketplace'. Bok is equally concerned about the detrimental effects of marketising the research process, but cannot agree that a loss of basic research is a consequence. Echoing the theory of open innovation, Bok recognises that American technology transfer offices have sometimes slowed scientific progress by protecting discoveries and hence restricting healthy competition. Nonetheless, despite problems in the process of knowledge exchange, Bok concludes that: '[t]wo decades of experience reveals no significant tendency to abandon basic research for more profitable kinds of applied or practical work' (Bok 2003: 142).

Whilst not concurring with Ziman's principal concern, Bok does agree with several of his contentions regarding the impact of commercialised research on the integrity of departments undertaking such work. This impact manifests itself in two ways, firstly on academic standards and, secondly, on the ability of researchers to conduct disinterested research. In respect of academic standards, Bok and others contend that the secrecy required in order to protect results for commercialisation can be damaging (Bok 2003; Florida 1999; Tether and Swann 2003). Accuracy of findings has

traditionally been assessed by peer review, but if findings are to be successfully protected, publication of results is often delayed. With reference to research conducted in South Africa in 2003, Kruss (2006) finds that delay is seen by academics to frustrate career prospects, particularly of academics in the early stages of their careers, and is thus regarded as a threat to academic freedom. Delays in publication also slow the review process and complicate attempts to verify results. This in itself can affect academic standards: whereas results that are immediately subjected to peer review can be tested again and conclusions altered if necessary, if they have already been adopted commercially this becomes far harder.

Of even greater danger to academic standards is the active suppression of results in order to prevent commercial interests from being discredited. In their introduction to an issue of the journal *Science and Engineering Ethics* devoted to the subject, Evans and Packham (2003) argue that examples of such behaviour are widespread. One of the more famous instances is that of the Canadian Dr Nancy Olivieri, who took a stand against the withholding of research data yet failed to receive adequate support for her actions from her university (Evans and Packham 2003; Olivieri 2003). Such situations remain rare but are not impossible to find, particularly in the biomedical research field. Evans and Packham cite some particularly disturbing cases in which research giving cause for concern about the health risks of certain clinical drugs and products entering the food chain has been suppressed by GlaxoSmithKline and Monsanto respectively. A further example is provided by Dr Mike Clark of the University of Cambridge, who found that the University's Research Services Division had agreed to a number of undertakings on his behalf, including one to submit any

written findings to his industrial sponsor for vetting prior to publication (University of Cambridge 2003).

These examples not only demonstrate a threat to the high standards hitherto expected of academic researchers, but also present a warning in respect of the pursuit of truth in academia. Referring to the need for scientific endeavour to be disinterested, Bok claims that achieving the 'best' research results depends on inquiry being conducted in a scholarly manner. Although an element of subjectivity is unavoidable, a researcher should aim to express his or her views 'as truthfully and objectively as possible' (Bok 2003: 110). An understanding of Merton's (1968) four imperatives for the conduct of science provides insight into what this might entail. These imperatives are universalism, communism, disinterestedness, and organised scepticism. In turn they demand: that scientific enquiry is subjected to universal pre-established criteria for the objective assessment of truth; that 'the substantive findings of science ... are assigned to the community' (1968: 610); that science should remain neutral in its objectives, by not being conducted for interested purposes; and that beliefs should be subject to 'detached scrutiny' coupled with a 'suspension of judgement until the 'facts are at hand' (1968: 614).

Merton claims that these are important goals 'not only because they are procedurally efficient, but because they are believed right and good' (1968: 607). Indeed, drawing on Merton's norms, Packham (2003: 92) considers that 'moral and intellectual independence of all political authority and economic power' would be widely acknowledged by scientists to be a key aspiration of scientific endeavour. This requires a strict separation to be maintained between scientific discovery and

application. In practice, as Bok (2003) has noted, complete objectivity is not possible. Nor, as will be discussed, is separation of theory and practice necessarily desirable (Etzkowitz and Webster 1998; Packham 2003). Taking a more pragmatic approach, Scott (2003: 81) admits a greater number of scientific endeavours into the pantheon of 'good science', in requiring solely that science be 'truthful' and 'socially responsible'. Provided that it fulfils these criteria, which Scott does admit are open to interpretation, no distinction is made between theoretical and practical science.

Commercialisation of knowledge is also problematic because the protection and private exploitation of intellectual property challenges the idea of science as a public good. The privatisation of knowledge presents this challenge because ownership in a market environment brings with it financial considerations that cloud judgements about the impact of the research on society as a whole. To Merton (1968: 612), 'the communism of the scientific ethos is incompatible with the definition of technology as 'private property' in a capitalistic economy'. Even if one does not admit such total incompatibility, it is apparent that balancing exploitation of research with the pursuit of good science represents a significant challenge, and that tensions are bound to arise. Recent controversies, such as the loss of public confidence in government scientists during the BSE crisis, serve to emphasise how important ethical and open conduct is regarded as being (HM Treasury et al. 2004). Conflicts of interest in applied science are not always so apparent, however, and it is where they lie undetected that they are liable to cause most damage.

There are clear warnings to be heeded with respect to the introduction of a commercialised approach to university-industry interaction, but equally a number of

caveats against a blanket distrust of interaction should be noted. Evans and Packham problematise the use of corporate language in academia which, they argue, leads to a normalisation of a commercial model in the university. Thus they cite the UK Higher Education Minister, Margaret Hodge, congratulating Vice-Chancellors in 2002 for 'their excellent work in leading and managing their businesses' (Evans and Packham 2003: 8). However, in spite of their contention that 'this linguistic colonisation ... is no innocent foible' (2003: 8) and that it plays a powerful role in shaping attitudes and culture, they go on to question whether the view that science should be necessarily disinterested is valid in the present climate. This point is further developed by Packham (2003), who acknowledges that Merton's norms for the conduct of academic science are not immutable.

Packham continues by referencing the work of Gibbons et al. (1994) on Mode 1 and Mode 2 knowledge. According to Gibbons et al., two distinct forms of knowledge production, which they term Mode 1 and Mode 2, can be distinguished. In terms of scientific knowledge, the former equates with a traditional view of what is meant by 'science', being governed by the interests of the academic community. Knowledge production occurs in the absence of a practical goal and is primarily cognitive. By contrast, Mode 2 knowledge is acquired in the context of application. 'Such knowledge', claim the authors (Gibbons et al. 1994: 4), 'is intended to be useful to someone ... and this imperative is present from the beginning'. The two forms interact with one another, not simply in a linear fashion whereby theory influences application, but in a reciprocal relationship in which theories developed in the context of application can also contribute to further advances in theoretical research. Mode 2 consequently represents a new form of knowledge creation, but one that is

supplementary to, rather than succeeding, the Mode 1 form. Packham (2003) acknowledges the potential for complementarity between the two modes of knowledge and contends that it is not Mode 2 knowledge production per se that damages the credibility of science. Rather, expecting universities to compete in a free market is likely to damage the pursuit of 'morally and intellectually independent' research and teaching in both its Mode 1 and Mode 2 forms (2003: 98).

What constitutes the 'academic culture' has, argue Etzkowitz and Webster (1998), changed over time. Just as research, although controversial at the time of its introduction to university agendas, has now been assimilated with universities' teaching function, so Etzkowitz and Webster claim that the capitalisation of knowledge can be regarded as compatible with academic science. Echoing Gibbons et al.'s (1994) assertion of complementarity between Mode 1 and Mode 2 knowledge, they argue that it is erroneous to regard scientific advance – development of theory – and technological advance as necessarily independent, and conflicting, goals. Rather than accepting a linear progression from basic science to application, they propose that a non-linear, bi-directional interaction occurs between the two. There is always at least potential for reciprocity between them. This implies that critiques of knowledge exchange based on possible damage to the development of non-instrumental knowledge are only partially valid; the threat of the restriction of research activity can be countered by the promise of an enrichment of the research process.

Etzkowitz and Webster (1998), although acknowledging that change to universities' missions is in part externally driven, recognise also that many of the changes are internally induced. Universities are not passive recipients of change, but rather seek it

through the process of institutional development. For Scott (2003), the introduction of new research practices creates a complicated, and sometimes contradictory, environment in which it can be difficult to determine what the 'right' course of action might be. Scott notes that external influence introduces further complexity, but that scientific communities are already 'riddled by hierarchies and inequalities' (2003: 80). This is a finding developed by Renault (2006) who, with reference to research conducted at twelve universities in the south-eastern USA, concludes that tension occurs when university-wide policies on knowledge exchange override established departmental norms. The range of academics' attitudes towards academic capitalism covers a wide spectrum, and the official stance of an academic's university represents only one influence on his or her opinion. Renault concludes from her research that an individual's behaviour is ultimately most closely linked to his or her personal beliefs about the commercialisation of research. In light of this plethora of attitudes to the changing role of the university, and of their proven influence in practice, university policy on knowledge exchange does not appear as consistent or as dominant as rhetoric on the subject sometimes suggests.

Likewise, Harloe and Perry (2004) have questioned whether Mode 1 research is actually being eclipsed by the Mode 2 model, or whether an accommodation is instead being reached between the two, and Ziman (2003: 17) contends that, 'we cannot go back to the old academic model for science, but need to consider how to maintain its vital non-instrumental roles'. Presumably, of course, it is not strictly speaking the case that we cannot go back since, following Scott's (2003) reasoning, the university is what its members make it; given consensus, it could as readily be an institution run along traditional lines as one forging a new, more entrepreneurial, future.

Nonetheless, as the present consensus seems to be largely in favour of the latter option, we can take Ziman's point. Given the diversity of attitudes and approaches to university-industry relations, wholesale support for or dismissal of knowledge exchange is untenable. The specific circumstances of the interaction are of absolute importance in determining the various costs and benefits involved.

2.9 Towards an alternative theorisation of knowledge exchange

It is apparent from the literature reviewed here that two distinct camps can be identified with respect to university-industry interactions. Firstly, practitioners of knowledge exchange are principally interested in improving the efficacy of the practices used to engage with businesses. Formalisation of processes is often regarded as a means of improving efficiency and, where financial considerations are foregrounded, commercialisation also finds favour. Practitioners, being engaged in making knowledge exchange work in their university, take as a theoretical starting point the fact that university-industry interaction is a beneficial goal. As a consequence, any critiques of knowledge exchange from this camp tend to be limited to debate of specific practices. Secondly, there is a group of theoreticians who are concerned with the future role of universities. Because of the close relationship in many higher education institutions between knowledge exchange and processes of formalisation and commercialisation, criticism of these processes on the grounds of declining academic freedom and integrity often spills over into an outright criticism of knowledge exchange. It would be easy to characterise these groups as the pro- and anti-knowledge exchange camps, but to do so would be to suggest that they were *necessarily* opposed. In fact, there is a case to be made for a clearer dialogue between practitioners and theorists, something that is currently lacking and that represents a

significant failing in the existing literature. If, as Ziman (2003) contends, we are now committed to university-industry engagement, then there is a need for crossover research to be undertaken.

For dialogue to occur, however, the gulf in approach between those who pursue knowledge exchange as a predominantly economic enterprise and those who regard such activity as damaging to academia needs to be bridged. It is a striking fact, and one suggestive of the deeply embedded nature of neoliberal thinking, that adherents of both of these viewpoints take for granted that it is the *economic* value of knowledge that creates opportunities for exchange. Writing about what he perceives as the failure of the profit motive to create a sustainable future for society and the natural world, Lux (2003: 4) notes that '...I am further led to realize just how much we are held in a beguiled trance by the profit motive, so that even those who are considered sustainability theorists are not able to challenge its hold on their thinking'. A similar charge might be levelled against knowledge exchange theorists. As long as this is the case, it would seem to be impossible to reconcile those who engage in knowledge exchange with those who remain suspicious of it. Yet there is no absolute reason why the market should be regarded as the principal outlet for academic research.

In its 2004 report 'That Full Complement of Riches', the British Academy challenged the Government's focus on the science base to the detriment of the arts, humanities and social sciences. The report equated the scientific focus with the concern for an economic return on investment in research, but claimed that 'it is illogical and damaging to equate a real return solely with a measurable, immediate economic return' (2004: 62). It went on to argue that investment in quality higher education 'is

not merely *or mainly* a matter of meeting the needs of a knowledge-based economy; it is fundamental to a civilised, liberal and enlightened society' (2004: 63, emphasis added). To this latter end, a case was made for broader definitions of the value of research and the contributions that it can make to society at large. Bond and Paterson's (2005) study of Scottish and English academics' external engagement showed that academics regarded universities' provision of various civic services to be at least as important as fulfilment of economic roles. The British Academy's broader definition of the 'value' of research would therefore seem not to be alien to Bond and Paterson's respondents.

With reference to the Scottish case, Ozga and Jones (2006) have examined knowledge exchange policy within the context of the countervailing tendencies of globalisation and local mediation of global trends. They argue that 'travelling' or global policies associated with, for example, globalisation and knowledge economy agendas are recontextualised in the light of, and hence remodelled according to, local, regional and national priorities, thereby creating 'embedded' policy. This perspective has a specific relevance to knowledge exchange. Whereas 'travelling' policy seeks to exploit knowledge exchange for its own ends – notably to advance the competitiveness agenda and provide 'evidence' for future policy development – knowledge can also be, and is, used in a way that responds to local needs and mitigates some of the locally damaging effects of globalisation. This breaks the bonds that link 'knowledge to the economy within a wholly commercializing framework', and instead reconnects knowledge exchange with the Scottish Enlightenment ideals of 'reciprocity, mutuality and cooperation beyond the calculus of pure exchange' (2006: 14).

This appears to point us in the direction of an approach to knowledge exchange that, given the current dominance of a neoliberal agenda, seems altogether more radical. Ozga and Jones' work evokes a wide-ranging literature that addresses alternative values to market-centrism. Schumacher's (1993) 'Small is Beautiful', Sen's (2001) 'Development as Freedom', and the 2006 call to set the university at the heart of a new era of responsible citizenship and sustainable living, 'Planet U' (M'Gonigle and Starke 2006), are three examples of books that seek to redefine the ground rules by which society is organised. The goal of all is to develop a society in which, as Sen (2001: 18) puts it, people can 'lead the kind of lives they value – and have reason to value'. Compared with these ground-breaking texts, the great majority of the literature on knowledge exchange, together with the main thrust of government policy, appears distinctly conservative, using, as it does, at the very least the language of the market, if not an outright economic justification for knowledge exchange.

Given the contrast between the breadth of activity already recorded (British Academy 2004; Bond and Paterson 2005) and the narrowly economic scope of much of the existing knowledge exchange literature, what is needed is for knowledge exchange in its broadest possible sense to be examined afresh, to ensure that our conceptualisation of it accurately reflects the reality of its practice. Then, drawing on a values literature that is seemingly of relevance to the knowledge exchange debate but has, as yet, remained untapped, and in the light of this fresh understanding of its practice, the future role of knowledge exchange in universities and in society can be explored. The following chapter sets out a structure for this research.

Chapter 3: Research structure

3.1 Research purpose

It is apparent from the preceding chapter that the question of what constitutes 'value' in relation to the production and utilisation of academic knowledge is central to many critiques of knowledge exchange. Whilst many of the arguments against giving precedence to the economic value of knowledge are compelling, where these are marshalled to defend an outright rejection of knowledge exchange the case is less clear. There is no absolute reason for knowledge exchange to be regarded as an exclusively economic process, and yet the profit motive has left many in a 'beguiled trance' (Lux 2003: 4) that leads them to assume that there is. The British Academy's 2004 publication 'That Full Complement of Riches' challenged this assumption. In doing so, it demonstrated a range of values of knowledge far broader than the merely economic.

The British Academy stands largely alone in its attempt to promote a more inclusive concept of utility, and economic justifications for knowledge exchange remain predominant in the academic and policy literature. This is problematic for two reasons. Firstly, it can have a negative effect on knowledge generation, by creating a climate that favours research which demonstrates potential for good financial returns. As David (2002) and Feldman and Desrochers (2004) agree, institutional diversity is central to effective innovation; this diversity, together with that found in the approaches of different disciplines to research and knowledge exchange (Upton 2004), would appear to be threatened by a narrow concern with maximising economic returns. The more readily measurable nature of these returns than of the long-term

cost to academia and society of an economic focus (Bok 2003) compounds the problem. The second and more immediately damaging problem with focusing on economically valuable research is that many of the positive effects of non-economically valuable research risk being lost to society, through lack of support for research sharing activities in this area. Although, as Ozga and Jones (2006) argue, knowledge is used not only for the advancement of 'travelling' or global policies, but also to locally mitigate some of the more negative effects of these, it is to the former role of knowledge that government attention tends to be directed (British Academy 2004).

Ozga and Jones claim that knowledge can be freed from the bonds that bind it to the economy, opening up the prospect of a more inclusive form of knowledge exchange, one which encompasses the ideals of 'reciprocity, mutuality and cooperation' as a means for meeting locally expressed needs (2006: 14). That potential might exist within universities to help address entrenched social problems as well as to enrich society (British Academy 2004) is undoubtedly an appealing prospect. Moreover, experience suggests that academics are indeed engaging with non-academic audiences for precisely these ends. As yet, however, this engagement has been insufficiently explored. The knowledge exchange debate frequently returns to discussion of the economic potential of knowledge, and the question 'what are universities for?' thus tends to be answered in these terms. In spite of the fact that the notion of what constitutes 'value' is contested, demonstrating that other possible answers exist, too often critiques of the economic rationale for knowledge exchange fail to develop these. Instead of separating knowledge exchange from the economic rationale, and seeking alternative rationales in its place, they conflate the *process* of exchanging

knowledge with one of the potential *outcomes* of the process, and hence argue that it is knowledge exchange per se that represents the threat to academia. While this situation continues, the knowledge exchange debate will not be moved forward. Proponents of knowledge exchange will continue to promote it on the grounds of the economic value that it generates, whilst its detractors will rehearse arguments about the damage caused to academia by the commercialisation process.

What, then, is the alternative? Throughout the various arguments and counterarguments, the dominant discourse that links knowledge exchange to the economy has remained largely unchallenged. Taking inspiration from world views such as Sen's (2001) and M'Gonigle and Starke's (2006), a new approach is needed that explores the fundamentals of knowledge exchange and examines afresh the contribution that universities can make in society. Based on the twin hypotheses that, firstly, policy is tending to favour economic valuation of knowledge and, secondly, that this fails to reflect the full scope of academics' research sharing practices, the following **research purpose** is proposed:

To explore the ways in which the role of the university, and more specifically of knowledge exchange, is conceived.

By pursuing this key objective, the aim is to move away from existing, often implicit, assumptions about the value of knowledge, the purpose of academic knowledge generation, and the nature of knowledge exchange. In their place will be presented the realities of why and how knowledge sharing occurs as expressed by, among others,

academics who engage in interactions beyond the academic boundary. Through this, a response will be sought to the **central research question**:

What can we learn about the possible future directions for knowledge exchange, and by extrapolation for the university as an institution?

It is by no means certain that existing government policy is being developed based on anything other than untested assumptions about what knowledge exchange is and should be: with a better understanding of what those engaged in research sharing understand knowledge exchange to be, policies and infrastructure can be developed that are grounded in reality. Furthermore, it should be possible to explore alternative rationales for knowledge exchange, and hence approaches to the role of the university, in a way that challenges a reliance on economic value as a measure of 'success', that recognises the multiplicity of academic motivations for, and benefits of, sharing research, and that allows the whole of society to capitalise on this.

To provide a structure for answering the research question, a series of theory questions was developed. This provided a framework for the exploration of different aspects of the research purpose. Each question is designed with a logical progression from question one through to question five in mind, such that together the responses to each question should build to answer the central research question. The five theory questions are set out below, and are subsequently explained in greater detail so as to demonstrate their relevance to the research purpose. The methodological underpinnings of this approach, beginning with a research purpose and thence developing a series of theory questions, are explained in Chapter 4.

3.2 Theory questions

The following five theory questions were identified as targeting the principal issues in respect of the research purpose, understanding of which is necessary for the central research question to be answered:

Theory Question 1: What is current knowledge exchange policy at national government, devolved government, and university levels?

Theory Question 2: What are the (different) priorities for knowledge exchange in the UK, and are tensions apparent between them?

Theory Question 3: What forms of knowledge exchange are taking place in practice?

Theory Question 4: Is knowledge exchange policy addressing the needs of academics and society, as expressed by academics and their collaborative partners?

Theory Question 5: How do the different discourses on knowledge exchange impact upon our understanding of what a university is and does?

Theory Question 1 seeks to clarify what current political and university strategic thinking is in respect of knowledge exchange, its nature and scope, and what policies are in place to support these views. This will also give an insight into how knowledge exchange is expected to develop. Above all, the question will begin to probe what

policy makers think knowledge exchange *is*. In answering this question, evidence from both policy documents and interviews with key figures in the government and university policy-making communities can be drawn upon.

Question 2 is an extension of Question 1 and also relates to what might still be termed 'policy', albeit in a broader sense: as well as those of policy makers, the viewpoints of academics, the practitioners of knowledge exchange, will also be of import. This is significant because understanding how both policy makers and practitioners view the purpose of knowledge exchange is a critical first step in understanding the strengths and weaknesses of current policy, as required by Theory Question 4. The focus of Question 2 is on what respondents believe knowledge sharing to be *for*; this is therefore an exploration of knowledge exchange in relation to the ways in which it is valued by different individual respondents and respondent groups. From responses to this question, a picture should begin to emerge of the degree of consensus – or otherwise – between regions and organisations as well as within organisations. Where lack of consensus is a source of tension, it is anticipated that this will be drawn out through the interviews. Interview responses will be a crucial source of answers, but comparison of individuals' responses with the official line taken in policy documents will provide insight into the extent of intra-organisational consensus.

With Theory Question 3, the focus of attention shifts entirely to the *practice* of knowledge sharing. This allows the nature of knowledge exchange activity, and the relationship between theory and practice, to be examined with reference to concrete examples. Whilst it is acknowledged that teaching is one form of transferring knowledge between individuals, the subject of this investigation is limited to the

sharing of research outputs. A distinction can be drawn between the education/training debate, about the purpose of teaching in universities, and the debate about the value of academic research. 'Knowledge transfer' as an activity is more often used in the literature to refer to research sharing, in recognition that a mechanism for accessing valuable research results is desirable, and it is therefore with reference to research activity that the research purpose detailed above has been formulated. An explanation of the methods employed to select the academic respondents is provided in Chapter 4. The projects in which they were involved are not intended to be representative of knowledge exchange practices nationwide or at an institutional level, but rather will be illustrative of the fact that a wide range of research sharing activity is undertaken in the study institutions, whether formally identified as 'knowledge transfer' or not. Through interviews with academics and their collaborative partners, information will be gleaned on the motivations for, processes involved in and outcomes of knowledge exchange. In addition to illustrating the range of knowledge sharing activity, which in itself is an important prelude to assessing whether current definitions of knowledge exchange in the academic and policy literature are appropriate, examination of different forms of interaction permits an appraisal of policy that is grounded in its relevance to practice.

Theory Question 4 is intended to produce a synthesis of the results obtained from questions 1 to 3. Firstly, it questions how government and university knowledge exchange policy (Theory Question 1) relate to different individuals' and groups' priorities for knowledge sharing activity (Theory Question 2). This includes, for example, understanding whether policy favours certain groups' priorities over others. Secondly, it moves from this theoretical level to the practical, by exploring the

relationship between policy (Theory Question 1) and practice (Theory Question 3). The key issue here is whether practitioners are aware of knowledge exchange policy, governmental or institutional, impacting on their knowledge sharing activities and, if so, whether this impact is broadly productive or counterproductive for their activities. In answering Question 4, it will be possible also to address the twin hypotheses, stated above, that policy tends to favour economic valuation of knowledge, and that this fails to reflect the full scope of academics' research sharing practices.

Together, the four questions explained above combine to explore the nature of knowledge exchange policy and practice as it relates to the study institutions and to academics within them. From this, inferences can be drawn about the current climate for knowledge exchange in the United Kingdom. Drawing on the principle of induction, Theory Question 5 begins to examine some of the potential conclusions that can be drawn about the future direction of academia in Britain, as it relates to knowledge exchange activity. It also provides a platform for consideration, in the light of the evidence presented, of what rationale for knowledge exchange is most appropriate; once a conclusion has been reached regarding what world view best represents the way in which knowledge exchange is practised, suggestions can be made regarding future policy making. Chapter 4 sets out the research methods employed in pursuit of answers to these five theory questions.

Chapter 4: Methods

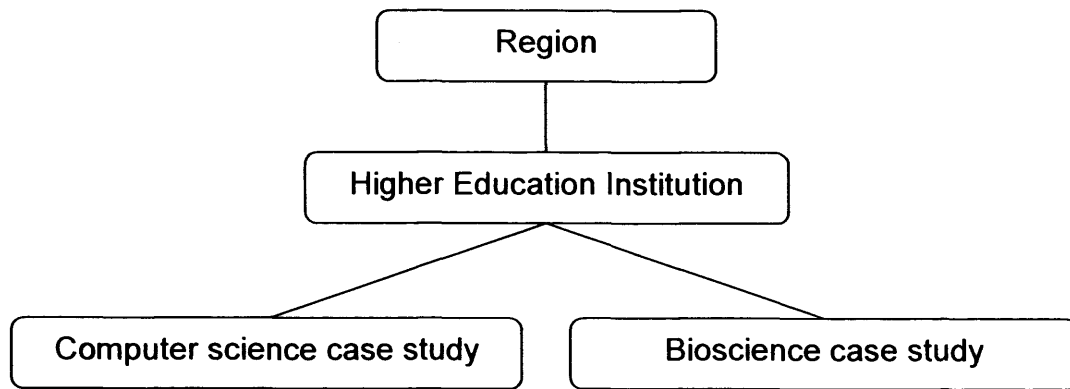
4.1 Research focus

An initial proposal for the research was submitted to the ESRC as part of the application for CASE funding. Entitled 'Universities, Business and Knowledge Exchange: exploring the Lambert agenda in post-devolution Britain', the proposed thesis was set against a background of growing interest in the promotion of innovation at the regional level in the United Kingdom. HM Treasury's 'Lambert Review of Business-University Collaboration' emphasised a need to increase business demand for university research in order to develop the knowledge economy in the UK. However, it failed to address the complexities of the governance system within which universities' third stream activities operate and, as a consequence, did not adequately problematise the processes involved in university-industry interactions.

The proposed research sought to rectify this by examining the distinctive regional policy environments emerging in the UK, and ascertaining their impact on the ability of universities and businesses to engage effectively in knowledge exchange activity. To this end, it was anticipated that three case study regions would be examined. These were identified as Scotland and Wales, of interest because of the changing governance structures emerging in the wake of devolution, and the East of England, chosen both as an English region and because, in the University of Cambridge, it contains a university recognised globally as being a success in the field of knowledge exchange. Studying each of these three regions was intended to increase understanding of the role played by governance structures in facilitating or otherwise hindering knowledge exchange activity, a role hitherto underplayed in the knowledge transfer literature. In

addition, it was hoped that, by examining a region relatively more advanced in business use of university research, lessons could be drawn in relation to good practice.

To complement the regional perspective it was deemed important also to explore micro-level case studies within each region, in order that the actual impact of the regional governance structures on higher education within the region could be assessed. The three institutions chosen for this purpose were Cardiff University in Wales, the University of Cambridge in Eastern England, and Heriot-Watt University in Scotland. These were chosen as leading research universities that were perceived to be playing a vanguard role in knowledge exchange in their nation and region. Each also has a proven track record in research in the biological and computer sciences, as demonstrated by the Research Assessment Exercise. Previous research (Upton 2004) explored the viability of university-industry knowledge exchange practices at the University of Cambridge in the fields of biological and computer science, each of which has been identified as being central to knowledge transfer strategies (HM Treasury 2003). This research found that the approaches in the two fields varied considerably due to differences in the nature of the finished 'product' of research. As a consequence, the continued distinction in the current research method between the fields was deemed relevant. A diagrammatic representation of the resulting research scales appears thus:



The intention, therefore, was to examine the policies and practices associated with knowledge exchange at the regional level, through research conducted at the level of the region, the higher education institution and the university department. Four key research questions were identified:

- **Governance structures and research supply.** What policies exist to facilitate knowledge exchange in each of the three regions – Wales, Scotland and Eastern England – and to what extent are these policies diverging?
- **Research demand.** How do businesses articulate demand for research? Is this undertaken individually, or collectively via their business associations?
- **Assessing the consequences of supply and demand relations at the regional level.** How do the above policies on knowledge exchange interact within a region, and what are the consequences for the supply and demand of research?
- **Assessing the practical consequences of the above at the institutional level.** How are individual flagship universities responding to the Lambert agenda?

However, following an initial reading of the literature addressing knowledge transfer, it became apparent that serious questions relating to the focus of the knowledge transfer debate could be raised. As already discussed, the three principal rationales for

knowledge exchange employed in the literature are associated with the benefits accruing to higher education institutions, and by extension to the regions and nation in which they are located, from interactions with, most commonly, industry. Such benefits are most often discussed in economic terms. This equation of the value of knowledge with economic value does not receive sufficient attention within the knowledge transfer literature, which is largely content to debate means of improving the success of knowledge sharing activities according to the existing economic rationale. Critiques of the commercialisation of higher education do exist but, although some of these locate themselves specifically within the knowledge transfer debate – as opposed to within a broader literature concerned with the future direction of higher education as a whole – they do not seem to address how a different approach to knowledge transfer could overcome the problems they identify.

Yet there do exist texts that appear to offer a challenge to the existing focus on the economic value of knowledge exchange. As has already been noted, Ozga and Jones' (2006) paper on the role of 'embedded', or localised, policy in lessening the damaging effects of globalised 'travelling' policies touches on the idea of alternatives to a wholly commercialising framework for knowledge exchange. Other texts, such as Sen's (2001) 'Development as Freedom', Schumacher's (1993) 'Small is Beautiful' and M'Gonigle and Starke's (2006) 'Planet U', explore the nature of value, and theorise different ways of applying values in defining the way in which society operates. Recognising the validity of the arguments employed in these texts has led to a rejection of the research focus initially proposed. Following the original research proposal would result in research that perpetuates the proposition that economic value is the most appropriate value to assign to knowledge in the research sharing process. It

is by no means clear that this is the case. A new direction for the research has therefore emerged, as set out in Chapter 3, which explores knowledge exchange policy and practice in relation to the ways in which research is valued by different actors.

4.2 Formulating a research structure

The research focus having shifted substantially from the original proposal, it was apparent that a new set of research questions, appropriate to the new focus, would need to be designed. In doing this, Wengraf's (2001) schedule for research design was broadly followed. Wengraf's method is aimed at research that will be predominantly interview-based, and takes the researcher through a series of steps that lead from the identification of a research purpose through to the design and execution of specific interview schedules. Since the intention from the outset of the research project had been to conduct a series of face-to-face interviews, this approach appeared particularly relevant. It also has a broader appeal in that it ensures that a framework for the research is established from the outset, which provides a reference point that can help to keep the research focused on the stated aims.

Before the nature of the research structure is explained, and to contribute to a fuller understanding of that structure, the question of epistemologies deserves some attention. Epistemologies, or 'theor[ies] of what constitutes valid knowledge' (Johnston et al. 2000: 226), underlie all claims to truth made in relation to the production and interpretation of knowledge. It is therefore necessary to make one's own views explicit if others are to judge the validity of research practices and conclusions. During the twentieth century, discussion of epistemological viewpoints

gave rise to a host of perspectives and associated terminology (as set out in, for example, Delanty (2005)). Many of these emerged in response to critiques of positivism, which contends that it is possible, through application of 'scientific' methods, to reveal objective and value-free facts about the nature of the world (Robson 2002). That positivism has been undermined both from within the natural sciences, its point of origin, and from the social sciences (Delanty 2005) adds to the force of this critique.

However, whilst it is relatively straightforward to marshal arguments *against* a positivist approach – as it is to do so against its polar opposite of relativism, which '[i]n its extreme form ... maintains that there is no external reality independent of human consciousness' (Robson 2002: 22) – it is less clear whether committing oneself to any single alternative epistemological framework, or 'label', is helpful. It is too easy to use such labels as a shorthand for a particular world view, whilst neither exploring their full implications nor, in practice, ultimately adhering strictly to their tenets. A more honest approach would seem to be to address epistemological questions as they arise in the context of the research, rather than to name a single epistemological framework at the outset.

This is not to sidestep the often problematic nature of the production and interpretation of knowledge. On the contrary, it is to ensure that questions of an epistemological nature are related to the practical situations on which they have a bearing. Hence, for example, reference below to the Observer's Paradox clearly sets out a methodological problem arising from a specific epistemological viewpoint, namely that what constitutes 'truth' can be context dependent. Although owing a debt

to the post-structuralist critiques of positivism, this is not meant in the often destabilising, Foucauldian sense that nothing can ever be truly known, that:

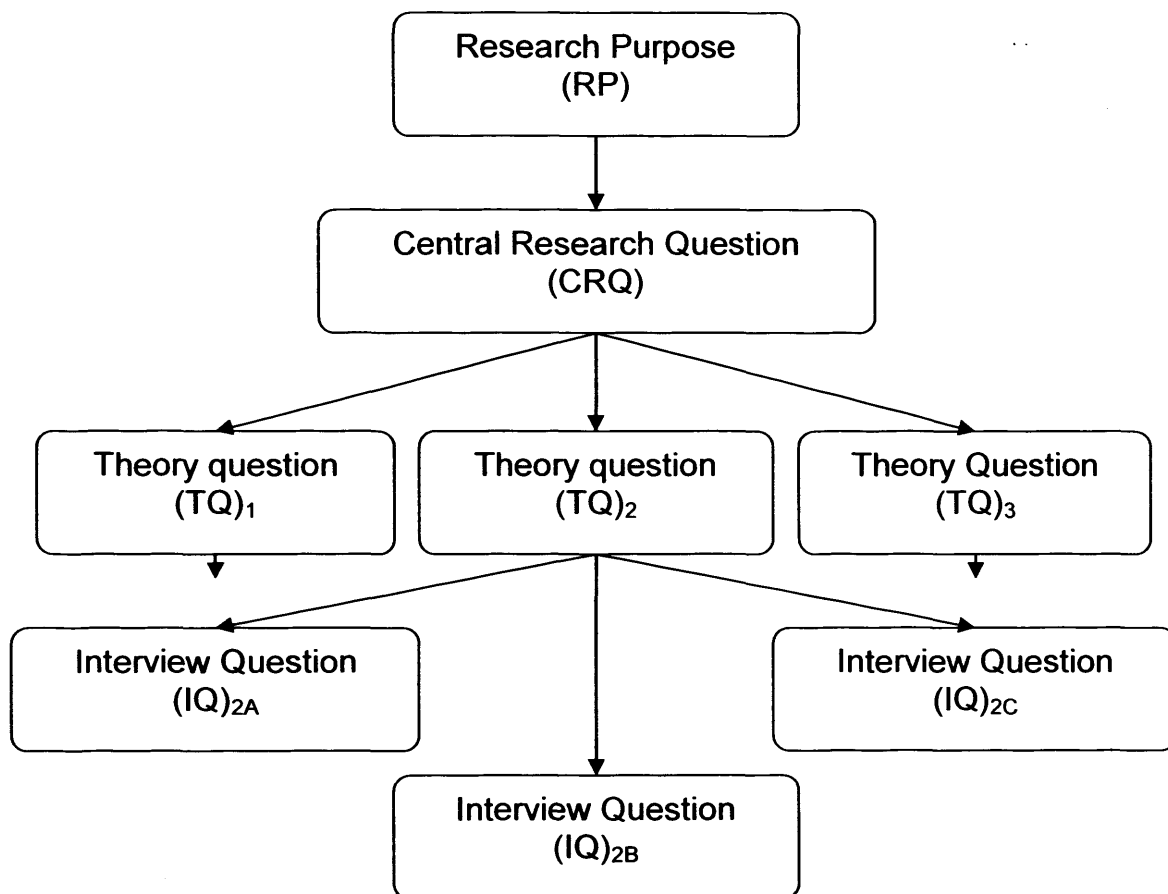
[t]here can be no question of the over-all truth or falsity of a classification or of a discourse – the relationship between words and things is always partial... (Philp 1990: 70)

Rather, it is meant in the sense that a 'reality' can be said to exist, but that truths can be both masked and shaped by human actions, interactions and language use; a distinction is therefore made between an underlying, immutable reality, and the veneer of constructed social norms that affect our understanding of it. This latter understanding of the nature of truth pervades the remainder of this research. The philosophical aspects of such a viewpoint are manifold and complex and, having been discussed in depth elsewhere (see, for example, Sayer's (2000a) discussion of 'critical realism'), will not be treated here. However, every effort will be made throughout the research to consider the viewpoint's practical implications. These relate firstly to the research method: thus, for example, to return to the Observer's Paradox, methods are suggested for the mitigation of its effects. Secondly, the analytical chapters will similarly attempt to be alive to instances in which attitudes and practices that are socially produced risk being naturalised and so taken as immutable.

Wengraf (2001) proposes that in designing research it is useful firstly to define the purpose of the research, before formulating a central research question or questions. To achieve the research purpose, the central research question can be broken into a series of more targeted questions, which Wengraf terms theory questions and of which he suggests there will be between approximately three and seven (see Figure 4.1). For the purposes of interviewing, Wengraf is clear that there should be a distinction

between the theory questions and the interview questions. This is because, whilst the theory questions are likely to be couched in the theoretical language used by the research community, interview questions should be worded in a way that is most suitable for the interviewee.

Figure 4.1 Structure for research design



Source: After Wengraf (2001: 63)

The design of interview schedules prior to interviewing can also prove beneficial to the research outcomes in other ways. As well as helping to set respondents at their ease by giving consideration to the language they will understand and wish to use, schedules also serve to direct the interview, thus making good use of the available time and ensuring that the necessary topics are covered. The interviewer can also at

this stage translate any closed questions into open questions, wherever possible and relevant, to avoid receiving only 'yes' or 'no' answers. Finally, and perhaps most importantly for the outcomes of the research, prior consideration of the questions to be asked can increase the reliability of the data obtained. By pre-planning not only the questions to be asked but also the manner in which they are put, the interviewer should be able to mitigate some of the effects of what Labov (1972) terms the Observer's Paradox. Writing about the study of sociolinguistics, Labov says:

We are then left with the Observer's Paradox: the aim of linguistic research in the community must be to find out how people talk when they are not being systematically observed; yet we can only obtain these data by systematic observation. (1972: 209)

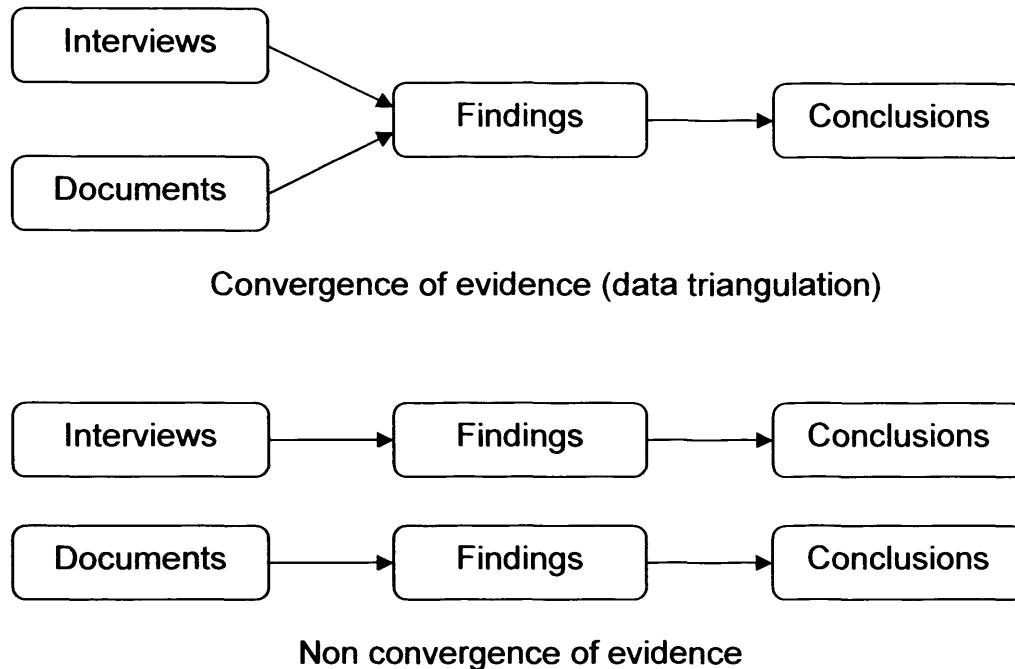
The mere presence of the interviewer can be responsible for altering the way in which an interviewee responds but, as Labov continues:

The problem is of course not insoluble: we must either find ways of supplementing the formal interviews with other data, or change the structure of the interview situation by one means or another. (1972: 209)

In fact, both techniques for dealing with the Observer's Paradox can work well in tandem to create a more robust data set. Yin (2003), in dealing with the design of research involving case studies, addresses the importance of data triangulation techniques as a means of developing 'converging lines of inquiry'; by using multiple sources of information, Yin argues, conclusions are likely to be 'much more convincing and robust' (2003: 98). Part of the benefit of such an approach is that it allows the findings derived from interviews to be interrogated by findings from other sources. Where discrepancies in the findings exist, the possibility that the Observer's Paradox has affected an interview response can be explored. For this to constitute true triangulation, it is essential that each data source addresses the same research

question, rather than independently addressing multiple questions, as shown in Figure 4.2.

Figure 4.2: Data triangulation



Source: After Yin (2003: 100)

Throughout the interview process, reports and other publications produced by the respondents' organisations, or otherwise recommended by respondents, were collected. Additional documentary evidence was obtained from online sources. The data comprised such publications as government white papers, remit letters, university magazines, press releases, and promotional material for specific projects and initiatives. Together, these sources represented a body of evidence that could be used to support or challenge assertions made during the interviews.

The second method described by Labov by which to overcome problems associated with the Observer's Paradox is to 'change the structure of the interview situation by

one means or another' (1972: 209). Labov's aim is to 'break through the constraints of the interview situation', thereby revealing more naturalistic responses. Sadly, his principal example of how such a break might be achieved – by employing the 'Danger of Death' question, asking whether the respondent has ever been in serious danger of being killed, with the intention that in generating a strong emotional response it will prompt a reply in the respondent's natural vernacular rather than in a more formal style – provides relatively little direction for those outside his field who wish to improve their interview structure.

A similar concern is raised by Wengraf (2001), however, who discusses how leading and biased questions are liable to contaminate the responses received. Wengraf's chief unease is that, if an element of bias is present in the way that a question is asked, a vulnerable respondent will often give the response that they believe the interviewer wants to hear. Conversely, a respondent might deliberately respond in a way counter to what the interviewer appears to want. In both cases the resultant data will be equally contaminated. To this it should be added that data from interviews with people in positions of power – and not just the vulnerable – can also be damaged by leading or biased questions. Where the issues being addressed are of a political nature, for instance, it is particularly important to avoid biased questions. By remaining neutral and non-judgemental, an interviewer is more likely to be able to probe the respondent's actual attitudes to a given issue, rather than solely prompting a partisan repetition of a particular party line. The process by which interview questions were designed to achieve this, whilst also addressing the theory questions, will be addressed in greater detail later in this chapter, but it is first necessary to examine the impact of the research questions' reformulation on the research focus.

4.3 Selection of study institutions

It was apparent that what had been an appropriate approach for the initial research proposal would be a poor fit with the new research, in respect of both the institutions to be studied and the individual study projects within each institution. In the first instance, following the reformulation of the research the University of Edinburgh was substituted for Heriot-Watt. This meant that the three case study universities were all Russell Group institutions; because of the similarity of missions across the Russell Group, notably in respect of the centrality of the research mission, an element of comparability could be expected that would not necessarily be the case for a more diverse set of institutions (as suggested by, for example, Goddard et al.'s (1994) data on the varying importance to 'old' and 'new' universities of links with the local community). Given that a variety of variables would be present in the research, it seemed appropriate to remove from the equation any that were not strictly necessary.

Whilst there was no obvious reason to reject the inclusion of Cardiff University, the case for keeping the University of Cambridge as part of the study appeared less clear. It was initially chosen for its past successes in knowledge exchange activity – as witnessed by the growth of Silicon Fen – and, because the impact of devolution on regional knowledge exchange policy was of central concern, to provide an English regional comparator for the Scottish and Welsh cases. With the shift in focus away from the specifically techno-scientific aspects of knowledge exchange, and to a *certain* extent also from the regional perspective, it became far from clear what could be added to the study by the inclusion of the University of Cambridge; therefore, it was decided to eliminate Cambridge from the research and to focus in greater depth on Cardiff and Edinburgh. Although this left the English case unstudied, the British

perspective would still be covered by including national Government as one of the institutions to be researched. Moreover, it was felt that inclusion of the University of Cambridge without a strong positive justification would do little more than provide a spurious sense of symmetry, and could thus undermine the research objectives.

The two centre structure for the research subsequently altered as a result of findings obtained during the pilot study, conducted in December 2006 at the University of Leeds. The pilot is described in greater detail below (see Section 4.6) in relation to its execution and impact on the interview design. Whilst the opportunity to test the interview schedules proved useful, the most significant effect of the pilot was that it led to the inclusion of the University in the main study. Two respondents were interviewed during the pilot, one a member of the University's Enterprise and Innovation Office, the other an academic engaged in interactions with external parties through her work in the Centre for Innovation in Health Management. From the enthusiasm expressed by both, and from the responses they gave, it was apparent that the University was attempting to develop its third mission in an exciting new direction. This direction included a move away from a techno-scientific focus, making knowledge exchange policy relevant to all of the institution's academics regardless of their field, and an attempt to alter the metrics used to measure knowledge exchange, so that a broader range of activities could be captured. This new direction chimed quite obviously with this study's focus on the ways in which knowledge exchange and its benefits are defined, and the valuation of knowledge inherent in that process. With such exciting developments in progress at Leeds, it was quite impossible not to investigate further, and so the University was included in the main study.

4.4 Selection of study projects

A central part of the research was an examination of not only the policies surrounding knowledge exchange, but also the ways in which it is practised. It was therefore necessary to interview academics engaged in knowledge exchange. To provide a framework for the selection of academic respondents, it was decided to interview academics involved in a limited number of knowledge exchange projects. Mirroring the original research design, two projects per institution were selected. The benefits of using these study projects as a selection framework were fourfold. Firstly, the approach avoids what Wengraf terms the 'haphazard selection of informants' (2001: 96) and ensures that consideration is given to who is interviewed and why. Secondly, it served to ensure that approximately equal numbers of academics engaged in science and social science knowledge exchange were interviewed and, thirdly, it provided a means to ensure that a range of knowledge exchange mechanisms was explored. The importance of this variety to the research is discussed in greater detail below. Finally, the study projects provided part of the context for discussions with the respondents, and allowed a degree of comparison to take place between those respondents engaged on the same project.

The type of knowledge exchange project to be explored within each institution had come into question as a result of the changes made to the research focus. The initial decision was to take one example of knowledge exchange activity from computer science and one from bioscience research at each university. These subjects were chosen firstly because they are widely used in the knowledge transfer literature as exemplar disciplines; new studies in these fields could therefore be expected to add to an already established line of enquiry. Secondly, as has already been discussed,

previous research (Upton 2004) suggests that interesting differences exist in the approach to knowledge exchange in the two fields, which are worthy of further investigation. Since the change in the research purpose came about as a result of concern over the dominance of a techno-scientific focus and primarily economic rationale for knowledge exchange, to continue a study based solely on activity operating largely within that discourse would have failed to provide insight into the full breadth of interactions between academics and external parties.

Nevertheless, to remain relevant to the existing debate on knowledge exchange, it was felt that making some use of the current direction of the debate would be helpful. With this in mind, and to ensure a degree of comparability between what could potentially be highly disparate examples, it was determined that cases would be chosen that encompassed research in the broad sphere of health and well-being. Two examples were chosen from each university, one with a scientific and one with a more social scientific perspective. The choice of two cases per university was made for largely pragmatic reasons: the examples were not intended to be *representative*, either of the department in which they originated or of the university's overall approach to knowledge exchange; rather, it was envisaged that they would *illustrate* how the regional and institutional perspectives on knowledge exchange affect activity in practice, in disciplines producing very different kinds of knowledge. In terms of Yin's (2003) description of the possible applications for case study research, the cases can be seen as partly illustrative of the types of knowledge exchange taking place in the UK at present (see also Theory Question 3), and partly exploratory, seeking to highlight the impact of government and university knowledge exchange policies on actual practice, as sought by Theory Question 4. An additional benefit of choosing

health and well-being as the framework for investigation, is that it represents one of the Government's principal foci for universities' third stream activity (Department for Education and Skills [DfES] 2003; HM Treasury, DTI and DfES 2004).

The sheer scale of third stream activity within the three institutions under investigation, and even in those disciplines with researchers working on topics within the sphere of health and well-being, potentially made choosing the study projects problematic. Nevertheless, given the nature of the research purpose, this problem was not as great as it might at first appear. Firstly, the cases were in no way intended to be representative of a particular discipline or institution, but were instead viewed as an opportunity to illustrate the experiences of academics operating 'in the field' and provide a counterbalance to the largely theoretical world of policy. The multiple concerns that these cases were expected to illuminate would then be analysed to provide a single synthesis of the key issues facing knowledge exchange practitioners. Secondly, it was most important that those participating in the research were excited about the third stream element of their work. The stated research purpose being to investigate possible future directions for knowledge exchange, there could be no better place to look for respondents than in the vanguard of research sharing activity. The academics most passionate about knowledge exchange activity could be expected to be those with an eye for the possibilities open to such work. Whilst the first of these factors opened out the choice of study projects to any and all projects occurring within health and well-being studies, there being no constraints due to the need for a representative case, the second factor narrowed the search to academics positively pursuing third stream activity and keen to share their experiences. Consequently, the

study projects were to a large extent self-selecting. The method by which each of the projects was identified is described in greater detail below.

The scientific cases were selected following consultation with Cardiff University's Research and Commercial Division, Edinburgh Research and Innovation, and the Enterprise and Innovation Office at the University of Leeds. Although the cases were not intended to be representative of knowledge exchange formats and practices at each University in an absolute sense, approaching the Universities' knowledge transfer officers gave them the opportunity to present examples that they considered to represent good practice in knowledge exchange at the University. In writing to the knowledge transfer officers for their advice, as little direction as possible was given as to the type of project required, beyond the restriction that it needed to encompass healthcare research in scientific disciplines. Indeed, each officer was positively encouraged to put forward as broad a range of potential study projects as possible. As a result, in each case a number of examples were suggested, encompassing a range of different means of knowledge exchange that included company spinout formation, licensing, consultancy, and work with both multinational corporations and locally based small and medium enterprises (SMEs).

From these suggestions, one potential case was chosen from each University. One important purpose of the study projects was to investigate the range of rationales for and practices involved in knowledge exchange, and so choosing a variety of approaches to it appeared apposite. It was decided to explore one instance of spinout creation, one example of collaborative research with a locally based SME, and one research network involving academia, the NHS and a multinational company. In

Cardiff, the chosen case was a spinout company called MedaPhor, which specialises in ultrasound training using a novel computer package and draws on academic expertise from the fields of healthcare and computer science. The Edinburgh case was a collaboration between academics in the Edinburgh Parallel Computing Centre (EPCC) and a Glasgow SME specialising in 3D facial mapping, a process of potential benefit in facial reconstructive surgery. For the Leeds case, an ongoing relationship between the University's Yorkshire Centre for Health Informatics (YCHI), the NHS Health Informatics Service, and the multinational computer company Intel was examined. This final case was not of a discrete project, but rather gives an insight into the process-based nature of YCHI's research and collaborative activity.

The non-scientific, social cases were, by their nature and that of much current thinking on knowledge exchange, harder to locate. Often conducted without the need for contracts, legal advice, or intellectual property protection, and frequently generating hard-to-measure outputs, such activity can easily exist below knowledge transfer offices' radars. At the Universities of Edinburgh and Cardiff, existing contacts with academics in Arts or Social Science faculties were approached for suggestions as to possible contacts for study projects. At the University of Edinburgh, this resulted in an email being forwarded to an academic in the School of Social and Political Studies, who subsequently made contact by telephone to express his interest in being involved as a respondent. At Cardiff University, having made email contact with a suggested respondent in the School of English, Communications and Philosophy, a meeting was held at which it was agreed that a more formal interview would be conducted at a later date. The University of Leeds project was chosen as a result of contact made with the principal respondent, from the Centre for Health Enterprise, at the University's

Enterprise and Innovation Day in May 2007. Just as the scientific cases covered a range of types of knowledge exchange, so the non-scientific projects involved research targeting different groups. The Leeds case was a project aimed at familiarising members of the public with the University's research in the field of healthcare; at Edinburgh academics were engaging directly with the policy community; and in Cardiff the chosen project involved contact between the academic, health practitioner and deaf communities.

The particular cases were chosen using two criteria: there needed to be sufficient information available at the outset about the nature of the knowledge exchange for a decision to be made about its suitability as a study project, and the academics engaged in the knowledge exchange needed to be clearly enthusiastic about participating in the research and sharing their experiences. Contact was lost with several potential respondents before interviews could be arranged; alternative respondents were used in these cases. Not only were those involved with the investigated projects enthusiastic about their work, but it was also crucial that the cases chosen were of interest to the researcher. Assessing the 'want-to-do-ability' of research (Rossman and Rallis 2003: 114) is a valid technique for choosing specific research topics. As Rossman and Rallis put it, '[y]ou need to have a sustaining interest in the topic. Period.' (2003: 116). The authors argue that this is central in ensuring that the researcher remains inspired, but the *ultimate* benefit of this approach should be that the researcher will be better able to generate findings that can inspire a wider audience.

4.5 Interview schedule design

As previously described, the research design method advocated by Wengraf (2001) suggests that, prior to interviews being undertaken, it is beneficial to draw up a schedule of the interview questions to be posed. This helps to ensure that the questions asked address the theory questions, whilst remaining distinct from them. It also allows the interviewer to consider the impact of questions – and the particular form used in asking them – prior to the interview, in a non-pressured environment. Based on the theory questions, it was identified that for the purposes of this research there was a need for four interview schedules. Whilst there was an obvious need to ensure overlap between the questions asked to different respondents, in order that comparisons could be made between their attitudes and approaches to knowledge exchange, it was clear that certain questions would be more relevant to particular groups of respondent than to others.

To answer Theory Question 1, "what is current knowledge exchange policy at national government, devolved government, and university levels?", questions would need to be asked of government officials as well as of those in charge of the strategic operation of the university. In addition to these two groups, academics engaged in different forms of knowledge exchange activity could help to answer the second theory question, about the current priorities for knowledge exchange in the UK. The third theory question, aimed at discovering the forms of knowledge exchange taking place in practice, was expected to be answered predominantly by academics engaged in such activity, with some input from university administrative officials. Theory Question 4, "is knowledge exchange policy addressing the needs of academics and society?", was relevant to all potential respondents. Finally, Theory Question 5 did

not require additional direct input from respondents, since its answer lay in the synthesis of data generated by the preceding four questions. Given this assessment of who would need to be targeted to answer the theory questions, three respondent groups – government officials, university administrators, and academics – were initially identified. A fourth interview schedule was also drawn up for non-academic partners, for those study projects which involved partnership between academics and external parties.

The first stage in the design of the schedules (each of which is reproduced in Appendix 2) was to brainstorm all potentially relevant questions. The questions were written in as neutral a manner as possible, so as to avoid suggestion of a preferred response; as Wengraf (2001) notes, this can lead respondents to tailor their responses either to what they think you wish to hear or to what they suspect you do not, hence contaminating the data. Certainly there is a place for questions that challenge a respondent's viewpoint, but these would seem to be better employed as tools in specific circumstances, as a response to particular comments. If used prior to a respondent's views being expressed, they become biased and leading rather than responsive. It was therefore determined that any such interventions would be decided upon during interviews, as and when appropriate.

The second step in the schedule design was to assess which theory question was addressed by each of the interview questions, and to assemble the interview questions into theory-question order. This made it easier to judge where gaps existed in the interview schedule that needed to be filled by additional questions. At this point each schedule was also tightened up through the removal of tangential questions that did

not directly address the theory questions. It was anticipated that there would be sufficient flexibility of approach in the interviews to allow for a certain amount of digression – by the interviewer or respondent – if this proved interesting or important to the overall picture being drawn. However, the schedule itself needed to remain concise for two reasons. Firstly, it served to focus attention on the most critical questions, which would need to be asked of each respondent to allow comparisons during the data analysis stage. Secondly, it ensured that the interview could be kept to a length appropriate to the limited time that some respondents were expected to be able to give; for those willing to spare more time for the interview, questions could be explored in greater depth, but the essential issues could be covered more quickly if necessary. Each schedule was consequently limited to one side of typed A4 paper, which amounted to between ten and thirteen principal questions per schedule. Additional questions and prompts were appended to these questions where relevant.

Although arranging the interview questions in theory-question order was helpful in determining whether they were sufficiently comprehensive, this order was not necessarily the most appropriate for use in interview. Questions that referred to separate theory questions but which might logically be linked together in the course of a conversation were placed together, creating a schedule that encouraged a less stilted conversational flow. In practice, the question order was not always rigidly followed, sometimes as a result of an interviewee answering multiple questions simultaneously and at other times because a particular response prompted a follow-up question to be asked out of sequence. Nonetheless, even in these instances the schedule order was largely adhered to, and proved useful in helping to keep the interview on track.

Once a comprehensive set of questions had been designed, the advice of senior colleagues was sought regarding their appropriateness. In the light of this, modifications were made to remove references to 'knowledge transfer' or 'knowledge exchange' in the questions; the terms had initially been included as a shorthand for all forms of knowledge sharing activity, but it was agreed that its often narrow meaning in general usage could result in respondents being led to give limited responses. The benefit of opening interviews not with a structured question, but by asking respondents to explain a little about their background and current role, was also discussed. This strategy was subsequently employed in many of the interviews, both because in allowing the respondent to talk about him- or herself at the outset it encouraged a more relaxed atmosphere, and because in many cases it allowed the respondent's own ideas about what constitutes 'knowledge exchange' to be introduced with minimal prompting.

4.6 Pilot study

As Yin (2003: 79) explains, pilot studies 'help you to refine your data collection plans with respect to both the content of the data and the procedures to be followed', and so, with the interview schedules prepared, pilot interviews were arranged. The University of Leeds was chosen as the location of the pilot study for two reasons. Firstly, as a Russell Group institution, it was sufficiently similar in its mission to the Universities of Cardiff and Edinburgh that the interview questions would be relevant to the chosen respondents. Secondly, and most importantly, access to respondents was good due to pre-existing contacts at the University. Interviews were accordingly arranged with two people, one an academic engaged in knowledge sharing activities and the other a Programme Manager in the University's Enterprise and Innovation Office. The first

interview took place in a public area of the University's Business School and lasted one hour, and the second interview, conducted in a meeting room at the Enterprise and Innovation Office, lasted for forty-five minutes. Both interviews were recorded and later transcribed.

In Yin's terms, as regards the 'content of the data' minimal alterations were made to the interview questions. One question, relating to the impact of government policy on institutional approaches to knowledge sharing activities, was added to the schedule targeted at university administrators, whilst another question was deemed irrelevant and removed. In terms of the procedures to be followed, from the interview conducted in the public space of the Business School it was apparent that the recording equipment was highly sensitive to all noise sources, making it difficult to distinguish between the sound of the interview and noises in the surrounding environment. This made transcription more problematic and time-consuming, and attempts were made to ensure that future interviews were not similarly affected. Although two interviews from the main body of the research were by necessity conducted in public places, it was possible to arrange for each of the others to be held in offices or meeting rooms. It has already been explained how the pilot institution came to be included as one of the main foci of the research; it should be noted that, as a result of this, the interview conducted with the Enterprise and Innovation Office's Programme Manager was incorporated into the data collected for the University. This is not methodologically problematic, however, since the approach taken to both the pilot and main studies was consistent, and no significant changes were made to the interview schedule or format following the pilot.

4.7 Selection of respondents

With the pilot study successfully completed, the process of selecting respondents for the main body of the research began. The structure of the research allowed the division of the interviews into two rounds, the first comprising the government and university administrative officials who would give insights into knowledge exchange policies and priorities, and the second consisting of the academics whose work would form the basis of the study projects. In both instances no a priori assumption was made about what would constitute a 'sufficient' number of respondents. Indeed, it was quite deliberately decided that no such number would be decided upon and that, instead, the focus would be on ensuring that the major organisations and key individuals with an interest in the knowledge transfer debate in each of the three regions under investigation were represented.

The respondents needed for the first round of interviews were identified once the organisations to which they belonged had been highlighted as relevant to the study. The importance of gaining responses from representatives of the three universities in the study was, of course, immediately obvious, and direct requests were made to the Vice Chancellors and relevant Pro-Vice Chancellors for interviews. Each university's administrative department with responsibility for knowledge exchange activity was also approached; the specific person with whom an interview was requested was determined after a combination of Internet-based research and telephone or email contact with members of the department. Identifying the respondents relevant to the study projects proved relatively more straightforward. Each project involved knowledge sharing activities that were being carried out by a limited number of academics. Once contact was made with one of these academics, and his or her

interest in being interviewed had been confirmed, additional interview subjects were identified through a snowballing technique initiated by the first respondent.

Owing to the different governmental structures operating in England, Scotland and Wales, the organisations targeted in each region were not always directly comparable, but the common factor was that all were involved in policy making and delivery related to higher education and knowledge exchange. As at the universities, contacts were made following searches of the organisations' websites and through telephone and email conversations. Where potential interviewees were suggested by other members of their organisation, further investigation of their specific roles was undertaken before an interview was requested: a small number were not sufficiently involved in higher education or knowledge exchange to be relevant to the study. Of those approached for interview, not all were interested enough in being involved to reply. Where possible, alternative respondents were found to compensate for these non-responses, but a pragmatic approach was taken and so, provided that a full range of organisations and their constituent departments was already represented in each location, this process was not exhaustive. A full list of respondents is appended.

Apart from two interviews that were arranged by telephone, all of the interviews were set up through email contact. Writing the emails in which contact was initiated, and the purpose of the research and reason for the interview request set out, was no less challenging than was ensuring that the interview schedules were written in a neutral manner. There was an understandable desire amongst potential respondents to understand the nature of the research before committing to being involved, but the responsibility to realise this wish was tempered by a need not to reveal too much

detail, since to do so would be to risk biasing the ensuing interview. The description of the research included in the emails was therefore kept deliberately broad and did not make reference to the nature of the underlying theory questions. The use of phrases including 'knowledge sharing activity' and 'academics' interactions with external parties' allowed the emails' recipients to make their own reading of the scope of the study. This approach appeared to satisfy respondents' requirement to understand the research, whilst also ensuring that interviews began without the interviewer's opinions having been foregrounded. Five of the interviews were conducted by telephone as this was the only way in which contact could be made with the respondents, whose views were regarded as being of sufficient potential import to the research that they could not be omitted. The preferred method of interviewing, however, was through face-to-face meetings and this method was employed to interview forty-five of the fifty respondents.

4.8 Interview transcription

With consent from the respondents, every interview was digitally recorded before being transferred onto a computer for transcription. After the pilot study, a pro forma was created to allow interview responses to be organised under a consistent set of headings related to the theory questions. The pilot interviews were accordingly typed up with the respondents' answers being placed under the most appropriate heading as they were transcribed; responses thus appeared not necessarily in interview order but in a format where ready comparisons could be made between different interviewees' views on particular points.

Although this design was intended to permit greater ease of analysis, it was ultimately judged to be problematic in two ways: firstly, from a practical point of view, choosing which heading represented the best fit for a given answer made the transcription process complicated and time-consuming; secondly, it constituted a form of analysis, as it began the process of re-ordering the data into a different format from the one presented by the respondent. Data analysis does require the manipulation of the data, but proto-analysis at the outset limits the options available to the analyst at later stages. A much better approach is to present the raw data in a format that can later be manipulated. By creating a verbatim transcript of the interviews, the raw data remained more readily accessible than if it had been available only in a recorded format. This fact having been recognised, the main interviews were all transcribed word-for-word. The pilot interview that was incorporated into the main study was also re-transcribed to fit with the new format.

4.9 Data analysis

In the first stage of analysis, printed copies of the transcripts were marked up twice. The first set of markings highlighted key terms of interest in the research, including the various terms employed for 'knowledge exchange' and terms relating to the valuation of knowledge, such as 'economic' or 'social'. In the second phase, an overview of each respondent's viewpoint was sought, and other comments of clear importance to the respondent were noted; this ensured that the analysis was driven by the data, rather than preconceived ideas about what constituted 'important' data limiting the analysis.

From these transcripts, one page summaries of each respondent's views were prepared, to allow greater ease of comparison between respondents. These summaries included page number references to the full transcripts and margin notes indicating the topic being discussed at any given point. Topics ranged from the definition of knowledge exchange, to discussion of government policy and the valuation of knowledge. References to recurring topics were then arranged under those topic headings in a second set of summaries, of which one was produced for each chapter. From these two sets of summaries it was therefore possible to see, firstly, all of a given respondent's views on one page and, secondly, all views relating to a single topic of discussion on one page. Through comparison of individuals' views on different topics, the summaries were then used to develop a structure for each chapter. During the writing phase, they were also used to help navigate the full transcripts.

Throughout this thesis all respondents are anonymised, and are referred to by a unique code. Each respondent is first classed as a Government Respondent, a Funding Council Respondent, a University Respondent or an Academic Respondent, the latter two categories distinguishing between university management and academics. Secondly, respondents are assigned a letter – E, S or W – according to whether the respondent represents an English, Scottish or Welsh institution; the exception to this is that Funding Council respondents are not distinguished thus because, were they to be assigned a letter, the small sample size would allow individuals to be identified. In addition, academic respondents are coded 'Sci' or 'Soc', to distinguish between scientific and social study projects. Finally, respondents within each category are randomly assigned a number to distinguish them from their colleagues. Thus, for example, a Cardiff University respondent might be referred to as University

Respondent W3, and a Scottish Government respondent as Government Respondent S1. With these codes in mind, it is possible to turn to an exploration of the collected data, beginning with the UK, Welsh and Scottish Governments' policies on knowledge exchange.

Section II

Data

Chapter 5: Government knowledge exchange policy

5.1 Higher education and knowledge exchange in post-devolution Britain

Following the establishment of the Scottish Parliament and Welsh Assembly under devolution, responsibility for higher education has largely fallen to the devolved institutions. As this chapter will explore, this has resulted in some divergence in the focus of higher education policy in England, Wales and Scotland. The principal means by which influence is exerted over higher education institutions is through the Funding Councils, each of which operates at arm's length from, but under the direction of, their education department masters; to this end an annual remit letter is delivered to each Funding Council from its respective Minister for Education. An exception to this structure is that responsibility for the Research Councils is not a devolved matter. Thus whilst policy on higher education institutions is devolved, responsibility for research policy, or science policy as it is often known, remains UK-wide.

The creation and delivery of knowledge exchange policy introduces greater complexity to the picture. In part an issue covered in higher education policy, university knowledge exchange also features in each administration's science and innovation strategies. Because of this, initiatives and associated financial support for knowledge exchange have been spawned by departments more closely concerned with science, innovation and economic development than with higher education. Nevertheless, policy delivery associated with the *main* body of funding for this area is largely the onus of the Funding Councils.

The role of the Funding Councils will be explored in Chapter 6. The focus of this chapter is an exploration of the direction – and, in some cases, directions – being taken by UK central Government, by the Welsh Assembly Government and by the Scottish Government in relation to university knowledge exchange. In order to understand fully the Governments' stances, and having first set out the different powers and responsibilities of the three administrations, references to knowledge exchange firstly in higher education policy documents and, secondly, in the wider policy sphere will be discussed. Following this, and to illuminate how policy is being interpreted in practice, the chapter will address the views of senior civil servants in each of the administrations.

5.2 Governance structures and policy responsibilities

In 1997 referenda were held in Scotland and Wales on devolution. With a turnout of 60.4%, Scotland achieved a 'yes' vote of 74.3%; in Wales, from a turnout of just 50% a narrow majority of 50.3% voted in favour of devolution. Accordingly, Parliament passed the Scotland Act and Government of Wales Act in late 1998, with elections to the Scottish Parliament and National Assembly for Wales taking place in May 1999 (Leeke et al. 2003). As reflected in their different titles, the two administrations were established with very different powers.

The Scottish Parliament was granted both primary and secondary legislative powers for all devolved matters. Devolved matters are all those not specifically listed as reserved in the Scotland Act 1998, and include education and economic development. Reserved subjects include trade and industry, together with important issues requiring national control, such as defence, the fiscal, economic and monetary system, energy

policy, immigration and employment. A more comprehensive list of devolved and reserved matters in Scotland is provided by Leeke et al. (2003). In addition to legislative responsibility for devolved topics, the Scottish Parliament was also awarded tax-varying powers of up to three pence in the pound from the UK level. UK Parliament still retains overall sovereignty, and so has the power to make legislation even in devolved areas; in practice this power is not exercised because, under the terms of the Sewell Convention, Westminster can only do so with the agreement of the Scottish Parliament.

In Wales, the Government of Wales Act 1998 provided only for executive devolution. Between its inception and 2006, the Assembly had no power to enact primary legislation, but rather held only secondary legislative capacity, devolved from the relevant Westminster ministers. Unlike in Scotland, all devolved matters were specifically listed in the Act, and totalled seventeen in all. These include education, as well as a variety of areas which potentially touch upon knowledge exchange policy. The 2006 Government of Wales Act formalised a division between the National Assembly for Wales' function as legislature and the Welsh Assembly Government's executive role that had been followed in practice from 1999 onwards. Additionally, the new Act awarded the Assembly limited primary legislative competence, in the form of 'Assembly Measures', for devolved matters. This power remains limited because approval will need to be sought from UK Parliament each time that the Assembly wishes to make Measures relating to a new matter, but is ultimately designed to speed up the implementation of some new areas of legislation in Wales (Welsh Assembly Government 2007).

5.3 Knowledge exchange in higher education policy

With the publication of the Lambert Review of Business-University Collaboration late in 2003, the knowledge exchange agenda found itself firmly in the spotlight as a key part of universities' mission. Sponsored by the Treasury, the Review was always intended to be an examination of the national, regional and local *economic* impacts of university-generated research. Its principal finding was that, although the availability of applicable research in the United Kingdom was good, the demand for and uptake of research by business was poor. Along with suggestions targeting the demand side, aimed at encouraging businesses to commit to more and stronger R&D links with universities, recommendations for the supply side included standardising universities' licensing agreements to help improve clarity over ownership of intellectual property and avoid over-valuation of IP by universities. One of the most significant recommendations from the university perspective was that:

if knowledge transfer is to achieve its full potential in the UK, ... third stream funding should be substantial, permanent and allocated in a way that enables universities to make long-term plans for these activities. (HM Treasury 2003: 46)

The idea of establishing substantial and permanent funding represents a shift in the understanding of knowledge exchange from an add-on activity to a central function, alongside research and teaching, of higher education. The levels of funding now available in England, Wales and Scotland are detailed in Chapter 6 and, whilst the amounts involved mean that knowledge exchange is, in the words of a Scottish Government respondent, 'still the very short of the [academic mission's] three legs', it is clearly becoming increasingly embedded in higher education policy. It is therefore pertinent to ask: what is the nature of the national policies that govern the focus of knowledge exchange funding allocation?

5.3.1. England

In January 2003, the then Department for Education and Skills published its white paper on 'The Future of Higher Education'. In spite of an interchangeable use of 'Britain' and 'England' in the document, this represents the primary policy document for *English* higher education policy. In his foreword to the white paper, the then Secretary of State, Charles Clarke, characterised universities as critical to '[o]ur national ability to master [the] process of [global] change and not be ground down by it' (Department for Education and Skills [DfES] 2003: 2), and accordingly he noted two areas of higher education in need of immediate improvement. The first of these, the expansion of higher education to facilitate access for less advantaged school leavers, remains, along with the skills agenda, a central plank of the Government's agenda for the teaching mission. As such, it will not be dealt with here. The second target of the white paper, however, demonstrated a direct concern with universities' knowledge sharing practices: 'we have to make better progress', declared Clarke, 'in harnessing knowledge to wealth creation' (2003: 2).

In Chapter 2 of the white paper, research is introduced as:

lay[ing] the long-term foundations for innovation, which is central to improved growth, productivity and quality of life. This applies not only to scientific and technical knowledge. Research in the social sciences, and in the arts and humanities can also benefit the economy – for example, in tourism, social and economic trends, design, law, and the performing arts – not to speak of enriching our culture more widely. (DfES 2003: 23)

Interesting here is that the 'wealth creation' element of the academic project demanded by the Secretary of State is – at least to some extent – balanced by reference to a broader role for university-generated knowledge, namely the enrichment of our culture; this view is echoed in a later reference to universities as 'key drivers for their

regions, both economically and in terms of the social and cultural contribution they make to their communities' (2003: 36). The implication is that the research sharing role of universities is of potential benefit in a variety of fields and to a variety of actors.

Yet of the eight 'key points and proposals' for knowledge sharing announced in the white paper, four have a skills focus and a further three deal with interactions between academia and business. Only one key proposal is to support and 'celebrate' the cultural and social contributions made by universities in their role as 'community leaders' (2003: 37). In a chapter entitled 'Higher education and *business* – exchanging and developing knowledge and skills' (2003: 36, emphasis added), a predominantly economic focus might come as little surprise. However, since in the same chapter it is recognised that universities are 'often engaged in community capacity building and regeneration, and make an important contribution to civil society' (2003: 40), an ambiguity surrounding what precisely knowledge exchange is for begins to emerge.

Indeed, matters only become more confused when one considers the paper's discussion of the Higher Education Innovation Fund (HEIF). In establishing HEIF as a permanent third stream of funding for universities, alongside teaching and research funds, the Government claims that it is seeking to broaden its scope, 'reaching out not only to business but also to the regional and local economy, and the wider community' (2003: 38). The paper then refers, in the same paragraph, to a desired expansion of the Regional Development Agencies' role in distributing HEIF, 'to make sure that it is properly focused on regional development priorities' (2003: 38). Again, a stated commitment to a broad, if somewhat ill-defined, vision of social as well as economic

knowledge exchange is countered by concrete proposals that suggest wealth creation to be the principal goal of knowledge exchange.

5.3.2 Wales

Whilst the English higher education strategy refers to a broad economic and social mission for university knowledge exchange activities, the Welsh strategy, 'Reaching Higher' (Welsh Assembly Government 2002a), makes no such claims. In its section on knowledge exploitation, the strategy highlights 'economic and market gain' from commercialisation of cutting edge technology as an imperative, and makes four recommendations for achieving it: firstly, institutions are to develop their commercialisation portfolios, with HEFCW ensuring this is central to each university's strategic plan; links are to be made between research clusters and key Welsh growth sectors; closer links will be sought between industry needs and the academic R&D focus; and finally, HEFCW is charged with supporting institutions to become more confident in doing commercial deals over intellectual property.

The report makes one final, broad recommendation: that a single funding stream be introduced to support knowledge exploitation activities, replacing a previously diverse set of funds. It is here that the greatest potential for knowledge exchange to be more broadly defined, in line with the English and Scottish strategies, lies. Yet although we are told that 'we should not underestimate the importance of research to Welsh public services' (Welsh Assembly Government 2002a: 12), and that the health and social care professions and Assembly Government have much to gain from evidence-based decision making, no recommendations to this effect are made. This might be

considered surprising given that the strategy is introduced with reference to the purposes of higher education laid out in the 1997 Dearing Report:

The four main purposes of higher education are:

- to inspire and enable individuals to develop their capabilities to the highest potential levels throughout life, so that they grow intellectually, are well-equipped for work, can contribute effectively to society and achieve personal fulfilment;
- to increase knowledge and understanding for their own sake and to foster their application to the benefit of the economy and society;
- to serve the needs of an adaptable, sustainable, knowledge-based economy at local, regional and national levels;
- to play a major role in shaping a democratic, civilised, inclusive society. (NCIHE 1997: 72)

Whilst not a detailed exposition of Dearing's vision for higher education, and by inference for the role of knowledge exchange within that, this paragraph encompasses a greater variety of outcomes and beneficiaries of academic research – fulfilled individuals, an adaptable and sustainable economy, and a civilised society – than does the whole of the subsequent section on knowledge exploitation in 'Reaching Higher'. Nevertheless, this strategy alone does not constitute the whole of the Assembly Government's policy for higher education in Wales, and thus it is possible that a broad vision of the roles of university knowledge exchange is developed elsewhere. The most likely source for such a vision would seem to be the 2004 report 'Knowledge Economy Nexus: Role of Higher Education in Wales'. It is clear, however, within the first paragraph of this document, known widely as the Nexus Report, that the Assembly's Higher Education and Economic Development Task and Finish Group was 'commissioned to look at the economic development role of higher education in Wales' (Welsh Assembly Government 2004a: 2).

In spite of this, and as in 'Reaching Higher', consideration *is* given to the non-economic roles of the university sector. In a section on 'cultural influences', universities are recognised as having a cultural role that 'can be defined at its widest as the activities ... which both stimulate and direct the application of knowledge to the sustainable development benefit of our society' (2004a: 29). Among a series of university activities that can help to achieve this are listed promoting the green agenda, the Welsh language and culture, and creating better informed and healthier citizens. The report also noted that relatively little public sector money was then available for universities to draw upon in support of such activity. This reflects the fact that the Higher Education Funding Council's third mission funding stream, at that time known as the Higher Education Economic Development (HEED) Fund, focused 'principally on economic development activities' (HEFCW 2004: 1).

Although Nexus acknowledges the potential for universities to engage with their communities for the 'sustainable development benefit of our society', it is never entirely clear that the Assembly Government's commitment to this activity is as great as to supporting universities' economic development role. Whereas the Funding Council describes economic development as 'an integral *component* of institutions' overall third mission activities', with these activities ideally encompassing 'both the economic and social agendas' (HEFCW 2002: 1, emphasis added), the Assembly Government often refers to cultural contributions within the context of the economic agenda. The cultural development of universities' neighbouring communities is described as having 'economic consequences', and generating sustainable development benefit is 'an important part of any national innovation system' (Welsh Assembly Government 2004a: 29).

Reference, of course, is made to promoting the green agenda, the Welsh language and culture, and a healthy and informed citizenry, and there is no reason to suspect that the report's authors were anything other than sincere in these objectives. Even so, of the seven recommendations made by the Nexus Report for developing the role of the higher education sector in Wales, not one deals with the development of its cultural role. The recommendations instead refer to university commercialisation activity and business links, inter-university research opportunities, and government policy making and monitoring structures. This disconnect between a broad initial definition of the value of research followed by a narrow, predominantly economic, set of recommendations for the furtherance of knowledge sharing activity reflects a similar pattern in the English and Scottish higher education strategies. As will be seen it is a recurring theme, and as such will be explored further throughout this chapter.

5.3.3 Scotland

As in England, in Scotland acknowledgement is made of the economic and social potential of academic research. The introduction to a chapter in the 'Framework for Higher Education in Scotland' covering research and knowledge transfer identifies a key challenge as being 'ensuring research plays an increasing part in Scotland's economic and social well-being, delivering the most gains possible for the Scottish economy and our quality of life' (Scottish Executive 2003: 40). The sciences are identified as making contributions to wealth creation and – unspecified – improvements to quality of life, whilst the social sciences are regarded as vital to improving quality of life and social justice. Not to be left out, the arts, or 'creative disciplines' should be seen as ripe for commercialisation, through which can be

generated 'cultural, social and economic benefits' and a 'highly visible international profile' for Scotland (2003: 41).

If there is a suggestion in this that commercialisation represents a strong element of the Executive's vision of knowledge exchange, this is reinforced in the detail of the Framework. Although knowledge transfer is broadly defined as covering 'the whole process of distilling research and expertise from one sector for the benefit of another' (2003: 46), the Framework refers most often to knowledge transfer in the context of commercialisation activity, and cites the Executive's priority as being to strengthen links between researchers, businesses and investors in Scotland for the creation of a high technology, knowledge-based economy.

Reference is made to the potential of social science research to feed into policy making and service delivery, but the point is not developed. Instead, all ten commitments relating to knowledge transfer activity made in the report focus on business links and research commercialisation. Of these, half deal with the need to develop and share expertise and good practice between the Funding Council, the regional development agency, academics and the business community. The Executive also commits to acting on the recommendations of the Lambert Review of Business-University Collaboration and to publishing measures of commercialisation activity for benchmarking purposes. In addition to promising support for centres designed to promote closer university-industry interaction, provision is made for the growth of the Funding Council's Knowledge Transfer Grant; this is designed to provide 'incentives for much more intensive interactions between HE and business' (2003: 48). An additional two points refer in the most general terms to the need to ensure that

research assessment does not stifle outward-looking behaviour by academics, and that the Executive promotes the best of Scottish research to an international audience. Given that the Framework states that '[w]e believe there is scope to do more *in particular* to improve engagement between researchers in the social sciences and local and national policy makers and service deliverers...' (2003: 46, emphasis added), the omission of concrete proposals for developing this area is a significant one.

5.4 Knowledge exchange in the wider policy sphere

The administrations' higher education strategies are by no means the only policy documents to refer to universities' role as agents of knowledge exchange. This is not to suggest, however, that references are evenly spread across government departments. The 2005 plan from the Office of the Deputy Prime Minister (ODPM) for 'Sustainable Communities: People, Places and Prosperity', for example, makes only two references to the contributory role of universities. The first deals strictly with the relationship between universities, business and the regional development agencies, whilst the second includes higher education institutions in a list of life-long learning providers. The broader 'social and cultural contribution' that 'The Future of Higher Education' suggested universities could also make to their communities (DfES 2003: 36) is nowhere discussed. Likewise, the strategic plan for Wales, entitled 'Wales: A Better Country', refers only to the need for improved university-*business* links. Of the strategy's six 'visions' for the nation's future, covering education, the economy, culture, the environment, social justice and health, only one – the vision for the economy – mentions a potential role for higher education institutions: '[w]e want to forge much closer links between research in our universities and colleges and commercial opportunities' (Welsh Assembly Government 2003a: 18); other potential

applications for research output are not discussed. In contrast to these scant references, the administrations' science, innovation and economic strategies all refer in some detail to university knowledge exchange.

5.4.1 England and the United Kingdom

As the formation of the Scottish Parliament and the Welsh Assembly has resulted in the devolution of only certain portfolios, with others being reserved by Westminster, some policy documents emanating from central Government can deal with both English and UK matters simultaneously. This is particularly true in the policy area under scrutiny here. As a result of this, policy relating to both England and the United Kingdom will be treated together in this section.

The ten year 'Science and Innovation Investment Framework', published in 2004 by HM Treasury in collaboration with the Department for Trade and Industry and Department for Education and Skills, describes knowledge transfer as one of the strategy's most important elements, because 'there is an economic imperative to make sure that scientific knowledge is used by business to create wealth' (HM Treasury et al. 2004: 69). This economic rationale sets the tone for the chapter on 'knowledge transfer and innovation', which focuses on developing policies that facilitate the transfer of knowledge 'in support of public services and wealth creation' (2004: 69). In spite of this claim for dual beneficiaries of knowledge transfer, the chapter confines itself to focusing on interactions with business.

Written in the context of the Lambert Review, published six months earlier, the Framework assesses government and university performance against the Review's

recommendations, and discusses the role of HEIF, the Research Councils, government departments and the RDAs in further addressing them. In its discussion of the uses to which it is expected HEIF monies will be put, knowledge transfer activity that includes 'developing an appropriate balance between market-priced interactions and contributions to social and cultural knowledge transfer needs' (2004: 76) is referred to. This hints at potential non-market values of knowledge, although no further discussion of the topic arises. Moreover, such activity is listed as one of the alternative roles for less research-intensive departments, the implication being that where top-quality research is conducted there is an expectation of exploitation in a market context.

In light of the context in which it was produced, it is perhaps unsurprising that the Framework concentrates predominantly on university-business collaboration in its discussion of knowledge transfer. However, some vindication of the earlier claim for the role of knowledge exchange in support of public services is found in a subsequent chapter on 'science and innovation across Government'. Universities are mentioned, together with Public Sector Research Establishments (PSREs) and the private sector, as one of the possible sources of evidence for use in policy making. Ultimately the main purpose of the chapter is to set out the current research activities and future priorities of specific departments, but it is clear that there are significant opportunities here for universities to be involved in knowledge exchange. By contrast, a chapter covering 'science and society' does not consider a range of applications of science and innovation with social benefit, as the introductory statement that '[t]he 'endless frontier' of research is opening up an array of new opportunities and ways of addressing societal challenges' (2004: 103) might suggest. Rather, it deals with the

need for properly regulated – safe and ethical – scientific research, and for there to be public confidence that this is the case.

Following on from the 'Science and Innovation Investment Framework', Lord Sainsbury of Turville was commissioned to undertake a review of science and innovation policies. Published in 2007 as 'The Race to the Top', the report covers a full range of issues associated with science and innovation policy, of which knowledge transfer is one. Setting the scene for his discussion of university knowledge transfer, Lord Sainsbury writes of the change in the purpose of the modern university, 'driven by the concept of the knowledge economy', an economy which values knowledge more highly than traditional factors of production; '[i]n this economy, a world-class university looks an increasingly useful asset' (Lord Sainsbury 2007: 43). Drawing a distinction between the functions of research-intensive universities and of the rest, he continues – and here it is not entirely clear whether the whole of the academic mission or only knowledge exchange is being referred to – '[we] should accept that both types of economic mission are equally important' (2007: 44). Already, then, we gain an impression of universities as 'assets' and of knowledge exchange as an 'economic mission'.

Turning to the chapter on 'knowledge transfer', we find a similar structure to that of the knowledge transfer chapter of the 'Science and Innovation Investment Framework'. In relation to HEIs, the review looks at progress since the Lambert Review, at HEIF, at the role of the Research Councils and at Knowledge Transfer Partnerships, a scheme for the placement of graduates in firms. The recurrent theme throughout is interaction with industry and commercialisation of research results.

Echoing the earlier reference to universities as assets, Lord Sainsbury claims that 'our future international competitiveness rests more than ever on the development, dissemination and application of knowledge and ideas' (2007: 57), and that this in turn makes the Lambert agenda more important than ever.

Of the four examples given of Research Council involvement in knowledge exchange, two describe health-related projects. There is an argument to be made that knowledge exchange in the health field has very real social benefits, and that this therefore fits with the vision in 'The Future of Higher Education' of universities as 'key drivers for their regions ... in terms of the social ... contribution they make to their communities' (DfES 2003: 36). Whilst this is certainly acknowledged by Government, the centrality of economics in the equation cannot be ignored, as witnessed by the Sainsbury Review: '[h]ealth R&D is an area of UK strength, promoting both health and economic gains' (Lord Sainsbury 2007: 125). It would seem that health gains are to be desired, but that health *and* wealth gains are more desirable still.

Still more recently, the new Department for Innovation, Universities and Skills (DIUS), which has brought responsibility for the innovation function previously held by the DTI together with higher education, published its innovation white paper, 'Innovation Nation'. It is clear, not only from the new department's name but also from the white paper, that 'innovation' is the current buzzword, regarded as the key to British prosperity. Only if we 'unlock the talents of all our people' can Britain 'prosper in a globalised economy' (DIUS 2008: 2). To achieve this, innovation is therefore essential in all sectors of the economy, in public services, and in pursuit of answers to challenges such as global warming and sustainable development. The research base is

regarded as an 'important component' (2008: 42) of the innovation system, and accordingly a full chapter is devoted to its part in the system.

The introduction to this chapter sets out DIUS's goal of 'broaden[ing] the traditional knowledge exchange agenda to encompass new disciplines, new sectors, new businesses and those who work in the development and delivery of public services' (2008: 42). Much of this represents an extension of the existing focus of knowledge exchange, which is to say university-business interaction, but the addition of the public sector as a knowledge exchange partner does represent a new departure when one compares 'Innovation Nation' with previous policy documents. Nevertheless, an economic imperative for knowledge exchange continues to be foregrounded, with the harnessing of innovation for wealth creation being described as the rationale for investment in the research base. This investment, continues the white paper, should drive innovation in five ways:

- Qualified people – highly skilled people trained within the research environment are in high demand in businesses across every sector from pharmaceuticals to finance.
- Improved products and processes – research outcomes help businesses and public services create new and better products and more effective and efficient processes.
- Attracting investment – major businesses from around the globe making R&D investments in the UK to gain access to our research base and its extraordinarily talented people.
- New businesses – ideas sparked from research leading to new, exciting commercial opportunities that sustain our knowledge economy, such as through spin out companies.
- Improved public policy – research adding to the evidence base and bringing about more effective policy making – from health care to flood defences, transport to food safety. (DIUS 2008: 43)

The impression given here is that knowledge exchange is principally of economic benefit, with public services also profiting through the impact of the research base on

policy making and service delivery. Whether this is a reasonable assessment of DIUS' policy as a whole will be discussed below with reference to information gathered at interview but, based on the white paper alone, it is the message that is being most clearly transmitted.

Although much of the focus remains on university-business interactions – of which a paragraph detailing plans to 'broaden' the knowledge exchange agenda so that the arts and humanities can also contribute to 'economic impact' is just one example – the potential impact of the introduction of public services into the equation should perhaps not be underestimated. A series of cross-Research Council research programmes, funded by DIUS and intended to address key public policy challenges, is looking at issues including how to live with environmental change, global threats to security, and the problems of ageing. The core aim of each of these programmes is to benefit society in a multitude of ways that range beyond the economic, and it is this, more than promises to include the economic impact of the creative industries within our understanding of knowledge exchange, that suggests a broadening of the knowledge exchange agenda. This message is reinforced by one of the knowledge exchange case studies in the white paper, which cites a partnership between the University of Sheffield's Department of Landscape and Timberplay aimed at promoting play through the development of more natural environments in playgrounds.

'Innovation Nation' has relevance both for England and for the United Kingdom more generally, since responsibility lies with the Department for Innovation, Universities and Skills for England only in relation to higher education policy, but for the entire

UK with respect to science policy. For those areas where they alone have responsibility, the devolved administrations for Wales and Scotland have also created a number of policy documents that deal with the relationship between science, innovation, economic and higher education policies.

5.4.2 Wales

'Generally, the science policy objectives in Wales are similar to those for the rest of the United Kingdom...' (Welsh Assembly Government 2006a: 39). Nevertheless, the documents contributing to the Assembly's science, innovation and economic strategies currently total an impressive seven, produced at a rate of one per year between 2002 and 2007, with two published in 2003. These seven are set out in Table 5.1 below. Of the seven, and in addition to 'Wales: A Better Country' and 'Reaching Higher', a 2006 review by the Assembly Government's Enterprise, Innovation and Networks Committee listed the spatial plan, the 2005 economic development strategy, and the (then forthcoming) science policy as comprising the central framework for science policy in Wales. The spatial plan, designed to be read in conjunction with the strategic plan, 'Wales: A Better Country', makes only oblique reference to the role of universities in meeting the challenges facing Wales. Under the heading of 'promoting a sustainable economy', the Assembly Government promises 'investment in knowledge transfer initiatives' (Welsh Assembly Government 2004b: 22), but for detail on the delivery of this and other 'sustainable economy' objectives, we are pointed towards the economic strategy.

Table 5.1: Science, innovation and economic development reports by and for the Welsh Assembly Government

Year	Author	Title and content
2002	Welsh Assembly Government	A Winning Wales National economic development strategy
2003	Welsh Assembly Government	Wales for Innovation Action plan for innovation
2003	PricewaterhouseCoopers	Building the 'Dragon Economy' Benchmark of Welsh innovation activity
2004	Welsh Assembly Government	People, Places, Futures The Wales spatial plan
2005	Welsh Assembly Government	Wales: A Vibrant Economy (WAVE) Strategic framework for economic development, updating A Winning Wales
2006	Welsh Assembly Government	A Science Policy for Wales
2007	Independent Task and Finish Group	Commercialisation in Wales Report assessing the impact of publicly funded commercialisation activities

As one might expect, university knowledge exchange forms only one part of the overall economic agenda for Wales. Having set out the necessary conditions for creating a favourable business environment in Wales, 'Wales: A Vibrant Economy' identifies innovation, entrepreneurship, skills, investment and trade as the key factors that can influence company growth. Of these, innovation is of particular concern to us here, as '[u]niversities have a vital role in generating the building blocks for innovation through their research projects...' (Welsh Assembly Government 2005: 49). Although progress made in encouraging universities to seek the economic development of their research is registered, the need for greater efforts to be made in this regard remains, according to the strategy, an imperative. Mirroring the Lambert Review's finding that demand for academic research by business is poor, 'WAVE' points to low levels of R&D investment as a proportion of gross value-added (GVA) as a barrier to innovation. This is partly attributed to the dominant role of pharmaceutical and aerospace sectors – neither of which have significant

representation in Wales – but Office for National Statistics figures show that per capita business expenditure on R&D in Wales in 2001 was just 25% of the national average (HM Treasury 2003: 75). If low levels of business R&D are of national concern, then it is clear that in Wales it is an even more significant issue.

Proposals for overcoming the Welsh innovation deficit are set out in greater detail in the 2003 action plan for innovation, 'Wales for Innovation', which was produced in response to the 2002 economic development strategy, 'A Winning Wales'. 'Wales for Innovation' (Welsh Assembly Government 2003b) sets out five main 'action areas' for achieving the vision of a more innovative, and therefore competitive, national economy:

- communicating what can be achieved through more innovation;
- developing more high growth potential businesses;
- better equipping people to innovate;
- simpler, more effective, business innovation support;
- maximising the economic development impact of our universities and colleges.

Clearly the focus of the fifth action area is entirely on the *economic* impact of academic research. The detail of this action area makes reference to the ongoing importance of a variety of knowledge exchange schemes, including CETIC – the Centres of Excellence – and the flagship Technium network. Both the Funding Council's third mission fund, still known in 2003 as the Higher Education Economic Development (HEED) Fund, and the Assembly's own Knowledge Exploitation Fund

(KEF) are referred to as core elements of efforts to maximise universities' economic development impact. The HEED Fund is envisaged as supporting HEIs in developing and implementing third mission business plans, which will 'have the sole aim of making a commercial reality of their third mission and boosting their capacity to contribute more effectively to the growth of local and regional knowledge economies' (Welsh Assembly Government 2003b: 15). The idea that the HEED Fund is *solely* for the purpose of encouraging the commercial exploitation of knowledge once again suggests a narrowing of objectives for knowledge exchange at the point where broad visions become concrete policies.

With the rebranding in 2004 of HEFCW funds for knowledge exchange from the HEED Fund to the Third Mission Fund, there is evidence of a shift in focus. Consultation on the nature of third mission funding in Wales highlighted concern in the higher education sector that the economic mission had hitherto been overemphasised (HEFCW 2004). The establishment of the 'new' Third Mission Fund therefore represented a commitment by the Funding Council to reward the full range of third mission activities, social as well as economic. This development raises two interesting issues, both of which will also be of interest in later chapters. Firstly, the impetus for a change in focus, from the purely economic to the full range of university knowledge exchange activity, came from the academic community itself, rather than from the Assembly Government or Funding Council. Secondly, by 2004 a distinction appears to have emerged between the Funding Council and the Assembly: whilst the detail of Assembly-driven policy related overwhelmingly to economic objectives, a new strand had emerged in the Funding Council's third mission function that sought to support broader goals.

Then, in 2006, the Welsh Assembly Government published 'A Science Policy for Wales'. The tone of this document is unlike that of its predecessors. More detailed in its exploration of the critical challenges facing Wales, the policy contains chapters on 'key priority' areas of health, the low carbon economy, and sustained social and economic renewal. At least in relation to science policy, 'Wales: A Vibrant Economy' appears to have been developed into a more nuanced strategy. Discussion of the role assigned to academia in meeting these challenges is also better developed. Whereas the detail of previous strategies has tended to focus on the economic aspect of knowledge exchange, 'A Science Policy for Wales' presents a broader agenda:

Communities are generally striving for a better life and improved life chances in material, social and cultural ways. Knowledge from the natural sciences, social sciences and the arts and humanities can be brought to bear in helping to meet these aspirations, by creating or facilitating:

- better, more influential, communications
- better jobs
- better health/education
- greater and lower-cost access to, and participation in, cultural and sporting activity
- improvements in the efficiency of resource utilisation
- capacity building and cultural changes within communities. (Welsh Assembly Government 2006b: 41)

The Policy then goes on to detail Wales' relevant academic strengths, in university schools from manufacturing, engineering and environmental science, to journalism, psychology, business and planning. Detailing future opportunities for creating sustained social and economic renewal, social justice and community development are both mentioned, together with the potential for humanities-orientated expertise to be mobilised in its pursuit. Elsewhere, the Policy also addresses public understanding of science, which 'forms a significant sub-set of [universities'] 'third mission' activity' (2006b: 27), and the role of scientific evidence in policy making.

A picture emerges from 'A Science Policy for Wales', not apparent in previous policy documents, of a broad understanding of the value of academic research to Welsh society. There is, however, one concern. In a chapter devoted to the contribution of higher education in terms of science research and its application, one section – the only which explicitly deals with the topic – covers the third mission. In spite of a description of the third mission as the exploitation of knowledge and expertise 'for the benefit of society and economy' (2006b: 16), the section focuses exclusively on the commercialisation of scientific knowledge, and directs the reader to the 'commercialisation of science' chapter for more detailed examples. This despite the fact that, as discussed above, examples of knowledge sharing activity are to be found throughout the document. Given the broader definition of knowledge exchange implied elsewhere in the Science Policy, the focus of the 'third mission' section seems incongruous, and questions therefore persist about the extent of the Assembly Government's commitment to such a definition.

5.4.3 Scotland

In assessing the Scottish Government's inclusion of knowledge exchange in its non-higher education strategies, it is instructive to begin by looking at the most recent of these, the 2007 'Government Economic Strategy'. Published after the establishment of a Scottish National Party Government in 2007, the strategy reflects a major reorganisation of Scottish government departments. The traditional department structure was replaced, following the 2007 election, by five 'Strategic Objectives', to deliver a wealthier and fairer, smarter, healthier, safer and stronger, and greener Scotland. In pursuing these objectives, each minister now has responsibilities that cut across previous departmental boundaries. What is apparent from the Economic

Strategy, and why it is helpful to begin with it, is that each of these objectives is subservient to a single purpose. In the foreword to the strategy, First Minister Alex Salmond writes:

The Purpose of the Government I lead is to create a more successful country, with opportunities for all of Scotland to flourish, through increasing sustainable economic growth. Sustainable economic growth is the one central Purpose to which all else in government is directed and contributes. (Scottish Government 2007: v)

This is the most clearly stated expression of the pre-eminence of economic goals to be found in any of the three Governments' policy documents. The five strategic objectives are 'focused on the delivery of the Purpose' (2007: 3), and so it appears that their pursuit is the means to sustainable economic growth, rather than economic growth being the means to a wealthier and fairer, smarter, healthier, safer and stronger, and greener Scotland. The point is reinforced in discussion of the strategic objectives: a wealthier and fairer Scotland will be a place that generates employment opportunities, increases competitiveness and is an attractive place to invest; a smarter Scotland will increase skill levels and channel research into wealth creation; a healthier Scottish populace will be a more productive workforce; safer and stronger communities will be more attractive to investors and talented migrants; and a greener Scotland will be valued by those living and working in the country, and will underpin key businesses and sectors. The objectives of a wealthier and fairer, a safer and stronger and a greener Scotland are also intended to make Scotland a more attractive place to *live*, and not simply work, whilst a smarter Scotland will 'lay the foundations for the future growth and well-being of our children' (2007: 4). However, with these two exceptions the benefits of meeting the objectives are all defined in direct relation to their ability to contribute to achieving the Scottish Government's central purpose.

To an extent the arrival of a new SNP administration and associated restructuring has meant some redefinition of objectives and associated policies. Certainly through the summer of 2007 there was some sense among key stakeholders that 'everything is very much unknown, so everybody feels they're in uncharted territories' (Government Respondent S3). Stability in the structure and composition of the civil service creates a certain continuity between administrations, though, and it is apparent from a comparison of strategies prepared before and after the election that the new administration is not seeking an entirely new start.

The 'Framework for Economic Development in Scotland' (FEDS), published in 2004, sets out the economic strategy of the previous administration. In his preface to the document Jack McConnell, then First Minister, stated that 'growing the economy is our top priority' (Scottish Executive 2004a: v), as it has continued to be under the SNP Government. If we compare the vision set out in the 2004 strategy:

to raise the quality of life of the Scottish people through increasing the economic opportunities for all on a socially and environmentally sustainable basis (Scottish Executive 2004a: 2)

with that from the 2007 strategy:

to focus the Government and public services on creating a more successful country, with opportunities for all of Scotland to flourish, through increasing sustainable economic growth (Scottish Government 2007: 1)

it is apparent that, despite different wording, the meaning of the former has been retained in the latter.

Building on FEDS, the 2004 document 'A Smart, Successful Scotland' focuses on three themes that are intended to promote enterprise, which in turn is regarded as essential for sustained economic growth. The three themes are growing businesses, skills and learning, and global connections, and of these the first is where universities are expected to make a difference. Because '[p]roductivity and competitiveness increasingly depend on the ability to generate and exploit knowledge', '[u]niversities should be helped to package the knowledge generated by their research and to bring it to the attention of business' (Scottish Executive 2004b: 16). Equally, businesses will be encouraged to seek out the fruits of academics' labours.

In its economic strategies, the Scottish Government thus shows its priorities for the role of university knowledge exchange to be broadly the same as those of central Government and of the Welsh Assembly Government. Yet there is a further element of knowledge exchange that is more firmly established in Scotland than in either England or Wales. Whilst these Governments are beginning to include references to evidence-based policy making in their discussions, as witnessed by the 2008 DIUS white paper, 'Innovation Nation', in Scotland it is already a recognised part of knowledge exchange. This is not to suggest that the English and Welsh administrations do not use evidence to inform their policy – indeed the Scottish Executive report examined below draws on good practice in Whitehall and the Welsh Assembly as well as within the Executive – but rather that, unlike in Scotland, it has not been regarded as a form of knowledge exchange in such an explicit way.

In 2006, the Office of the Chief Researcher published a report investigating knowledge transfer good practice in the policy process. Since the report begins with a

working definition of knowledge transfer as '[t]he interactive delivery of external social science knowledge and expertise to Ministers, and policy and analytical colleagues' (Scottish Executive 2006: 4), it is clear from the outset that the purpose of knowledge transfer is being defined differently than in the economic strategies. Together with internal networks, databases and websites, and seminars and conferences, academic expertise was listed as one of the four main sources of evidence in the policy process. Those consulted for the report regarded maintaining a pool of academic contacts as a 'speedy and useful way of transferring external knowledge into Government' (2006: 9). Furthermore, engagement also opened up academics' own networks, many of which could not be accessed other than with their input, to government researchers. This distinctly Scottish definition is discussed further in Section 5.5.1, below.

5.5 Knowledge exchange through the eyes of the civil service

All three administrations make reference in their policy documents to the potential for knowledge exchange to have both economic and social impacts. More recent policy documents note in particular the relevance of academic knowledge to the policy-making community, and also highlight the fact that *all* disciplines can have a beneficial effect on society and the economy by sharing their research. As has been seen, though, there are tensions apparent in the documentation that suggest a not altogether level playing field for all forms of knowledge exchange. In Scotland, the Office of the Chief Researcher's report into the use of evidence in the policy cycle demonstrates that knowledge exchange is considered valuable in this context, but the Scottish Government's number one priority is to boost the national economy, and the general tenor of knowledge exchange policy reflects this. Similarly, both English and

Welsh policy documents give examples of both economic and social benefits arising from academic research, yet recommendations frequently relate more to the former. In the case of the Welsh Science Policy, having acknowledged that the third mission is about exploiting knowledge and expertise for both social and economic benefit, a section devoted to the subject refers exclusively to the commercialisation of science.

In view of these ambiguities surrounding the stated purpose of knowledge exchange, it is clear that policy documentation alone is not sufficient to allow a complete understanding of the policy landscape for knowledge exchange. It is where policies are put into practice that they exert their influence: policy documents provide a framework but, if actions speak louder than words, then it is the actions of those who enact policy rather than the words of the documents per se that define what knowledge exchange actually 'is', and hence is for. Understanding how these practitioners of policy view knowledge exchange, its purposes and their own priorities is therefore essential.

5.5.1 The role of government departments

A good initial indication of the actual purpose of knowledge exchange can be gained by examining which government departments are actively involved in shaping and implementing policies that are geared towards supporting the application of university research. Respondents in England worked for the Department for Innovation, Universities and Skills (DIUS), for the Education Section of the Government Office for Yorkshire and Humberside (GOYH), and for Yorkshire Forward, the regional development agency of Yorkshire and Humberside.

Two respondents agreed that, regionally, Yorkshire Forward is under the greatest pressure from central Government to take forward the knowledge exchange agenda. By contrast, the agenda is 'not a high profile issue' for the Government Office. At the national level, the Funding Council was agreed to be an important agency, because of its delivery role in relation to the Higher Education Innovation Fund (HEIF). Government control of HEFCE is, as of 2007, the responsibility of DIUS, which combines responsibility for higher education and science, and also has jurisdiction over the UK-wide Research Councils. According to one respondent, prior to the creation of DIUS knowledge exchange was never of interest to the old Department for Education and Skills (DfES), despite the department having responsibility for higher education. Instead, the Department of Trade and Industry (DTI) took responsibility for knowledge exchange, and the focus was accordingly on wealth creation. This view was corroborated by a second respondent, who argued that the RDA's vital role at the regional level came about because it is an economic development organisation.

In Wales a similar division of labour emerges. There was consensus among all government respondents – who hailed from the Department for the Economy and Transport (DET) and the Department for Education, Culture and the Welsh Language (DECWL) – that, following the abolition of the Welsh Development Agency, the Department for the Economy and Transport is central to the Assembly's knowledge exchange programme, with one respondent venturing that 'I suspect that [DET] would be viewed as having the lead in terms of knowledge transfer'. Colleagues in DECWL are also engaged, not least because, whereas DET focuses on the business pull side of the exploitation of science, DECWL deals directly with the higher education sector. In this respect the Welsh Funding Council also plays a significant part. HEFCW is the

delivery agency for the country's Third Mission Fund, one of two main funding strands for third mission activity. That the Department for the Economy and Transport leads on knowledge exchange within the Assembly is further underlined by the fact that it administers the second strand, the Knowledge Exploitation Fund, or KEF.

With regard to non-commercial knowledge exchange, one respondent assigned responsibility to the higher education element of DECWL, whilst another stated that colleagues in those departments with the relevant policy lead – for instance on health or care for the elderly – would take responsibility. However, whilst each respondent agreed that non-commercial activities take place, Respondent W1 agreed that the Assembly regards knowledge exchange as a predominantly economic strategy. Respondent W3, discussing the priorities of the Science Policy and the spatial planning process in Wales, talked of aligning priorities 'so that in a relatively local area what the universities are trying to achieve and what the economy's trying to achieve match up'. That these comments come not just from civil servants with responsibility for the economy, but also from one with higher education responsibilities, further supports the view that DET, with support from DECWL, is the Assembly Government lead on knowledge exchange.

The Scottish view of what constitutes knowledge exchange is, from an initial viewing of the departments involved, somewhat different. Where respondents in England and Wales emphasised the centrality of departments with concerns for trade and economic development, it was immediately clear that in Scotland knowledge exchange was also an important part of policy in the Analytical Services Group, which has responsibility for social research across the Scottish Government, and the Chief Scientist Office.

Respondents from these offices *volunteered* to be interviewed following an approach by the Head of Science Strategy in the Office of the Chief Scientific Adviser, who was himself unavailable for interview but was able to assist in identifying other contacts. Scotland was described by one respondent as 'slightly pioneering' and 'ahead of the game' on knowledge exchange in the field of social research, and another described Analytical Services as the principal driving force behind the Scottish Government's knowledge transfer strategy.

This could, of course, be attributed to the respondents being from departments with an interest in social research, but the view is supported by one Innovation Policy Unit respondent who, although arguing that there is no one lead department, cited not only the Innovation Policy Unit but also colleagues in the Office of the Chief Scientific Adviser as wearing 'on occasions a knowledge exchange hat'. A fourth respondent had noticed 'across the board' a feeling in the Scottish Government that insufficient capital was being made of the research generated by universities. Academic Respondent S Soc 2 suggested one reason for this Scottish interest in social research when he stated that:

...there's an old democratic tradition that may be partly mythological, but it's nonetheless one that the Scottish Parliament has been very keen to develop. So that includes new engagement activities of all sorts, including you know, various stakeholders. But also much closer linkage I think between academia generally and Government than is often seen to be the case south of the border.

This view is consistent with analysis that the Scottish devolution campaign rested 'first and foremost ... on a "claim of right" from a historic nation seeking to regain part of its lost statehood' (Morgan 2006: 197). Respondent S Soc 2 also noted that academics from the University of Edinburgh had been involved in developing the

parliamentary structures during the process of devolution, suggesting close links between academia and the Government from the Parliament's inception. Also feeding into this 'mythology' are the frequent references to 'Scotland as a small country' (Government Respondent S4), and to the associated benefit of closer collaborative links, made by government, university and academic respondents; the closeness of these links is examined further in Section 7.5. As discussed in Section 5.5.5, however, a distinction must nevertheless be drawn between social outcomes as one *purpose* of knowledge exchange, and economic outcomes as the Scottish Government's *priority*.

5.5.2 Defining knowledge exchange

Department structures are not always the best indicator of policy direction, particularly because the siting of policy areas within particular departments can be as much a legacy of earlier restructuring as a function of any strong positive link with that department. Following the formation of DIUS and the Department for Business, Enterprise and Regulatory Reform (BERR) out of the former DTI and DfES, web links referring to knowledge transfer ended up pointing to the BERR website. According to one respondent, though, this was '...just mad, but that's I'm afraid poor merger activity'. Given these legacy issues, and the associated risk of misreading each Government's policy focus, it is essential to talk to the people actively involved in setting and implementing policy, to uncover what they understand knowledge exchange to be. Of immediate note is that there is no single definition, nor even agreement on what terminology provides the most appropriate description of interactions between academia and the non-academic world. Respondents variously described the research sharing process as 'knowledge transfer', 'knowledge exchange',

'technology transfer', 'translational research', the 'third mission' and 'commercialisation'.

In the more business-oriented Department for the Economy and Transport in Wales, Innovation Policy Unit in Scotland and regional development agency in England, the terms 'knowledge transfer', 'technology transfer' and 'commercialisation' were all used. Some fine distinctions were made between them. In Wales, one respondent explained the difference between the three terms: knowledge transfer was about 'making existing things better', as opposed to commercialisation, which was geared towards making new products, processes and services for a business; he then continued that 'I tend to think of commercialisation and technology transfer with an overlap in the middle, where there's a bit of both', and here it seems likely that technology transfer is used in place of the earlier reference to knowledge transfer. In England, the distinction between knowledge transfer and technology transfer was described somewhat differently. Having first noted that 'different people define [knowledge transfer] in different ways', the respondent describes a distinction drawn, by those working in the context of the European Framework Programme, between the academia to business activity of *knowledge* transfer and business to business *technology* transfer. Later he draws a different distinction, explaining technology transfer as being the commercialisation of a product or process, with knowledge transfer relating to the sharing of knowledge of a less near-market nature.

Respondents from the Scottish Government's Innovation Policy Unit made only oblique references to a definition of knowledge exchange, but from these a definition of it simply as the exploitation of knowledge emerged. While two thirds of all

respondents defined knowledge exchange with direct reference to their own experience of it – be that a social researcher describing it as 'getting ... knowledge in to the policy arenas' or a civil servant engaged in economic development seeing it as a mechanism for helping businesses – many also acknowledged its wider relevance. Respondents, for example, in the Scottish Analytical Services Division – 'it's to do with exchange' – and in the Department for Innovation, Universities and Skills – 'it's about engagement with the outside world' did so. And, in Wales, one DET respondent described commercialisation as only half of universities' third mission, which 'also includes all of the social outreach and other activity that they do', and cited the Innovation Action Plan's definition of knowledge transfer as the 'successful exploitation of new ideas'. In total, half of the respondents made statements, in the vein of those quoted above, that painted knowledge exchange in all-encompassing, extremely broad brush terms.

Some views on the nature of knowledge exchange were more narrow than this. In spite of arguing that a broad definition of knowledge exchange was essential, one respondent in England listed examples of transfer mechanisms, including science parks, spinoffs and professional development, that tended towards an interpretation of it as encompassing training and commercialisation. Although he also referred to monitoring and evaluation of publicly funded programmes, he ultimately concluded that:

I think the kind of people who are more likely to recognise knowledge transfer as a team would be those around the skills agenda to be honest. ... I think the universities have a lot more to offer in the economic agenda than perhaps we've utilised.

This understanding of knowledge transfer as being predominantly a tool for economic ends was shared elsewhere, by another education colleague, who described 'whatever you want to call it, the topic we're discussing' as 'the ways in which universities sort of add value relatively directly to the economy'. However, this statement was made by a respondent who subsequently went on to talk about higher education 'adding value or impact on individuals, the economy, communities...'. This represents not so much an inconsistency in an individual's opinion as a manifestation of a widespread issue; not only was no single view of the nature of knowledge exchange held by all respondents, but individual respondents themselves found it hard to determine a 'tablets of stone type definition' (Government Respondent S4). It is therefore difficult to draw conclusions from the above about what civil servants understand knowledge exchange – if indeed that is the appropriate term – to be, or about whether there are any significant differences of opinion over definitions between the Governments or their constituent departments.

Two regional variations do emerge from amongst these many definitions. The first is that the term 'third mission' emerges as a phrase used in Wales but no other region. This reflects the title of the country's principal knowledge transfer funding stream, the Third Mission Fund. A similar phrase, 'third stream', was rejected by one respondent from England, who would 'happily kill it off as a phrase' because the implied third place ranking fails to place knowledge sharing activities at the heart of universities' mission. Respondents did not explain why 'third mission' is used in Wales, but it seems possible that it is merely the result of circumstance. Funding Council Respondent 1 noted that the similar term 'third stream' was commonly used by the Funding Councils from the late 1990s onwards to describe knowledge exchange

activity. Having decided in 2004 that the HEED Fund needed to be rebranded, HEFCW's decision to adopt the term 'Third Mission Fund' can be seen in the context of this wider usage. Although the term 'third stream' has fallen out of favour elsewhere, its continued use in Wales is necessarily perpetuated by its inclusion in the title of this funding stream. The fact that respondents in Wales also frequently referred to 'knowledge transfer' further suggests that there is no particular commitment to the term 'third mission'.

The second regional variation is that in Scotland the term 'knowledge exchange' rather than 'transfer' was used. No respondents mentioned the term in England or Wales, but four out of five Scottish respondents chose to use it in place of, or in addition to, knowledge transfer. Of these, two specifically stated that they were doing so because the phrase better reflected the desired two-way interaction and flow of knowledge between parties. The fifth respondent recognised 'knowledge transfer' as a 'very used terminology', but also pointed to the use in the health field of the term 'translational research'. This was not used by any other respondents, and thus appears to be specific to (Scottish) health researchers.

5.5.3 The purpose of knowledge exchange

Respondents not only referred to what they thought knowledge exchange to be as a process. They also discussed what they believed it to be *for*, which is to say that they identified what ends they thought knowledge exchange should achieve. As with their definitions of knowledge exchange, some respondents related the ends that they expected the process to achieve directly to their own field of interest. Thus, for example, respondents engaged in bridging the gap between academics and policy

makers in Scotland talked about the goal of knowledge exchange as being to 'maximis[e] the benefits of [academic] work' (Government Respondent S4) so as to 'try and ensure that the policies that are developed and taken forward by Ministers are as soundly based as possible' (Government Respondent S2). For Scotland's Chief Scientist Office, knowledge exchange is about transferring lab-based research and research on patient care into the Scottish NHS. Likewise for those engaged with economic concerns, the ends of knowledge exchange were related to their specific policy areas: in Wales, one respondent described it as 'vital' to commercialise academic R&D, and twice mentioned the benefit of this as being 'money coming into Wales'; a Scottish respondent described a drive by Government from 1995 onwards to ensure that academic research was commercialised, in order that the country could get 'more bang for our buck from universities'; in England, too, knowledge exchange was not the end point in itself, but represented a means for Yorkshire Forward to 'improve business and improve the economy', whilst central Government 'are interested in stimulating that kind of work because it's money coming into the economy basically'.

The purpose of knowledge exchange as a means to economic ends was not only mentioned by those engaged in economic development activities. Two respondents, both with education portfolios, also foregrounded this purpose. When asked to explain the benefits of 'the whole spectrum of knowledge transfer', one – who had earlier defined knowledge transfer as the process of adding value to the economy – replied that:

the value, a very very key part of the value, is actually increasing ... innovative capability throughout the economy.

He then expanded on this with reference to the importance of diffusion of technology and knowledge for the advancement of economies, to the importance of placing graduates in businesses to begin that process, and to the economic potential of spinouts and intellectual property licensing. Echoing the Scottish view, he did also note the potential for academic knowledge to address policy questions such as how to tackle climate change, as well as to improve public service delivery in areas like health and social services. However, the benefits of knowledge transfer for tourism, sport, and the 'Welsh cultural experience' were all described in terms of the potential to increase their contribution to the national economy. Enhancing the economy was also, according to the second respondent, important in England, where 'the education agenda as a whole is an economic agenda'. This assertion was made twice and, despite mentioning monitoring and evaluation of public programmes as a potential purpose of knowledge transfer, the respondent claimed that 'if you said 'knowledge transfer' to most people', the skills and economic agendas would be 'the end they would go for'.

Although frequently relating the purpose of knowledge exchange to their own relationship with it, respondents were clearly able to set their experiences within the context of broader goals expressed throughout other parts of government. One DET respondent in Wales saw:

some areas of knowledge transfer [where] we're going to have more direct social – what's the word? – social outcomes. I can't think what those would be, but you've got social sciences looking at things around healthcare, care for the elderly, different ways of doing things.

That the respondent could not immediately think what non-economic outcomes might flow from knowledge transfer is telling, but nonetheless he does recognise that 'the areas with the policy leads in the social areas' – and particularly health – do a lot of

work on social outcomes. Government Respondents S2 and S4 both noted that the Scottish Funding Council's Knowledge Transfer Grant also rewarded economic development and the cultural sector in addition to their own field of public policy. The former also referred to the SNP administration's agenda for both 'boosting the growth of the economy and addressing some of the serious sort of outstanding social problems' as the new context for knowledge transfer in Scotland. A third Scottish respondent placed principal responsibility for knowledge transfer policy within government departments dealing with industry, enterprise, lifelong learning and education, whilst one Innovation Unit respondent acknowledged that his Unit also has some interest in academics' interactions with the public sector. This suggests a shared interest in knowledge transfer across a number of the Scottish Government's departments.

Again moving beyond their own personal goals, some respondents referred to the wider value of knowledge exchange in the broadest possible terms. Each of the Welsh respondents opined that the purpose of knowledge exchange is 'to inform the kind of wider public good going forward', that the third mission is only half about commercialisation, the other half being about 'social outreach and all the other activity that [universities] do', or that 'it is across quite a wide spectrum I think that the Assembly Government is seeing that HE can add value'. For this third respondent, 'community, society, culture' are also part of the engagement mission of universities. Knowledge exchange was described by Government Respondent E2 as being about 'engagement with the outside world' for the benefit of both the economy and society. He also anticipated that DIUS, as a new department, would 'more explicitly consider

the wider impacts [of knowledge exchange] beyond ... the more hardcore, commercial, wealth creation bit of the economic'.

5.5.4 The (loose) definition of terms

At this point it is worth pausing to consider precisely what this respondent means when he refers to the 'more hardcore, commercial, wealth creation bit of the economic'. The term 'economic' is, after all, an adjective that means 'of, relating to, or concerned with the science of economics or with the economy in general' – 'economics' being 'the branch of knowledge concerned with the production, distribution, consumption, and transfer of wealth' (Oxford English Dictionary) – and the suggestion that there might be more to the economic than merely the wealth creation 'bit' is therefore intriguing. Throughout the course of the interview, the respondent mentioned a number of terms with unclear or ambiguous definitions. Early on in the interview, and referring to definitions of the 'science base', he said:

I think a lot of this is historic, and I think we're quite schizophrenic in what we mean by things, and we often end up saying what we think the other person wants to hear, not necessarily in a deliberate way because we want to dissemble, but just because we kind of have a sort of loose interpretation.

The idea of a 'schizophrenic' approach to the definition of terms was mentioned a further two times, in relation again to the meaning of 'science', and also to the definition of 'economic'. Confusion surrounding this latter term also led to ambiguity about the meaning of 'business' and about distinctions between 'economy and society' and 'business and the wider community'. The respondent contended that, when used in phrases such as 'business and the wider community', the term 'business' is being narrowly defined – as is 'economy' when used in 'economy and society'. These

'narrow' definitions would appear to fit closely with the dictionary definitions of the terms in question. However, '[s]ometimes we say 'business', but we use it as a shorthand. Clearly when you say 'business and the wider community' you don't mean it as a shorthand'.

Discussion elsewhere in the interview does provide support for the view that ambiguity is not necessarily a matter of dissembling, but can stem from historical precedent. In responding to questioning about what he considered 'economic' knowledge exchange to encompass, the respondent talked about the precedent set by the former DTI which, as an economic department, wanted to see 'hard', quantifiable benefits from its input into knowledge exchange policy, even where this touched upon university-community interactions; these were referred to as 'economic' benefits to distinguish them from 'making people feel better and beat the students up less and things like that', which was not regarded as part of the DTI's remit, but they could easily encompass outcomes such as NHS waiting time reduction. However, this does not entirely account for continued acceptance of the ambiguity, especially given the positively Kafkaesque situations to which it can give rise:

And then you get the confusion because we have things like we'd say, 'we want to see economic benefit'. And then some people would say, 'well don't you want to see economic and social benefits?'. And then we'd go, 'well, yeah, we want to see economic and social benefits'. And then they'd go, 'ah, that means there's a distinction between economic and social'. Well it's like, no, not really, it's just the way you describe it.

By the end of the interview it is not possible to conclude whether the economic ends of knowledge exchange should be broadly or narrowly defined, except perhaps to say that they are always the former, except when they are the latter. Despite vigorously defending this context-dependent reading of the terms, the respondent himself

admitted that ambiguity creates 'plenty of scope for confusion'. Even within his own Department this was the case:

I mean you know, you're talking to me because you want to speak to someone in [my Department], but when I say this do I mean on behalf of [my Department] as a whole or am I talking about the area I work in? I think I'd safely say I'm talking about the latter.

If the context within which a term is either narrowly or broadly defined was understood by all, then everyone would be able to determine when it was and wasn't being used as shorthand and its varying meaning would not necessarily be problematic. This is clearly not the case. Whilst one Scottish Government respondent argued that 'I think it's taken for granted that the term 'economic' is now a shorthand for economic, social and environmental impact', he also noted that it is 'always important that we keep reminding everybody that it's more than economic impact, that it is social and environmental impact as well'. This second statement undermines the suggestion that a broader definition of 'economic' is now taken for granted. The fact that, in practice, 'nobody uses all the terminology consistently' was reinforced by one Funding Council respondent, while another – also an academic – expressed concern about the Research Councils' requirement to consider 'economic impact' in the knowledge transfer section of grant proposals, which suggests that he did not share the view of 'economic' as a shorthand. Other government respondents, in distinguishing between the economy and other beneficiaries of knowledge exchange activity, including society, communities and policy makers, also appeared to regard 'economic' goals as narrowly relating to wealth creation.

There are two potential consequences of this ambiguity that are problematic for knowledge exchange. The first, and more benign, of the two is that, confronted with

economic and business-related terminology, those academics not engaged in research with wealth-creating potential will believe that knowledge exchange is not for them. For example, the five areas of impact for knowledge transfer envisaged in the 'Innovation Nation' white paper – qualified people, improved products and processes, attracting investment, new business, and public policy – largely make use of terms that strongly imply a narrowly economic focus. According to Government Respondent E2, we should understand from the context that this is merely a shorthand, and that social and environmental impacts can also (and indeed are expected to) be achieved within these five areas, but as the academic member of one Funding Council has shown, this is not a widely understood shorthand, even for academics with 'insider' knowledge of knowledge exchange policy. There is therefore potential for external engagement opportunities to be missed because certain academics have not even engaged *themselves* in the knowledge exchange process.

The second problem arising from this ambiguity is potentially more damaging to a broad-based knowledge exchange system. In using phrases that can be, and more usually are, defined more narrowly, but have been adopted as all-encompassing terms, there is always the potential to revert to a narrow definition: as Government Respondent S2 has noted, there is a constant need to remind people that 'economic' is shorthand for something much broader. This reversion, resulting either from a passive failure to promote the broader definition or from an active attempt by economically driven departments to foreground the narrower meaning, would stifle efforts by academics who were already attempting to engage in knowledge exchange with broader goals. The ambiguity of meaning allows policy makers to say that knowledge exchange is about a broad range of outcomes – social and environmental as well as

economic – but equally creates a slipperiness that makes it difficult to determine when particular outcomes are being privileged.

5.5.5 Government priorities for knowledge exchange

Whilst a range of potential outcomes emerged during discussions of the purpose of knowledge exchange, that certain outcomes are favoured is apparent from a close reading of the interviews with government respondents. Only one respondent, from the Department for the Economy and Transport in the Welsh Assembly Government, did not indicate any preference within his Government for particular knowledge exchange outcomes. Although all but one of the remaining respondents made some mention of a range of goals for knowledge exchange activity, even from these evidence emerged that they believed Government to be privileging one goal over the others. In only one case was this goal not economic. The one respondent who did not acknowledge a *range* of possible outcomes instead focused his discussion on economic ends, these being both his own professional responsibility and, in his opinion, the principal focus of government knowledge transfer policy in the English regions. In some instances the fact of a particular policy focus for knowledge exchange was made explicit by respondents, but in other cases it was implicit in their responses. The prioritisation of the economic ends of knowledge exchange was also sometimes explained as being an explicit policy, and at other times appeared as an unofficial and implicit prioritisation.

To deal first with the non-economic priority for knowledge exchange, one respondent from the Scottish Government's Analytical Services Group stated that knowledge exchange was 'primarily being driven forward by Analytical Services'. This statement

highlights evidence-based policy making as a clear priority within the Scottish Government's knowledge exchange policy. In spite of differences in perspective, arising from the narrow interest of Analytical Services in bringing evidence into *Government* set against the Council's focus on the *universities'* interest, no 'major mismatches or inconsistencies in the broad approach' of the Scottish Funding Council and Analytical Services were recognised.

This opinion contrasts, however, with that of the respondent's colleague, who identified an implicit preference for science and technology transfer activity because 'particularly this Government now is heavily committed to, you know, improving the economy of Scotland...'. That this latter point is so is confirmed by the new administration's economic strategy. According to this second respondent, the Knowledge Transfer Grant, administered through the Scottish Funding Council, 'goes more to science and technology transfer', and the Council's Strategic Research Development Grant Panel has only one social science representative among a large group of scientists and technologists. Although 'making sure that Scotland's also a healthier, happier place' is 'obviously on the Government's agenda too', '[i]t's much easier to make arguments for investing in science and technology than it is in the softer sort of social science, social policy type activity'. The impression that economically valuable forms of knowledge exchange activity are implicitly favoured is supported by the comments of two other Scottish Government respondents. Having talked almost exclusively about the role of knowledge exchange in the health field, when questioned about the Government-wide stance the first said:

I'm just trying to think where would that [policy] come from within the Executive, you know. Like within the Health Department, it wouldn't come from within the Health Department. ... I think the place it comes

more is, you know, within industry, enterprise, lifelong learning, education, it's in those.

Besides the obvious involvement of education colleagues, knowledge exchange policy responsibility is fairly firmly assigned to those concerned with industry, enterprise and lifelong learning, suggesting a skills and economic focus. A second respondent similarly listed the three divisions with an interest in knowledge exchange policy as being innovation, education and the Office of the Chief Scientific Adviser.

From the accounts of these respondents, the preference for knowledge exchange activities producing economic benefits emerges less as an explicitly stated policy and more as an unofficial prioritisation. However, as the 'The Government Economic Strategy' of 2007 shows, the prioritisation of economic growth in Scottish Government policy is not a covert strategy, and it is therefore unsurprising that its influence is felt by those with an interest in knowledge exchange. In both Wales and England respondents regarded the policy link between knowledge exchange and the economy as an explicit one. Government Respondent W1 suspected that the Department for the Economy and Transport '...would be viewed as having the lead in terms of knowledge transfer. And that's probably right'. Given that DET 'should be very focused on the commercialisation side', this suggests that knowledge transfer is seen by the Assembly as an economic strategy and, when asked whether this was in fact the case, the respondent replied: 'Yes, I think so'.

In England, one respondent argued that the link with the economy was only a historical one. He acknowledged that the former DTI, as a narrowly economic department, was interested in knowledge exchange for its wealth creation potential,

but suggested that the new Department for Innovation, Universities and Skills would take a broader view of what constituted desirable impacts. Whether this occurs in practice remains to be seen but, as discussion of Innovation Nation has shown, no radical transformation has yet taken place. Far from there being a decrease in the significance of economic forms of knowledge exchange, a second respondent argued that, in terms of knowledge exchange, 'spinoff into the economy is probably more overt than it's ever been'. He also twice stated that 'the education agenda as a whole is an economic agenda'. However, despite describing the economic aspects of knowledge exchange as more overt than ever, speaking about the link between education and the economy he said that 'I don't think you'd see that [link] written down that often. It's certainly the tenor of the discussion quite a lot of the time'. This implies a reluctance in Government to set down the link in writing, although in practice, as both this respondent and another agreed, Yorkshire Forward is under most pressure regionally to take forward the knowledge exchange agenda because of its status as an economic development agency.

The fact that the direction of knowledge exchange policy as it appears on first reading does not necessarily stand up to scrutiny has already been discussed in relation to the policy documentation. From the above it is also apparent that in Scotland, England and Wales policy makers themselves recognise a mismatch between the theory of a broad-based knowledge exchange and the practice, in which policy tends to favour economic interpretations of the activity's value. The views of two final respondents highlight some of the internal inconsistencies that arise from this mismatch. Most respondents distinguished between individual personal or departmental priorities and those of their Government as a whole; thus they were able to reconcile the existence,

and pursuit, of myriad *purposes* of knowledge exchange with the existence of a favoured, *priority* outcome.

In two interviews such a distinction is not readily apparent, however, and so it is unclear whether reference to non-economic outcomes is anything other than academic. In the first interview, Government Respondent E2 makes repeated reference to the commercialisation of research, and talks about engagement in the context of business-facing universities and the economy. This, he argues, is simply a terminological shorthand – the problematic implications of which have been set out above – but his discussion of knowledge exchange impacts reflects those set out in Innovation Nation; as discussion has suggested, the white paper maintains a largely economic focus, and hence it is difficult to believe that the priority outcome of knowledge exchange is other than economic, or that other purposes are seriously supported.

The second respondent acknowledges that knowledge transfer is about 'adding value or impact on individuals, the economy, communities...', but the value to which he repeatedly refers, to the near exclusion of all else, is economic value. This valuation of knowledge transfer is the one to which he turns at the beginning of the interview in response to the following exchange:

GR W3: And the focus [of your research] is particularly around the kind of knowledge transfer is it?

SU: Obviously it would be interesting to see how you want to define that, but the whole issue of universities and specific academics using their research outside of the academic environment, and the ways, the mechanisms, through which that occurs, and the purposes of that.

A later question asking the respondent to discuss the benefits of knowledge transfer across its full spectrum elicits a similarly focused response. Although he concludes by saying that he tends to begin with the economic because of his professional background in that area, he has already failed to discuss the non-economic in spite of a number of prompts designed to open up the discussion.

The focused answers from the two respondents are significant because each is directly concerned with setting higher education policy in either England or Wales. They suggest that the other respondents' views on the prioritisation of the economic are accurate, but also that the continued existence of multiple rationales for knowledge exchange might be threatened by the privileging of one. Whether this indeed proves to be the case will become clearer following examination, in Chapter 6, of the Funding Councils' knowledge exchange funding strategies and mechanisms.

5.6 Key findings

Emerging from the evidence is an obvious distinction between the stated *purposes* of knowledge exchange and the de facto *prioritisation* of economic ends within each administration. This prioritisation is made evident in three ways. Firstly, the government departments with the greatest degree of responsibility for knowledge exchange policy are predominantly those with a focus on science, innovation and the economy. In England, the Department for Innovation, Universities and Skills takes a national lead, with the Regional Development Agencies playing the most significant role regionally. In Wales, the Department for the Economy and Transport is regarded as 'having the lead in terms of knowledge transfer' (Government Respondent W1). The Scottish case is somewhat different, in that the Analytical Services Group, which

has responsibility for social research in the Scottish Government, was described by some respondents as having as significant a role as the Innovation Policy Unit. Others, however, brought this parity of esteem into question.

The second piece of evidence for a discrepancy between the rhetoric of a broadly defined purpose for knowledge exchange and the reality of a narrower, economic focus arises from a reading of the policy documents. Although apparently broad definitions are employed throughout much of the documentation, the recommendations for the enactment of policy refer overwhelmingly to economic ends. Moreover, whereas the science, innovation and economic strategies of each administration all refer in some detail to university knowledge exchange, references in such documents as the ODPM's 'Sustainable Communities' are lacking.

Thirdly, government respondents' discussion of the purposes of and priorities for university knowledge exchange reveal a prioritisation of economic outcomes by each Government. Whilst respondents often defined knowledge exchange and its purpose with reference to their own policy areas, the policy drivers were most frequently described as being economic. Of particular note is that this was the view of one member of the Analytical Services Group; thus, despite it being described by respondents as an important contributor to knowledge exchange policy in Scotland, within the Group concerns were raised about the greater attention paid to income-generating knowledge exchange.

In addition to the mismatch between the rhetoric and reality of knowledge exchange policy, also apparent from the evidence is the problematic nature of the loose

definition of terms within Government. At best, ambiguity of meaning can be expected to convince academics not engaged in research with wealth-creating potential that knowledge exchange is not relevant to them. More problematically, the use of terminology that more normally carries a restricted meaning risks users reverting to that narrower definition; this reversion would be liable to stifle efforts by academics to engage in non-economic knowledge exchange. It is not Government alone, however, which has responsibility for the definition of terms and the enactment of policy. The role of the Higher Education Funding Councils in this regard is also fundamental, and examination of their approaches to knowledge exchange is hence crucial to our understanding of the policy landscape.

Chapter 6: Knowledge exchange and the Funding Councils

6.1 Remit of the Higher Education Funding Councils

Whilst Government is responsible for setting the terms of knowledge exchange policy, the Higher Education Funding Councils for England, Wales and Scotland are instrumental in enacting that policy. Their approaches to doing so contribute much to our understanding of the climate for knowledge exchange across the UK, and are therefore the subject of this chapter. As non-departmental public bodies, the Funding Councils operate at arm's length from, but under the direction of, their respective Governments. This means that, whilst their remit is set by the department in each administration with responsibility for higher education, within their remits the Councils have autonomy to develop their own strategies. As the bodies responsible for distributing the recurrent grants to universities, and for formulating much of the policy governing their distribution, they exert considerable influence over the higher education sector, and their approach to the role of knowledge exchange in universities is thus of considerable interest.

Each year the Funding Councils receive what is known as a remit letter, or letter of guidance, from the Minister in charge; this details the actions that the Government expects the Council to carry out. In Scotland, the 2006-09 Corporate Plan of the Scottish Funding Council has been approved by Ministers. The Plan therefore represents the agreed direction of the Council, and any letters of guidance are now regarded as supplementary to this. Whether regarded as 'famously detailed' or 'fairly consistent and broad' – as by the two Welsh Funding Council respondents – the letters

cover teaching, research and knowledge exchange priorities for the coming academic year.

In his 2008 letter to HEFCE, the Secretary of State for Innovation, Universities and Skills sets as a priority 'maximis[ing] the application of research results while encouraging innovation', and recognises the 'increasingly telling contributions' that higher education is making 'to all areas of the economy and society' (Denham 2008: 1, 5). The letter does not set specific targets for knowledge exchange, but notes that DIUS will be looking for clear evidence about the relationship between investment in knowledge exchange and outcomes. The Welsh remit letter for 2007-08 takes a more directive line. It sets university knowledge exchange within the context of the 2006 Science Policy, tasking HEFCW with supporting the 'Welsh infrastructure for commercialising research' (Davidson 2007: 4), and calls upon the Council to focus its activities towards making the Welsh HE sector competitive in terms of its economic impact. Like the English letter of guidance, the Scottish letter (Hyslop 2008) does not offer close direction on the knowledge exchange strategies to be pursued, although in part this is because the Corporate Plan serves much of the purpose formerly fulfilled by the letter. As in Wales, however, the letter makes reference to the key government policy document to be referenced for strategic direction, in this case the Government Economic Strategy of 2007.

Having received their letters of guidance, the Funding Councils produce their own strategic plans. These lay down the Councils' policy frameworks in the same way as do government white papers, and describe how policy will be implemented over the course of the planning period. The content of these plans will be discussed in Section

6.2 below but, before this, the scope of the Councils' knowledge exchange funding streams will be examined; as is made clear in the English and Scottish remit letters, the Governments are committing more resources to this stream than ever before, and regard it as an increasingly important plank of the Councils' remit.

6.1.1 England: Higher Education Innovation Fund

In England, the Funding Council's dedicated knowledge exchange funding stream is known as the Higher Education Innovation Fund, or HEIF. Entering its fourth round in 2008, according to HEFCE the Fund 'builds capacity and provides incentives for higher education institutions (HEIs) to work with business, public sector bodies and third sector partners, with a view to transferring knowledge and thereby improving products, goods and services' (HEFCE 2008a: 1). HEIF 4 funding covers the period 2008-11 and totals £112 million in the academic year 2008-09, rising to £150 million by the end of the period. For comparison, the total HEFCE research budget for 2008-09 is £1460 million, of which £1436 million is quality-related research (QR) funding (HEFCE 2008b: 9); HEIF 4 therefore totals approximately eight percent of the value of the QR fund.

Following previous rounds in which HEIF funds were allocated on a competitive basis, a fully formula allocation method is now employed. This comprises two components. The first component, accounting for forty percent of the total funds, is allocated according to the full-time equivalent academic staff numbers in each institution. Recognising that academic staff embody much of an institution's capacity for knowledge exchange, this strand provides a baseline of funding for every institution that is scaled according to existing knowledge exchange potential and

intended to encourage capacity-building to support that potential (HEFCE 2005). The second, larger component of HEIF 4 rewards previous performance and hence 'create[s] incentives for greater interaction' (2005: 9); it uses 'various measures of income from business and non-commercial sources as a proxy for the value placed on HEIs' activities by users of knowledge in the wider economy and society' (HEFCE 2008a: 5). The specific data that HEIs must submit to the Funding Council are set out in Table 6.1.

Table 6.1: Data sources for HEIF 4 allocation

Funding component	Metric	Source
Capacity	FTE academic staff	HESA
Performance	Contract research income	HEBCIS
	Consultancy income	"
	Equipment and facilities income	"
	Regeneration income	"
	Intellectual property income	"
	Income from non-credit bearing courses	HESA
	KTP income	Momenta

Source: HEFCE (2008a)

A third component was introduced in HEIF 3 as a means of valuing knowledge transfer activity that could not be readily captured through income measures. Deemed 'not sufficiently robust' (HEFCE 2008a: 5), the component was dropped from use in HEIF 4. However, in detailing the intended purpose of the latest round of funds, the Funding Council states:

While engagement with business and wealth creation are critically important, we note that a large proportion (50 per cent) of knowledge transfer income to the sector ... comes from non-commercial partners such as public sector bodies and third sector partners. Through these kinds of interactions the HE sector makes a contribution ... that is equally important as its contributions towards commercial wealth creation. (HEFCE 2008a: 4)

Moreover, HEFCE makes clear that the scope of the Fund remains the same as for previous rounds and 'is not limited to economic impact on the commercial wealth-creating sector' (HEFCE 2008a: 5). In view of this, the introduction of formula funding for knowledge transfer is seen as providing an opportunity for each university to choose its own knowledge transfer partners and activities. Although the resultant institutional strategies are monitored by the Funding Council, and indeed are required by the Council before funds are released, it does not make demands about their content beyond providing a general template, and instead acknowledges that strategies will differ significantly as a result of the diverse types of knowledge exchange.

6.1.2 Wales: Third Mission Fund

Unlike the Higher Education Innovation Fund, the Welsh Third Mission Fund is not entirely allocated by formula. Established in 2004, and currently standing at £6.1 million per annum for the academic years 2007-10, the Fund is equal to nine percent of the Welsh QR allocation (HEFCW 2007; 2008). For the purposes of distribution, it is divided into three parts. The first part, totalling £1.2 million, is allocated as foundation funding, giving each HEI in Wales a baseline knowledge transfer fund of £100,000. An additional £1 million is reserved for collaborative activity between institutions and must be bid for. This element of the Fund supports the Assembly Government's agenda to strengthen the Welsh HE sector through reconfiguration and collaboration, as set out in 'Reaching Higher' (Welsh Assembly Government 2002a). The remaining £3.9 million is allocated by formula.

Of the £3.9 million available under the formula allocation, half is based on a measure of each institution's third mission potential. As in England this uses data on full-time

equivalent staff numbers from the Higher Education Statistics Agency (HESA), although a broader range of university staff is included. The remaining £1.95 million rewards performance, with £0.78 million allocated according to income related measures, and £1.17 million reserved for performance against non-income based metrics. The detail of these various metrics is shown in Table 6.2.

Table 6.2: Data sources for Third Mission Fund allocation

Funding component	Metric	Source
Potential and Capacity	FTE managerial, academic, professional, technical and administrative staff	HESA
Performance (income)	Contract research income	HEBCIS
	Intellectual property income	"
	Regeneration income	"
	Collaborative research income	"
Performance (non-income)	Number of engagements with KEF	KEF
	Number of graduate start-ups	HEBCIS
	Number of licenses	"
	Number of active spinouts	"
	Number of contracts – consultancy	"
	Number of contracts – facilities, equipment	"
	Number benefiting from GO Wales scheme	GO Wales
	Number of businesses in GO Wales scheme	"
	Number of outgoing exchange students	HESA
	Number of industrial placements	"
	Total learner days – CPD/CE courses	HEBCIS

Source: HEFCW (2007)

As in England, HEFCW requests a third mission strategy from each HEI prior to funds being released. A template is provided for institutions to use, along with guidance on completion of the strategy; HEFCW requires that each university should take account of the Council's third mission policy agenda, and should 'pay appropriate regard to Assembly and Whitehall Government policy imperatives' (HEFCW 2007: 4). Producing a strategy is far from being merely a hoop that institutions must jump through to receive funding, and quality is paramount. As one Funding Council

respondent reported, 'we do say to institutions, you know, look, we're sorry but this strategy's unacceptable, and you'll have to rewrite it before we release the money to you', a situation which had arisen in relation to one university's bid for the latest funding round. HEFCW has adopted a principle of non-hypothecation of funding, with the exception of the £1 million stream for collaborative activity, in order that each university can tailor its activity to its own strengths (HEFCW 2006a).

6.1.3 Scotland: Knowledge Transfer Grant

Scotland's Knowledge Transfer Grant was introduced by the Funding Council in 2001, with a consistent approach to universities' knowledge transfer returns having been in place since the publication of Circular HE/33/04 (SHEFC 2004). From a level of approximately £3 million per annum, the total available Grant has now grown to £21.5 million. An additional £2 million has been set aside in 2008 to fund specific projects under the forthcoming 'strategic priority investment in research and innovation translation (SPIRIT)' (SFC 2008: 22). With the QR research budget standing at £197.5 million for 2008-09, the main KTG equates to nearly eleven percent of this value; the Funding Council's ambition is to increase the level of the KTG to between twenty and twenty-five percent of the value of the QR grant (SFC 2008; Funding Council respondent). Within the £21.5 million KTG, £0.5 million has been set aside since 2006-07 'specifically for knowledge transfer activity in cultural engagement' (SFC 2006b: 5).

To receive cultural engagement funding, HEIs must submit a cultural engagement strategy. This is assessed by the Funding Council and, once it is judged to be of sufficient quality, funds of a minimum of £20,000 per institution are released. This

new requirement for the receipt of funding was introduced following the publication of research suggesting that universities were failing to plan their knowledge exchange activities in a sufficiently coordinated manner. In addition, the Funding Council hopes that, by examining the strategies, it will be possible to develop metrics suitable for the measurement of cultural activities (SFC 2006b). In addition to providing a cultural engagement strategy, HEIs must demonstrate that their strategic plans contain a knowledge transfer strategy before the main element of the KTG can be awarded. The proportion of the KTG received by each university is then calculated based on their performance against a set of income based metrics. These are set out in Table 6.3. Whereas the English and Welsh Funding Councils draw their data predominantly from HESA and the Higher Education-Business and Community Interaction Survey (HEBCIS), in Scotland universities are required to return their own income figures directly to the Funding Council.

Table 6.3: Data sources for Knowledge Transfer Grant allocation

Funding component	Metric	Source
Cultural engagement	Cultural engagement strategy	HEIs
Knowledge Transfer Grant	(1) Venture capital income	"
	(2) University Challenge Fund income	"
	(3) Licensing income	"
	(4) External research grants and contracts	"
	(5) CPD income	"
	(6) Consultancy income	"
	(7) Proof of Concept Fund income	"
	(8) Enterprise Fellowship income	"
	(9) Faraday Partnership income	"
	(10) LINK/ForesightLINK income	"
	(11) Teaching Company Scheme income	"
	(12) European Structural Fund income	"

Source: SFC (2007)

Although the Scottish Funding Council relies entirely on income related measures to assign the main portion of the KTG, it assigns each form of knowledge exchange activity a weighting. This is designed to ensure that activities which are 'for the public good' (SFC 2006a: 116) are better rewarded than those that generate substantial amounts of income; the Grant thus acts as a public subsidy for activities which would otherwise appear less profitable. Table 6.4 shows the weightings used and how the metrics supplied by universities – numbered as in Table 6.3 – are categorised for the purposes of weighting.

Table 6.4: Weightings applied to knowledge transfer metrics by the Scottish Funding Council

Activity	Weighting	Metrics
Venturing	1	(1) & (2)
Licensing	1.5	(3)
Industry, UK central government bodies, local authorities & health/hospital authorities external research	2.25	(4)
Continuing professional development	2.5	(5)
Consultancy	3.5	(6)
Enterprise schemes	4	(7) to (10)
Outreach	5	(11) & (12)

Sources: SFC (2006a); Funding Council representative

As a result of this approach, the Scottish system differs from that followed in England, where funding allocations are also largely income based but no weightings are applied. In spite of this, both strategies are more similar to each other than to the Welsh system, where measurement of the *number* of engagements of various types (see Table 6.2) represents a somewhat different attempt to reward performance in engagements that do not necessarily produce significant income. The use of both weightings and non-income based performance measures implies some degree of valuation of non-economic forms of knowledge exchange on the part of the Funding

Councils. Neither system entirely succeeds in valuing such forms, however. The Scottish system remains reliant on income measures whilst, in practice, the non-income based performance measures in Wales are still largely applied to activities which also generate income. As discussed further in Section 6.2.3, although Funding Council representatives accept that the existing metrics are imperfect, and the reliance on income measures 'debatable', it is proving difficult to develop an alternative approach.

6.2 Funding Council knowledge exchange strategies

Although the Funding Councils are accountable to their respective Governments, and through their remit letters are steered by them, within their remits they are able to independently formulate policy in the best interests of the higher education sector. Sitting as they do between Government and the universities, their policies on knowledge exchange are particularly interesting for two reasons. Firstly, as the policy delivery agencies for higher education in relation to the recurrent grants, they exert a considerable amount of influence over the ways in which universities as institutions are able to carry out knowledge exchange. Secondly, they are neither university nor Government and yet have the ear of both, and so are likely to reflect the attitudes of both parties towards knowledge exchange. It is therefore through understanding the approaches of the Funding Councils to knowledge exchange that we can begin to understand whether tensions exist between different conceptualisations of it.

6.2.1 Defining knowledge exchange

Reflecting the various definitions of knowledge exchange given by those within Government, no *single* definition of the term emerges from the Funding Councils'

strategic plans, or from discussions with those employed by them. HEFCE's Strategic Plan 2006-11 describes a 'third stream' of activity alongside research and teaching, in which universities engage with 'the users of knowledge and with employers of skilled people'; these users includes businesses, public services, social enterprises and arts and cultural institutions (HEFCE 2007: 26). This is a typically all-encompassing definition. In *its* Corporate Plan, the Welsh Funding Council describes one of its six core strategic aims, benefiting the economy and society, as 'delivering more productive relationships between higher education institutions and the public and private sectors, other agencies and local communities' (HEFCW 2006b: 6). Meanwhile in Scotland, the Funding Council's Corporate Plan for 2006-09 does not set out a single sentence definition of what knowledge exchange is, but instead describes universities as 'developing individuals; serving communities and regions; and enriching our culture and society' (SFC 2006c: 9), and knowledge and information as 'driving growth and social development' (2006c: 56).

In interview, respondents from two of the Funding Councils also employed general descriptions of knowledge exchange. In England and Wales definitions emerged that, if not identical, were certainly similar. For one respondent, knowledge exchange is the means by which higher education contributes 'to the economy and society'. Traditionally encompassing more research-based interactions, it has also come to be used in relation to the teaching and skills agenda for activities such as continuing professional development. Another respondent described knowledge exchange as being 'the impacts that arise out of the research and teaching activity that's going on in the university anyway', and said that those impacts can be on both economic and social well-being. For a third respondent the third mission is 'interaction with society,

culture and economy, higher education interaction'. The word 'interaction' here is crucial because, as the respondent explained, knowledge exchange should involve a two-way flow of ideas between the parties involved.

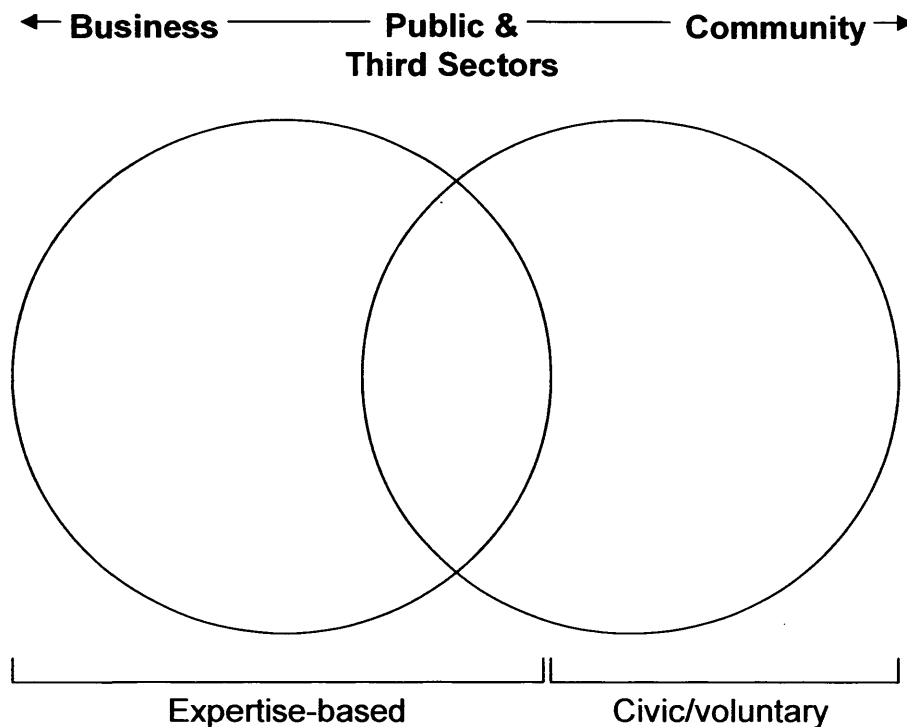
When the question of how knowledge transfer is defined was put to the Scottish Funding Council respondent, a more complicated picture emerged. He agreed that the Funding Council does indeed use the term knowledge transfer, before continuing: 'I mean it talks about knowledge exchange, it talks very much about economic development'. This economic development strand constitutes the largest part of what the SFC understands by knowledge transfer, and was mentioned most often by the respondent in relation to the Council's agenda. In addition, however, the Council does regard knowledge exchange as an activity that contributes to government policy and to the creative industries. That the Scottish Government is responsible for driving the Funding Council's priorities was reflected in the respondent's acknowledgement that economic development is being given 'a very high priority' in the Government at present and that the economic agenda for knowledge exchange 'has to do most'. The respondent also said, though, that 'I think they [the Scottish Government] have got a fairly loose definition of knowledge transfer'. His perception was, he said, that education, housing and transport agendas for knowledge transfer are also important to the Government. Later in the discussion, the respondent expressed the opinion that 'most academics' would much prefer a broader definition.

Where the English and Welsh definitions of knowledge exchange describe it as an activity conducted for the benefit of society and the economy, whilst telling us very little about the anticipated outcomes, the Scottish Funding Council respondent's

immediate linking of the definition of knowledge transfer with a highly specific set of outcomes already gives an insight into the purpose of knowledge transfer in Scotland. To pursue this in greater detail, and to ascertain what the English and Welsh Funding Councils' agenda for knowledge exchange is, it is to the purpose of knowledge exchange that we must now turn.

6.2.2 The purpose of knowledge exchange

The English Funding Council's Strategic Plan, the Corporate Strategy of HEFCW, and the SFC's Corporate Plan present three similar visions for the purpose of knowledge exchange activities, which nevertheless have noticeably different nuances. All three strategy documents refer to both the economy and society as their desired destinations for transferred knowledge. In England, the range of target audiences for knowledge exchange has been described in a diagram, which is shown at Figure 6.1. The diagram draws a distinction between business, the public and third sectors, and community audiences as potential knowledge transfer partners. Although seen as distinct audiences, however, their place on the diagram is not absolute: according to the diagram, knowledge exchange relating to the left-hand, or 'business', sphere tends to be based on specific academic expertise, whilst much of academia's contact with the community relates to the right-hand side of the diagram, in which engagement is largely based on universities' civic responsibility and so does not have a particularly 'academic' flavour; this notwithstanding, there is an area of cross-over in the middle of the diagram in which universities' offering is based on their research expertise, but the audience need not be a commercial one.

Figure 6.1: Higher education spheres of engagement

Source: HEFCE Respondent

This non-commercial area of research-based knowledge exchange is one that the 2006-11 Strategic Plan focuses on, recognising that it has hitherto not received the recognition that it deserves:

While we clearly value the benefits of HE to wealth creation, we probably do not celebrate enough the civilising contribution that HE can make to a more complex social environment. HE ... provides resources for intellectual and cultural enrichment that make the world a more exciting and vital place to be. (HEFCE 2007: 26)

The Strategic Plan continues by pledging that, '[i]n the plan period, we want to focus more on our strategic support for HE to contribute to wider social agendas' (HEFCE 2007: 27). This represents an explicit commitment to the middle portion of Figure 6.1 that is not found in the Welsh or Scottish strategies. It is also argued by the HEFCE

respondent that '[m]ost of the things that people really want, like education and health, are being supported...'.

The Welsh Funding Council's Corporate Strategy also makes repeated reference to economic, social and cultural well-being or development, and the core strategic aim relating to the third mission is titled 'Benefiting the Economy and Society'. Yet, where the HEFCE strategy expands upon the latter element of this aim, in the Welsh document the anticipated outcomes for the third mission refer to enhancing economic and skills-related knowledge transfer, to encouraging sustainable development in the HE sector, to enabling universities to develop third mission strategies, and to attracting European and other funding for the third mission. Whilst these last two ambitions are couched in terms of a desire to maximise 'economic and social well-being' (HEFCW 2006b: 12), the planning period actions (2006b: 22) relate almost exclusively to the economy and skills; none seek to directly develop social well-being.

It is apparent from conversations with HEFCW representatives, though, that those enacting policy within the Funding Council do not necessarily hold that economic well-being should take priority. In fact, from Funding Council Respondent 4's first response, it is clear that the title of the Council's Economic Development Team is regarded internally as a 'misnomer', because 'the third mission agenda is just as much about promoting social and community well-being as it is economic'. A second respondent stated:

Most people think third mission it's about economic development. It largely is in practice, but it's very important that it's not seen exclusively as that. You know, and I'm very concerned that that's the question.

The issue of knowledge exchange being about the economy in practice is a critical one, which will be dealt with further in Section 6.2.3; what is interesting to note here is that those at the forefront of operationalising knowledge exchange policy remain keen to support a broad range of activities.

As in the other strategies, the Corporate Plan of the Scottish Funding Council notes the contribution of universities to society, to the enrichment of culture and to health, as well as to the Scottish economy. And again, echoing other Funding Council respondents' descriptions of the purpose of knowledge transfer, the SFC respondent made reference to 'economic, cultural, creative industry and certain policy angles and other options for knowledge transfer'. Unlike the Welsh stance of critique towards prioritisation of economic ends, however, in Scotland the Funding Council respondent's discussion for the most part mirrored the Scottish Government's position.

This is also the case for the Corporate Plan's treatment of knowledge exchange. Having referred to the Government's priorities in the introduction, the Plan's fifth aim out of the seven is 'to generate effective knowledge exchange that stimulates innovation and development in public and private sector organisations and enterprises' (SFC 2006c: 56). Stimulating innovation in existing and new businesses is taken to be the major challenge for knowledge exchange, with innovation in public policy and services also being regarded as important. The development of Scotland's 'artistic and cultural life' is relegated to a support role – albeit one that the Council aims to develop – which will 'assist with the creation of an attractive environment in which innovation can develop' (2006c: 57). Throughout the document, although both the economy and society reappear as cross-cutting themes, it is the former that receives greater

attention, in relation both to the definition of knowledge exchange (2006c: 5) and to the objectives associated with it (2006c: 58). This reflects the fact that developing the economy is 'the Scottish Executive's top policy priority' (2006c: 13).

Having said that the SFC respondent adopted a similar position to that taken by the Scottish Government, one important qualification is necessary. Although knowledge exchange is explained with frequent reference to economic benefit, the respondent draws a distinction between the creation of knowledge – the research agenda – and the dissemination agenda, and makes it clear that the former rather than the latter must be the key driver for universities. The application of research 'shouldn't be the over-riding priority'. Why this is significant is that, towards the end of the interview, the respondent says:

I think the danger will be if things start to get tight in Britain over the next two years, the squeeze will be on the universities to show their economic benefit.

This implies that the respondent is happy with a predominantly economic focus for knowledge exchange activity, provided that it does not impinge on academics' ability to conduct research according to their own interests. Although the respondent regards the balance between different activities to be acceptable at present, there is a suggestion that the Government would be prepared to develop economic knowledge exchange beyond the point where it might impinge, and therefore that government and Funding Council priorities could diverge.

6.2.3 Managing differing priorities

If there is a suggestion in the Scottish Funding Council respondent's comments that potential exists for disagreement and conflict between the Funding Council and Government, it is one that is made also by respondents in England and Wales. Funding Council Respondents 2 and 3 both described their Council's job as being, in one's words, 'closing the loop' between the HE sector and Government, and in that role saw themselves as a buffer between the two. In managing both the health of the university sector and the expectations of the Councils' parent departments, a third respondent described how a 'complex picture' was created.

According to respondents, where government and academic viewpoints diverge in particular is over the desired outcomes of knowledge exchange activity. Having made the case – albeit less strongly in the Scottish instance – for adherence to a broad definition of the value of knowledge exchange, each respondent volunteered that economic ends were those most favoured by their respective Governments. In Wales, for example, the Third Mission Fund is only one of a number of Assembly initiatives for knowledge exchange; according to one HEFCW respondent, 'largely, of course, they are aimed at the economic agenda'. The almost taken-for-granted nature of this bias became apparent when one respondent stated, towards the very end of her interview, that 'there's obviously more of an engagement with the economic agendas'. During the course of the interviews, a common assessment of politicians' rationale for prioritising outcomes with a narrowly economic impact emerged:

One of the easiest justifications for politicians spending large sums of money on higher education is its economic impact, you know ... hard hats and photographs, it's what politicians really want, to show they're doing something, which is fair enough. (Funding Council Respondent 2)

...it's a way of being able to demonstrate to people in the Assembly, well actually you know, expenditure on the higher education sector ... it is actually an investment, because it can, you know, buy you an awful lot of return for that money. (Funding Council Respondent 4)

[I]n general it's been an issue of how can we get better economic development on the back of what is a very strong research base. ... Relative to the UK we do extremely well in research... And then the politicians turn around and say 'but where's the spinouts, where's the new companies, where's the jobs being created?'. (Funding Council Respondent 3)

This is not a prioritisation that the respondents, two of whom are also academics, appear to feel is shared by the academics with whom they come into contact. One academic respondent, talking about whether potential economic benefits of knowledge exchange constitute a motivating factor in academics' engagement, said:

If you look at what motivates an academic, money to some extent motivates academics, but it's not the biggest driver. The biggest driver is kudos amongst their peers. ... So just kind of waving pound notes in front of people doesn't drive things. (Funding Council Respondent 3)

Another argued that:

I think that commodification process where even if you're in the public sector you act as if you're a private corporation, ... I think that's a big threat. ...the third mission could be the soft underbelly of the independence and heterodox, and I think that's quite a widely accepted view. (Funding Council Respondent 2)

By way of compromise – to ensure that academics in Wales retain sufficient independence to be able to transfer their research as they choose – the Third Mission Fund exists solely as an infrastructure fund, without any close control of its use by HEFCW. The same point was made about HEIF by the HEFCE respondent, and it is also true of the Scottish Knowledge Transfer Grant. However, although it can be argued that 'that in a sense is a boundary' which helps to protect academic freedom,

the nature of the funding system itself is not unproblematic in this regard. The funding, once allocated, is not hypothecated and so can be used for any form of knowledge exchange by the recipient institution, but the allocation method *does* favour particular types of knowledge exchange.

All three Funding Councils fund against what the HEFCE respondent termed 'a basket of metrics which are the most solid'. In practice, as has been shown in discussion of the three knowledge transfer funds, this means either income based metrics or metrics that relate to income-generating activity, such as numbers of spinouts created. As the respondent from HEFCE pointed out, not all income comes from businesses; about fifty percent in England comes from the public sector, third sector or regeneration activity. However, she also realised that using income based metrics 'favours stuff where there's a real beneficiary who will pay. And that's kind of debatable. ... So I mean it inevitably biases it to the beneficiaries who have more availability of funding, which can be difficult for, you know, I suppose cultural areas, say'. Even in Scotland, where a dedicated cultural engagement fund now exists, it accounts for only a little over two percent of the total knowledge transfer budget.

Three rationales for the income-related nature of the funding metrics were suggested by the respondents. The first, and most obvious, is that the most dominant priority within the three Governments is the economy, and hence the benefits of knowledge exchange are seen in economic terms. That this is the case is strongly supported not only by Funding Council respondents' own observations on government priorities, which have been detailed above, but also by the Governments' policy documents and the comments of their representatives, as discussed in Chapter 5. The second, related,

reason behind the choice of metrics – one alluded to by both HEFCW respondents – is that economic outputs create readily quotable statistics. This comes back to the notion of 'hard hats and photographs', or the wish among certain politicians 'to be able to count beans': by creating statistics that reveal a tangible return on investment in higher education, the latter's 'value' can be demonstrated.

If these first two reasons were the only ones given for the use of such metrics then, given that the Funding Council respondents claim to be ambivalent about the targeted pursuit of economic ends, it would be surprising if alternative metrics had not yet been sought. However, a third reason identified for the use of income metrics is that they are easy to measure, whereas measurable alternatives have not yet been identified for non-income based knowledge exchange. The difficulties encountered in trying to demonstrate the impact of social research were identified by Government Respondent S4. It is, she concluded, particularly problematic to track whether new knowledge has made a difference in the policy realm, because policy making is 'more diffuse, it's not a linear process at all'. This concern over identifying impact is shared in the English policy system, where Government Respondent E2 expressed the opinion that the 'unsophisticated nature' of income measures could distort behaviour. Despite identifying that income levels are an imperfect proxy for impact, however, he was unable to identify suitable alternatives.

As this second respondent explained, it is possible to track the effect of an engagement on a sample basis, but this is 'not an easy job to do, and actually it probably takes more effort than the original bit of work'. The tracking of so-called outreach indicators was also suggested by other respondents, but it is noteworthy that

several government and Funding Council respondents drew a distinction between the validity of statistical measures and outreach indicators. Whilst some described the latter as 'woolly', 'greyer' or 'soft' measures, other respondents talked of the former in terms of their 'solid' or 'more hardcore commercial' properties. This does not imply that respondents would not appreciate the existence and use of outreach indicators, but it does suggest an inherent, and perhaps unconscious, preference for 'bean counting'.

6.3 Key findings

All of the Funding Councils are at pains to point out that they operate as knowledge transfer infrastructure funders, and that this system ensures institutional autonomy in the setting of knowledge transfer agendas. It is also apparent that, in general, the economic agenda, which comes frequently to the fore in discussions with government officials in England, Scotland and Wales, holds far less currency for Funding Council respondents. Although not themselves subscribing to the primacy of economic goals, however, the Council respondents all provided evidence that they represent the most significant driver from Government. The Funding Councils do listen to the academic community, as witnessed by the 2004 shift in the focus of HEFCW's funding from economic development to the 'third mission' more broadly, but they nevertheless remain accountable to Government. The resultant tensions are discussed further in Chapter 9.

Scrutiny of the knowledge exchange funding mechanisms also shows that there is a bias in favour of rewarding forms of exchange that produce income. Efforts have been made by HEFCW and the SFC to reward activities that do not generate significant amounts of income, the former by measuring total numbers of engagements and the

latter by applying a weighting system that favours less profitable activities. Yet, whilst the Welsh approach in particular might appear to reward non-income generating activities, in practice many of the non-income based performance measures apply to activities with at least some income-generating potential. Although not all income need be commercial, not all knowledge exchange necessarily produces income, and such activities are not equally well rewarded by the existing funding system.

In spite of some government, and much Funding Council, rhetoric in support of a broadly defined notion of knowledge exchange, and even given the freedom of universities to set their own objectives, the existing metrics send a message to academics that it is activities within the economic sphere which constitute the greater part of knowledge exchange, and that economic ends are those which should be most vigorously pursued. Whether this message actually impacts on university knowledge exchange agendas or on the activities of individual academics is the subject of Chapters 7 and 8.

Chapter 7: University knowledge exchange strategies

7.1 Introduction to the study institutions

The visions for university knowledge exchange held by the UK, Welsh Assembly and Scottish Governments, together with the strategies developed by the Funding Councils, comprise only a part of the policy landscape. As Funding Council respondents explained, their role as infrastructure funders is designed to ensure a high degree of institutional autonomy in the setting of university knowledge exchange policies. Since these policies must be vetted by the Funding Councils before funding is released, and since the Councils are themselves accountable to Government, universities are not wholly autonomous, but operate within the context of the policies described in the previous chapters. The nature of the study institutions' policies and their relationship to government policy, as well as the institutions' relationships with Government, are discussed below.

In determining the essence of these relationships, the views of senior managers at each of the study institutions were sought; the positions held by these individuals are set out in Appendix 1. The governance structures of the Universities enable many more individuals, of course, from academics to 'lay' members of public bodies and industry, to contribute to discussions on each institution's future direction. These structures include a Court of predominantly lay members, which oversees the management and governance of a university, and a governing Council, which holds the ultimate decision-making powers. In addition, Senate operates as the chief academic authority and is responsible for determining educational policy, whilst

numerous Boards – of which one holds responsibility for knowledge exchange – feed specific advice into this decision-making system.

However, although it is helpful to be aware of these structures, and of the fact that their existence means that policies reflect the interests of a wide variety of groups, it was by no means necessary to interview representatives from each part of the institution. The focus of this chapter is on *what* actual knowledge exchange policy is and *why* it is so, but not on the process by which consensus was achieved. The Vice Chancellors and Pro-Vice Chancellors, along with other senior colleagues with knowledge exchange responsibility, were deemed best able to explain these points.

As to the chosen institutions, the Universities of Leeds, Cardiff and Edinburgh are all members of the prestigious Russell Group of research intensive UK universities. In 2007 each confirmed its international reputation in the Times Higher Education world university rankings: the University of Edinburgh was ranked twenty-third in the world, the University of Leeds rated eightieth, and Cardiff University entered the top one hundred for the first time at ninety-ninth. Founded in 1583, the University of Edinburgh is by far the oldest of the three institutions, Cardiff University having been granted its charter in 1883 and Leeds in 1904. Although three hundred years older than Cardiff University, the University of Edinburgh is approximately the same in size, each institution teaching between 25,000 and 26,000 students; by contrast, the University of Leeds has in the region of 32,000 students, making it the second largest university in the country after Manchester.

It is, however, neither age nor student population that contributes to the Universities' placement within the world's top one hundred. As research intensive institutions, each receives a significant annual income from research grants and contracts that allows it to conduct world-class research. In 2006-07, the University of Leeds received almost £91 million of research income, predominantly from Research Council, charity, government and industrial sources (University of Leeds 2007a: 25). This figure was a little over £80 million for Cardiff University (Cardiff University 2007b: 19) and £120.8 million for the University of Edinburgh (University of Edinburgh 2007: 26). A more detailed breakdown of these amounts is shown in Table 7.1.

Table 7.1: Sources of research income for the Universities of Leeds, Cardiff and Edinburgh, 2006-07

Income source	University					
	Leeds		Cardiff		Edinburgh	
	£'000s	%	£'000s	%	£'000s	%
Research Councils	29,245	32	22,120	28	42,588	35
UK based charities	18,084	20	13,927	17	32,019	27
UK government bodies	19,464	21	19,543	24	20,714	17
UK industry	8,729	10	10,160	13	7,556	6
European Commission	7,063	8	5,138	6	11,630	10
Other	8,209	9	9,271	12	6,342	5
Total	90,794	100	80,159	100	120,849	100

Sources: University of Leeds 2007a; Cardiff University 2007b; University of Edinburgh 2007

In addition, the recurrent grants for 2008-09 will provide Leeds, Cardiff and Edinburgh respectively with £48.5 million, £41.7 million and £60 million of QR funding. In Wales, this figure equates to sixty-two percent of the available QR grant, making Cardiff University the best funded Welsh university for research in absolute terms. Similarly, the University of Edinburgh receives the largest single amount of any Scottish University, its £60 million grant accounting for thirty percent of the total

available. In England, Leeds receives the seventh largest amount of QR funding, behind the Universities of Cambridge, Oxford and Manchester, and King's College, Imperial College and University College London (HEFCE 2008b; HEFCW 2008; SFC 2008).

The three Universities also receive substantial amounts of funding from their respective knowledge transfer funds. The University of Leeds has been awarded a HEIF 4 allocation of £1,675,787 for the academic year 2008-09, rising to £1.9 million in 2010-11 (HEFCE 2008c). In Wales, HEFCW has given Cardiff University an indicative allocation of £1,235,786 per annum for the period to 2009-10 (HEFCW 2007). And in 2008-09 the University of Edinburgh will have a Cultural Engagement award of £61,000 and a total Knowledge Transfer Grant of £4,335,000 (SFC 2008). For the University of Leeds, £1.9 million represents the maximum available HEIF 4 allocation for English institutions, whilst both Cardiff and Edinburgh will receive larger allocations than any other institution funded by HEFCW and the SFC respectively. How the three Universities choose to interpret the responsibilities for knowledge exchange activity that accompany this funding is the subject of this chapter.

7.2 University of Leeds

In its Strategic Plan, the University of Leeds sets as its vision becoming one of the top fifty universities in the world, based on research, scholarship and education, by 2015. This is its immediate and short-term goal, but feeding into this is an enduring purpose for the University:

We are a research-intensive University which strives to create, advance and disseminate knowledge, develop outstanding graduates and scholars to make a major impact upon global society. (University of Leeds 2006a: 4)

Within this single sentence, the University sets out a mission that encompasses the three goals of research, teaching and knowledge exchange. Singling out the dimension of having a major impact on global society, the Plan concludes that '[t]his is the primary and fundamental purpose of the University of Leeds for the future' (2006a: 4). That the desired impact is on global *society*, as opposed to, for instance, the global economy, is highly significant. In expanding on its goal for enhanced 'enterprise and knowledge transfer', the University sets two objectives (2006a: 18): the first of these, enhancing 'performance and value derived from E&KT' is focused on the wealth-creation aspect of knowledge transfer; the second objective, 'to contribute to the enrichment of society on a local to global scale' deals much more with the social aspects of knowledge transfer, and makes specific reference to contribution to policy agendas.

Both objectives are enshrined in the University's 'strategy map' as key themes, alongside themes relating to Leeds' international standing, research profile and student experience (Appendix 3). The according of such significant weight to the two objectives in the University's strategy not only suggests that they are indeed regarded as part of the institution's 'fundamental purpose', but also hints at a broad definition of the value of knowledge exchange activities. This impression is further supported by Leeds' identification of 'seven areas where we can really make a difference' (2006a: 18). These are shown in Box 7.1. What is immediately apparent from an examination

of these impacts is that they encompass not simply a *broad* range of engagement activities, but rather the *full* spectrum of possibilities for research sharing.

Box 7.1: University of Leeds' seven impacts of knowledge exchange

Competitive companies

Helping individual companies to innovate so they can thrive in the 'knowledge economy' – as well as creating companies of our own.

Enriched local economies

Contributing to the range of economic activity necessary for local economies world-wide to thrive.

Informed government

Providing evidence and policy advice to national and local governments in the UK and around the world.

Enlightened public services

Assisting government agencies to operate, on a more practical front, with the benefit of the latest ideas and technology and the best-prepared staff.

Sustainable planet

Developing understanding of some major long-term global issues such as demographic trends, transport and energy.

Supported communities

Applying our expertise to benefit communities in Leeds and across the world, by working with schools, special needs groups and the voluntary sector.

Inspired individuals

Developing the leaders of the future and providing employers with skilled and work-ready graduates.

Source: University of Leeds (2006a: 18)

Given the limited conception of knowledge exchange frequently promulgated in the government policy literature, these seven impacts comprise a bold attempt to redefine knowledge exchange to appeal to all researchers, whoever their potential audience. Moreover, the University of Leeds has further developed its strategy through the creation, in 2006, of its 'Enterprise and Knowledge Transfer White Paper' (University

of Leeds 2006b). This more than fulfils the Funding Council's requirement for an institutional knowledge transfer strategy, comprising as it does a seventy-page exposition of the University's intended direction. The EKT white paper discusses knowledge transfer delivery under four headings. Whereas the seven impacts are broad in scope, however, these four headings are considerably more focused. Of the four, three deal with commercial knowledge transfer – through innovation to business, direct commercialisation and support for student and staff enterprise, whilst the fourth covers knowledge transfer to the policy community. This division is more reminiscent of that found in government policy documentation such as the 2008 white paper 'Innovation Nation'.

Nevertheless, several factors suggest that this does not indicate a narrowing of objectives for knowledge exchange at the point where they are operationalised, as has been suggested is the case for government policy. Firstly, the seven impacts do feature in the Leeds white paper, albeit not as prominently as in the Strategic Plan. Secondly, as University Respondent E4 pointed out, the review of the University's existing practices and the establishment of a new way of describing knowledge exchange '...was all done hastily. You'd want more time to do it I suppose better really...'. This implies that the finished document is not necessarily now regarded by University management as the best possible description of knowledge exchange policy at Leeds. From discussion with respondents, and from more recent documentary evidence, it is certainly apparent that the strategic approach has developed since 2006.

Each of the respondents responsible for creating and managing the University's strategic direction on knowledge exchange used the word 'impact' to explain what

they understood knowledge exchange to be. Two respondents defined it as creating 'impact on the (outside) world', and a third referred to the process of obtaining the 'maximum, most quickest impact from our activities on society'. Frequent references to impact – between eighteen and twenty-two mentions of 'impact', 'impacts', or 'impacting' per respondent – highlighted this as *the* official term under which knowledge exchange activity is now marshalled at Leeds.

In defining the purpose of knowledge exchange activity, the respondents also presented a coherent picture of where impact should be targeted. One of the Enterprise and Innovation Office respondents described the beneficiary of Leeds knowledge exchange as being 'global society', before stating that 'there's something in there for everybody'. Later, this same respondent went on to say:

And the impacts thing was seen to be the first message to put across – it's *every* impact from anyone, it doesn't have to make money, as long as you cover your costs and you're delivering impact and social benefit.

The message that social as well as economic impact is central to Leeds' knowledge exchange mission is clearly one emanating from the highest level within the management hierarchy. Both the Vice Chancellor and the Pro-Vice Chancellor for Enterprise and Knowledge Transfer agreed that tackling big societal issues and creating social, health and economic development impacts were equally important. The secondary importance of wealth creation to the knowledge exchange process at Leeds was referred to by University Respondent E3:

[Knowledge exchange] does have, in a university of our style, the baggage associated with the notion of it being ... activity that had its origins in generating a bit of extra cash on the side for the University, which again is not what it's about. That's a consequence of the activity, but it's not the driver of the activity.

The driver I see is very individual, it's about helping people to ... communicate their research to other people and to see it have an impact. ... And for different disciplines it's undertaken in terribly different ways. ... So I don't attach a financial value to something being useful.

This goes some way towards suggesting that, in defining the impact of each piece of research with reference to disciplinary differences, the University is eschewing a dirigiste approach in favour of something far more communitarian. Indeed, the Vice Chancellor acknowledged as much when he stated that:

I wish I could take the credit for it [the University's approach], but actually it was the people in this University that had that sentiment. I, of course, was a classic Vice Chancellor, as in 'please can we make some money out of this?' and so I literally wanted to stoke it up ... in the classical way – of course, I wouldn't deny that. But ... you know, the actual active academics said, 'well actually, we'd like to extend this and we'd like it to include other aspects'.

The University now recognises these other impacts in two publications which are produced biannually. The first of these, 'Insight', is the business magazine of the University of Leeds, and is distributed throughout the international business community. Published in a short, newsletter format, it contains examples of enterprise and knowledge transfer activities, of which at least one is drawn from each of the seven areas of impact identified as central to the University's mission. Reflecting the target audience of the publication, and with article titles such as 'Cash from trash' (University of Leeds 2007b: 4) and 'Students mean Business' (University of Leeds 2008a: 5), many of the chosen examples involve scientific and technological advances or business ventures. Since Insight focuses on the seven impacts, however, the *emphasis* often remains on social benefits, particularly where the intended area of impact is 'Informed Government', 'Supported Communities', or 'Enlightened Public Services' (see, for example, University of Leeds 2007b; 2007c; 2008a).

'Impact' is a younger magazine, first published in the summer of 2007. Billed as a 'biannual spotlight on research and innovation at the University of Leeds' (University of Leeds 2007d: i), the magazine 'celebrates some of the world-leading researchers at Leeds and their impact regionally, nationally and globally' (2007d: 2). The articles contained within the first two editions have focused on such diverse activities as interdisciplinary research into waste processing, engagement between the BBC and the School of English on the former's 'Voices' project, and the School of Law's involvement in researching and advising on terrorism (University of Leeds 2007d; 2007e). 'Impact' is an opportunity for the University to communicate its vision for a broad-based knowledge exchange with external parties, and also to reinforce that vision within the academic community.

Engagement with their academic community is important to senior managers at Leeds, because it aids the furtherance of the knowledge exchange agenda; this agenda, they agree, is an essential part of enhancing the University's reputation and establishing it as a world-class university. As University Respondent E1 explained, 'I think the [academic] champions and the enthusiasts will do a lot more to change the culture than anything that we can do centrally'. However, in deciding to place 'impact' at the heart of the University's mission – what Respondent E2 has called a 'eureka moment' – Respondent E4 recognises that Leeds has gone 'a bit against the grain', and the University has therefore not chosen the easiest path for developing knowledge exchange.

One of the most difficult aspects of focusing on impact has been that impact is often difficult to measure. All of the respondents from University management and

administration reported that the Government is under pressure to demonstrate where higher education monies have been spent, and that the metrics employed to do this are those which are easiest to capture; these are the quantifiable, often financial measures that tend to demonstrate *economic* impact, and Leeds collects these as part of its duty to the Funding Council. Demonstrating non-financial or social impact is, the respondents agreed, much harder and was described by University Respondents E2 and E4 as a 'leap of faith'. The former explained the importance of making this leap with reference to a new strategic partnership with Opera North:

[W]e think this is novel, innovative and is absolutely a big knowledge transfer-type activity, from which we will not make a bean. But the impact we have socially, culturally, on the city and region will be enormous really, we hope. So we've come to accept that that's a perfectly reasonable thing to do.

As to how to measure such impacts, two respondents talked of recording the 'anecdote' or 'story' of each engagement:

So you know, sometimes the anecdote, the story about what happened, is the only way that you can show after the event that you had some impact or benefit. (University Respondent E2)

I think it's important that we have the ability to recognise and collect the things that aren't measurable. And just having the kind of case study evidence is one way of doing that... But there must always be a place for the anecdotal stuff that isn't about the numbers, it's about the story of the impact... (University Respondent E1)

One example of this approach, to which a third respondent referred, is a newly established 'enrichment of society' report, which will be produced annually and which will contain case studies of impacts from across the faculties. That the University is celebrating the contributions of a diverse range of academics was also in evidence at the 2008 Enterprise and Knowledge Transfer Day. From a long-list of submitted

entries, University management compiled a list of ten ways in which the University of Leeds has changed the world. These are shown in Table 7.2. Throughout the day academics and invited guests were able to vote on these, with the winning entry being revealed at a gala dinner that evening. Professor Alastair Hay's success in securing a treaty outlawing chemical warfare was honoured as the most significant contribution to changing the world, with his achievement subsequently being reported in the Times Higher Education (Gill 2008).

Table 7.2 Ten ways that the University of Leeds has changed the world

Faculty	Way in which Leeds has changed the world
1 Biological Sciences	We have discovered how animals and humans move.
2 Engineering	We have created the most successful company ever to grow out of a UK university.
3 Education, Social Sciences and Law	We have changed the world's perception of disability.
4 Medicine and Health	We have helped to secure an international treaty outlawing chemical warfare.
5 Engineering	We have seen the invisible.
6 Arts	We describe how English really is.
7 Engineering	We have helped public transport to run more efficiently.
8 Arts	We have changed the study and development of African theatre.
9 Education, Social Sciences and Law	We have influenced the development of democracy.
10 Environment	We have changed the world's view of tropical rain forests.

Source: University of Leeds (2008b)

7.3 Cardiff University

Cardiff University describes its mission as '[t]o pursue research, learning and teaching of international distinction and impact' (Cardiff University 2006a: 1). As part of this mission, it is intended that an environment will be created in which 'all staff and

students can achieve their full potential *to the benefit of the wider community and society as a whole*' (2006a: 1, emphasis added). The importance of spreading wider benefits from the University's actions is drawn out in the innovation and engagement initiative, which sits alongside teaching and learning, and research as one of three aims of the University. These are set out in the 2006 'Strategic Plan' (Cardiff University 2006a), which covers the period to 2011, with an additional 'Innovation and Engagement Strategy' (Cardiff University 2006b) expanding on the aims described in the former.

The breadth of activity covered by the innovation and engagement agenda is made immediately apparent in the Plan:

The role of research in our innovation and engagement initiative is almost self-evident, ranging from the commercialisation of new research findings to providing evidence-based advice to governments and other agencies. Even our wider cultural contributions to society are provided by people with a distinct research background, who see these activities as an important adjunct to their scholarship. (Cardiff University 2006a: i)

It is particularly noteworthy here that cultural contributions to society are linked with academics' research. This suggests that there is a role for research-led knowledge exchange in the non-scientific domain that extends beyond purely civic and voluntary activities. In terms of HEFCE's 'spheres of engagement' diagram (Figure 6.1), this equates to the central section which is both expertise- and community-based.

In expanding on its strategy for innovation and engagement, the University defines six strategic objectives. These are shown in Box 7.2. Clearly there is flexibility within each objective in terms of the type of output and intended audience; thus, for example, the 'external organisations' to which research and consultancy opportunities will be

provided, according to Objective 2, could include third sector organisations as well as for-profit businesses. However, associated with each objective is a set of 'critical characteristics', which describe the objective's focus in greater detail. From these, it is possible to establish the objectives' main goals. Objective 1 deals with the University's corporate social responsibilities as a major civic institution in Cardiff, and is not intended to be based on specifically higher education-level expertise. The focus of the second objective is stated as '[c]ommercialisation opportunities arising from expertise of staff...' (Cardiff University 2006b: 7). Objective 3 relates to the University's role as an educator and trainer, of both students and others, whilst Objective 4 outlines Cardiff's commitment to engaging with policy makers. The fifth objective is concerned with 'communication ... of discoveries and expertise' in order to 'contribute to an informed general public' (2006b: 9). The establishment of a Community Engagement Team, which feeds into the Society and Community Panel of the University's Innovation and Engagement Board, is intended to facilitate the dissemination of knowledge to external parties on a non-commercial basis (University Respondents W2 and W4). Finally, the University aims to achieve Objective 6, cultural enrichment, through its programme of public events.

Together, these six objectives constitute a comprehensive vision for the scope of knowledge exchange activity at Cardiff. Perhaps the only caveat to this assertion is that Objective 5 refers to 'dissemination' and 'communication' (Cardiff University 2006b: 9), whereas there is no reference – except in the name of the Community Engagement Team – to engagement. In formally committing only to informing the public about its research, the University misses an opportunity to set out details of a more interactive relationship with the community that would move beyond 'tokenism'

(Arnstein 1969) and towards a more deep-seated association, and which could consequently increase the potential for engagements that fulfil the University's mission of benefiting 'the wider community and society as a whole' (Cardiff University 2006a: 1).

Box 7.2: Cardiff University's innovation and engagement objectives

Objective 1

To work with stakeholders to identify where, as a corporate entity, the University can broaden its civic responsibility and work for the wider benefits of society.

Objective 2

To provide a range of high quality research and consultancy opportunities that are valued by external organisations and, where appropriate, to further develop the outcomes of its research for the benefit of the external community and the University.

Objective 3

To contribute significantly to capacity building and professional development locally to globally.

Objective 4

To apply those activities consistent with the University's strategy and expertise that will help governments and national and international bodies worldwide to address particular problems and to contribute to policy development.

Objective 5

To disseminate effectively the University's research and knowledge to increase public awareness of and engagement with Cardiff's academic specialisms and expertise.

Objective 6

To contribute to the cultural enrichment of Wales, the UK and the world.

Source: Cardiff University (2006b: 4)

This notwithstanding, the vision set out in the Strategy is a broad one, and this is supported through a board structure that feeds innovation and engagement issues into the very highest level of the University management structure. The Innovation and Engagement Board comprises two panels, the Business and Enterprise Panel and the

Society and Community Panel, and was set up under the aegis of the Vice Chancellor (University Respondent W5). Whilst the activities encompassed by the former panel are those that 'universities have done for years' (University Respondent W3), and have long been dealt with by the University's Research and Commercial Division (RACD), recognition of the need for a dual panel structure is a much more recent development. Following the merger of Cardiff University with the University of Wales College of Medicine in 2004, the Vice Chancellor and Director of Strategic Development took the time to reassess what it was that the University valued. In doing so, they solicited views from each School of the University, from which they compiled a matrix of engagement activities that ranged from commercial outcomes to community outreach. The 'general feeling' that they encountered within the institution was that 'it [what is valued] comes back to that adding value to society part of what we do' (University Respondent W5).

This realisation led to the development of the broad view of knowledge exchange detailed in the Innovation and Engagement Strategy. The Vice Chancellor has explained, in relation to his vision for increased interdisciplinary research, that 'the part you have to drive is to make sure that it's not purely there for the purpose of economic development. It's there really to enrich the University, and to enrich our engagement with the public, with the Government, and with commercial and other concerns'. It is a commitment echoed in the Innovation and Engagement Strategy. With reference to the allocation of HEFCW Third Mission Funding, the University pledges to 'better support the full range of outcome and outreach focused activities', so as to overcome a historical bias towards income-generating knowledge exchange which 'failed to sufficiently reward some Schools for their work in advancing some

areas of the innovation and engagement agenda which were not in themselves income generating' (Cardiff University 2006b: 11).

Senior management now share a definition of knowledge exchange as the sharing and dissemination of knowledge 'for general use within the community in the broadest sense' (University Respondent W5). It is an understanding of knowledge exchange that has also filtered down into the Research and Commercial Division, where it was described as ensuring that research 'connect[s] with the world around it' (University Respondent W4). Respondents acknowledged the central University view that it isn't solely a commercial activity, and described it as 'quite broad' (University Respondent W2). This respondent also noted that the innovation and engagement agenda actually covers more than just knowledge exchange; although he did not develop the point, it is consistent with the message delivered in the 'Innovation and Engagement Strategy' that engagement comprises activities resulting from both academic expertise and corporate social responsibility.

In justifying this broad innovation and engagement mission, respondents detailed a wide range of potential benefits. In so doing, several explicitly moved beyond the economic valuation of knowledge. Although recognising that commercial knowledge exchange has got 'obvious value, because it will generate funds', University Respondent W3, a member of the senior management team, also referred to the 'other side' of the University's activities, and argued that 'we're about more than just doing things that you can measure easily'. These other things, he believed, also have 'payback', whether in terms of good citizenship and benefits to the community, or

student recruitment and widening access. Another senior colleague, who came to this management post from an industrial background, stressed that:

the University's fundamental purpose is to help people in society advance society, and advance as individuals.

The respondent admitted that tension does surround the University's mission, even within the institution. Colleagues in the humanities schools, he believed, felt that the knowledge exchange message conveyed by University management was often aimed at the sciences and engineering, and had also interpreted historically high levels of spending on laboratory equipment as demonstrating a preference for scientific activities. In spite, or perhaps because, of this perception, University Respondent W1 was keen to stress that 'moving *society* on' (emphasis added) is of key importance in the role of higher education.

Other respondents talked about the 'things which will benefit us all as individuals' (University Respondent W4). These included impacts on local communities and society more widely through healthcare (University Respondent W4), and public engagement activities or influence on Government's social policies (University Respondent W5). Whilst the business and enterprise element of knowledge exchange was referred to by all respondents, they agreed that business was only one of many beneficiaries, and one respondent went as far as to say that '[y]ou certainly don't see it [benefit] locked up within any organisation's profit line'. One final benefit that universities offer back to society was raised by University Respondent W5, namely the 'independence and questioning role of what is going on in society'. This reflects the view of one of the HEFCW respondents, who defended the importance of universities as a locus for heterodox opinion. This role is an inherently intangible one,

which certainly cannot be subjected to the knowledge transfer metrics currently in use at the Funding Council. How the University would propose to uphold such values in the light of the existing measurement system is therefore of considerable interest.

University Respondent W5 called knowledge exchange activity 'the hardest area of anything we do to measure', but argued that 'we are in a measures kind of society now', and thus measurement is required. Although as a whole knowledge exchange is difficult to measure, the three respondents from the top tiers of Cardiff University management agreed that certain disciplines lend themselves more readily to the application of metrics than do others. The volume of research sponsored by business, numbers of spinouts, and licensing income were all mentioned as examples of such measures. The relative ease of measurement of quantifiable, commercial activities – coupled with the fact that it is 'much easier for people outside the organisation to understand quantitative measures' (University Respondent W5) – has led, according to University Respondent W3, to a focus on that area.

At Cardiff, however, there is a recognition that alternative ways of recording knowledge exchange activity are needed, and the University has been working with HEFCW on generating a broader range of indicators. One possible alternative to quantitative measures is the use of spider diagrams to chart the area of impact, or footprint, of a particular piece of research. University Respondent W1 also suggested that focusing on the quality of the University's research output is paramount; this approach would result in a focus on the excellence, rather than the utility, of research. As one respondent admitted, though, 'we haven't made a lot of progress on that [alternative indicators] at the moment. We are actually scratching our heads quite a bit

about what to do...'. The problem they have encountered is that developing non-quantified indicators is 'quite challenging' because the types of knowledge exchange that are being recorded are 'inevitably subjective' (University Respondent W3).

The distinction between 'objective' and 'subjective' indicators, which in practice refers to a quantitative-qualitative divide, is one repeated by four of the Cardiff University respondents, albeit not in those terms. The words that they all chose to discuss this distinction were 'hard' and 'soft'. Although all agreed that the innovation and engagement mission encompasses a broad range of activities, every respondent – with the exception of University Respondent W1 – distinguished between the 'hard', or business exploitation, end of knowledge exchange, and the 'softer', relationship-based activities that often relate to community interactions. This is a dichotomy not confined to Cardiff University. It exactly mirrors the comments of respondents from the University of Leeds, three quarters of whom distinguished between the 'hard commercial stuff' (University Respondent E4) and a 'soft' or 'softer' approach to knowledge exchange. As has been seen in Chapter 6, a number of Funding Council respondents also differentiated between types of knowledge exchange in this way. The significance of this distinction is discussed further in Section 9.2.

7.4 University of Edinburgh

The University of Edinburgh sets out its core mission, which comprises four principal goals, in some detail:

The University's mission is the advancement and dissemination of knowledge and understanding. As a leading international centre of academic excellence, the University has as its core mission:

- to sustain and develop its position as a research and teaching institution of the highest quality...;

- to provide an outstanding educational environment...;
- to produce graduates equipped for high personal and professional achievement; and
- to contribute to society, promoting health, economic and cultural wellbeing. (University of Edinburgh 2005: 1)

The final point of the four is developed as a 'core strategic goal' – one of three, alongside education and research – to achieve 'excellence in knowledge transfer and commercialisation' (University of Edinburgh 2005: 12). The 'Strategic Plan 2004-2008' provides a broad definition of the University's knowledge transfer activities, to include those that impact on 'the health and welfare, quality of life, and culture of society, through to those that create commercial value and inform government policy' (2005: 12). In pursuit of this goal, the University aims to maximise the contribution of its knowledge 'towards realising Scottish Executive and UK Government objectives and the welfare of society as a whole' (2005: 12).

That the first part of this aim should be the case is supported by reference to the objectives and strategies for knowledge exchange laid out in the Plan. Of four objectives, three refer to commercial activity and only one to increasing non-commercial knowledge exchange. Similarly, out of the seven strategies, four relate to intellectual property, commercialisation and entrepreneurial skills development, one discusses developing strategic relationships with public and private sector partners, specifically to include SMEs, one strategy is for extending continuing professional development, and only the last commits to 'extending the non-commercial contribution of our staff...' (University of Edinburgh 2005: 13). The weighting of the strategic goal towards the commercialisation angle appears to echo the focus set out by successive Scottish Governments.

From this it would appear that the broad vision for knowledge exchange is not matched by an equally broad set of strategies and objectives. However, although it is not apparent why it is being treated separately, reference *is* made elsewhere in the Strategic Plan to engagement with the wider community. Under one of six 'operational priorities', the University states its aim as to '...make a positive intellectual, educational, economic, scientific, health-related and cultural contribution to society' (University of Edinburgh 2005: 30). Since reference is made here to an economic contribution to society, and given that the 'knowledge transfer and commercialisation' strategic goal also discusses non-commercial contributions, there is apparent overlap between strategic goal and operational priority. Whatever the reason for the distinction between them, the operational priority is expanded upon with reference to contributing to public debate and policy making, producing quality graduates and collaborating with external organisations. A significant part of the priority relates to marketing and branding of the University, but mention is also made of academic involvement with issues including planning, transport and health.

The use of commercial versus non-commercial as the principal characteristic that distinguishes different types of knowledge exchange reflects the fact that the former type has long been recognised as valuable within the University, whilst the latter has only recently become a focus of University policy. The University's 'Community Strategy', for example, is still in draft form and largely comprises an audit of the University's current position (University of Edinburgh 2008). Although commercial knowledge exchange at the University has traditionally been favoured over the non-commercial – 'because one makes a lot of money and one doesn't' (University Respondent S2) – respondents agreed that knowledge exchange is now understood in

a broad sense. According to University Respondent S1, 'I guess you could say everything that universities do to a certain extent are knowledge transfer'. Respondent S4 argued that the term's definition depended on 'who you're talking to', but suggested three main alternatives. These were restricted, focusing on commercialisation, broad, which covers any engagement with the wider community, and a middle ground. This final definition is 'roughly the definition that's used to determine the [KTG] funding', and is based on the metrics employed by the Funding Council. Senior University administrators, the respondent concluded, would use this as their 'operational definition'. As Chapter 6 has shown, and also as described by University Respondent S1, the Knowledge Transfer Grant predominantly rewards commercial activity, and is certainly focused at the outcome, rather than outreach, end of the knowledge transfer spectrum. There is therefore some tension in the claim of a broad definition.

In spite of this, the benefits discussed by the respondents were wide-ranging, and not restricted to the outputs measured by the SFC's knowledge transfer metrics. University Respondents S1 and S4 described the benefits in less specific terms than did Respondents S2 and S3. Respondent S1 saw the benefit as creating 'an impact', and not simply 'mak[ing] us loads of cash'. 'If you can make money from it, great,' he said. 'But that's not the be all and end all'. 'Impact' was not defined, but cited examples included improving the provision of healthcare services and helping children with communication problems to communicate. For Respondent S4, knowledge exchange is at the heart of the University mission, because 'there are some ideas which need testing on the world'. The principal purpose of doing this is 'to make the University a better place to be in... To make the University something that is useful to Scotland'.

The point is not elaborated, but a later reference to the impact of knowledge exchange draws out social as well as economic benefits.

Whilst the terms in which the benefits of knowledge exchange were described by University Respondents S1 and S4 were relatively general, both they and the other respondents tended towards a description of knowledge exchange that could be read as a three-part classification. This implicit classification was particularly apparent from discussions with Respondents S2 and S3. Describing knowledge transfer, the former said:

I like to use knowledge transfer in a very broad way, so not just rolling out research ideas and new technologies... [W]e need to have a lot of public engagement between the researchers and the public, and a way of feeding that back in to government policy, as well as our own research development.

This statement sets out three distinct types of knowledge transfer, namely technology transfer, public engagement and policy development. With a Vice-Principal for Community Relations, it is apparent that public engagement is a particular priority for the University. That this is so was also demonstrated by references made by every respondent, including the Director of Edinburgh's technology transfer office, Edinburgh Research and Innovation, to the University's public lectures and events. A series of free 'Enlightenment lectures' was singled out by Respondent S3 as particularly popular, despite their 'esoteric' and 'heavyweight' content, and both he and Respondent S2 discussed future plans for developing engagements in new places, both in the University and in public spaces outside it.

Although the University has only recently begun to develop a strategic overview of it, it was made clear that the three Colleges of the University have always undertaken significant amounts of engagement activity. In making reference to the Enlightenment in the title of its recent public lectures, not all of which were *about* the Enlightenment, the University emphasises its link with that period's scientific and philosophical traditions, whilst Respondent S4 argued that the University's history of engagement could be traced still further back: 'I mean a feature anyway of the Scottish ancient universities is very strong civic engagement. From the outset this University was intended to serve the local community.' With an understanding of the role of public engagement so deeply embedded in Scottish history and traditions, it is unsurprising that it represents such a strong feature of discussions on knowledge exchange.

The contributory role of the University to government policy development represents a more recent element of engagement activity. In some respects policy engagement is regarded simply as an extension of public engagement. As the above quotation from Respondent S2 on different types of knowledge exchange suggests, it is through engagement with the public that the University has something to feed back into government policy. The University's recent successful bid to become a Beacon of Public Engagement is also intended to focus on public policy development. However, although the two areas of engagement can interact, the audience for each is distinct and thus they tend to be discussed as separate forms of engagement. The discussion at the University of Edinburgh of different 'types' of knowledge exchange, creating the implicit categorisation described above, is particularly notable because it contrasts with the approach taken by, for example, the University of Leeds. In the latter case, the University has consciously moved away from any attempt at describing whom an

engagement might take place with; instead, in shifting the emphasis to an engagement's 'impact', the focus is placed on the outcome. Whilst the University of Edinburgh's focus is now wider than its original concern for technology transfer, it does not embrace the same scope as does the Leeds approach.

In terms of the measurement of knowledge exchange activity, University Respondent S4 noted that the 'creative domain' was an area of unresolved debate, and that 'people have not yet successfully assimilated that into the model'. The engagement work of universities through 'exhibitions and conservatoires' is therefore not being recorded. University Respondent S1's view that the Knowledge Transfer Grant metrics are 'kind of income driven' serves to confirm this view. A third respondent championed case studies as 'a good way forward' for demonstrating levels of non-quantifiable knowledge exchange, but concluded that 'showing how you change a culture or impact on society is very very hard'. This difficulty the respondent deemed problematic for two reasons: firstly, because 'more and more people want you to justify what you did with your money'; secondly, 'there's not much point' in undertaking knowledge exchange activity if it has no impact, and so evaluation is crucial to assess effectiveness.

University Respondent S4 noted that the existing metrics were negotiated between the SFC and Universities Scotland, and also talked about the need to be 'skilful' in developing measures. From his discussion, it appeared that he believed that the negotiations had indeed been skilful, and had produced an acceptable set of metrics. However, Respondent S2's concerns about the difficulties of recording certain activities suggests that they are not perfect. Given Respondent S4's comment that:

...it's bound to be the case that what you measure, and the way you measure it, affects what's going on. ... To measure is to change.

then there would seem to be potential for the unmeasured impacts to be overlooked, as those activities that can best demonstrate a return on investment receive greater attention. Although the University of Edinburgh is clear in its mission to generate a range of impacts, this is an obvious tension.

One final comment that is worthy of note was made towards the end of the interview with Respondent S1. Having already discussed the metrics that the University is required to return to the Funding Council, and asked whether one particular measure spoke to him of the success of an interaction, he replied:

I'm not sure there's necessarily *one* thing. The thing that works well for us is when unsolicited, you know, people who've dealt with us compliment us. ...when we get venture capitalists saying, you know, that was dealt with professionally. Or we get any kind of thing, when third parties are saying that was actually pretty good. ... But I think when it's recognised, you know ... we want to be seen as the best in what we do. And it's that kind of thing which helps.

Even in commercial interactions with venture capitalists, it is the kudos of being seen as professional and 'the best in what we do' that, for this respondent, is the most significant measure of success. That kudos is important to someone responsible for developing the University's knowledge exchange policy is especially interesting, because it is a value that will appear again in Chapter 8, in relation to the motivations of individual academics.

7.5 Relationships with Government

It is apparent from the three Universities' knowledge exchange strategies that efforts are being made, at least within this sample of academia, to define knowledge exchange in a broad manner, encompassing work undertaken by academics from a range of disciplines. In the case of the University of Leeds in particular, this extends to an explicit policy of encouraging engagement of *any* kind by *any* academic. Given the findings of Chapter 5, that government knowledge transfer policy in England, Wales and Scotland exhibits a bias towards economic outcomes – even where reference to alternative benefits is made – there would seem to be some degree of divergence between university and government policy. To further investigate whether this is the case, university officials' views on government focus, and the extent to which they believe university and government policy to be convergent or divergent, is therefore of considerable interest.

All of the respondents from the University of Leeds and the University of Edinburgh, as well as three respondents from Cardiff University, mentioned achieving economic impact as a significant driver for government knowledge transfer policy. In England, the then Department for Trade and Industry was identified as playing a central role in setting policy, together with the Treasury, which 'has [had] a major influence on the way policy is determined in our Government for the past ten years' (University Respondent E2). According to University Respondent E3, while the DTI's interest 'extends probably to looking at UK plc', 'our world extends to the world'. Thus, while University Respondent E4 found that DTI contacts 'said all the right encouraging words' about broad-based knowledge transfer activities, respondents ultimately agreed that the government definition of knowledge exchange 'tend[s] to go back in that

[economic] direction at the drop of a hat' (University Respondent E2). In terms of regional policy delivery, Yorkshire Forward was identified by University Respondent E5 as being the only government agency of import; the impact of this is that 'of course, everything that Yorkshire Forward does has at some point to be tied into economic benefit' (University Respondent E6).

That the national focus of knowledge transfer policy has tended to be on scientific and technological research was noted not only by respondents from the University of Leeds – among them University Respondents E1, E3 and E4 – but also by those at Cardiff University. According to University Respondent W3, 'the Government when they talk about knowledge transfer tends to be DTI knowledge transfer focused'. This definition he distinguished from the broader one used by 'a lot of universities', Cardiff included. 'DTI knowledge transfer' was used here as a shorthand, the types of activities encompassed by it being also alluded to by University Respondent W1, who described the Department as 'historically an arm of government that helped economic development in a myriad of ways'.

In Wales, the Department for the Economy and Transport (DET) – briefly known as the Department for the Economy, Innovation and Networks (DEIN) – was cited by University Respondent W5 as having a significant impact on knowledge transfer policy. Here the respondent identified 'a tension between the EIN group and the Education group about what's Third Mission Funding for', the former being most keen to see 'hard', or economic, returns. As described in Chapter 5, however, the Assembly Government respondent from DECWL foregrounded economic benefits as strongly as did respondents from DET. When asked whether there was any engagement between

the University and departments of the Assembly other than DECWL and DET on knowledge exchange, University Respondent W5 issued a categorical 'no'. University Respondent W3 reported that '[o]bviously the Health Department's very interested with what we do with NHS Wales', but both he and Respondent W5 agreed that departments with responsibility for culture did not show sufficient interest in the University's activities.

Questioned about the Scottish Government's focus for knowledge exchange, University Respondents S2 and S3 both regarded the main driver as an economic one, the former going so far as to say that this was 'bound to be' the case. This was also true according to University Respondent S4, who believed that:

the current Scottish strong position in knowledge transfer is a direct consequence of the wish of the Scottish Executive to have the universities play a key role in economic development.

In spite of this, both he and Respondent S2 had observed a widening of the knowledge transfer agenda in recent years to include the 'social sciences' and 'community engagement'. The 'health and welfare of the nation' was also seen to be a Scottish Government priority with cross-overs into knowledge transfer policy.

What is particularly apparent in Scotland is the close relationship between the Scottish Government, Scottish Funding Council and University of Edinburgh. In the words of University Respondent S4, there are 'mostly areas of similarity' between the University's and the Government's policies. Moreover, the impact of the Scottish Government's approach on the University's ability to engage in knowledge exchange has been '[p]ositive, positive'. Eighty percent of respondents from the Scottish

Government, SFC and University of Edinburgh made reference to benefits arising from Scotland's small size in comparison with England. Because of the size, all of the relevant agencies were able to operate as a 'fairly local community' (University Respondent S1), allowing universities ready access to the Scottish Government and the Funding Council (University Respondent S2) and making it 'quite easy to form relationships' (Government Respondent S4). The upshot of this was variously described as 'consensus', a 'coordinated' and 'unified' approach that is far removed from the 'diffuse, not joined up' system in England (Government Respondents S1, S2 and S3, and Funding Council Respondent S3).

This clear consensus on the strength of the relationship between the Scottish Government and the University of Edinburgh provides an insight into the content of the University's knowledge exchange strategy. The University's commitment to 'realising Scottish Executive and UK Government objectives' (University of Edinburgh 2005: 12) is reflected particularly strongly in its development of two strategy areas. Firstly, the focus on commercial knowledge exchange – which accounts for three of the four objectives set out under the 'core strategic goal' – reflects the Scottish Government's prioritisation of the economy, as described in Chapter 5. Secondly, just as public engagement is justified with reference to specifically Scottish Enlightenment ideals, so the idea of 'Scotland as a small country' (Government Respondent S1) is used by respondents to warrant a focus on policy engagement. According to University Respondent S4, 'I think Scotland has been more explicit and more focused on these things [economic and social knowledge exchange] than Westminster'.

The sense of a shared agenda for knowledge exchange is readily apparent in Scotland, but not so in Wales. Here evidence arose of mutual suspicion between the Welsh Assembly and the higher education sector. University Respondent W5 described how:

there has been a bit of tension I think between the approach that we've taken in relation to our Third Mission Funding, which is to say that actually this covers the broad spectrum of innovation and engagement activity in our definition, and what [the DET] area of the Assembly seems to want out of this. ... And we perceive that the [DET] people are asking: 'well what are you spending this money on community activity or social activity [for]? It should all be on the hard end of knowledge transfer'.

The respondent then went on to identify a 'lack of sophistication' in the Assembly's approach to knowledge exchange, which is focused on 'the hard end outputs ... all the time'. This focus is unsurprising given how embedded economic concerns are in the Assembly's very *raison d'être* (Morgan 2006), but the tension that results when those concerns encounter the University's broader vision for knowledge exchange serves to emphasise just how strong the economic rationale is. Respondent W5's sentiments were also reciprocated by an Assembly Government respondent, who called universities, and 'particularly universities in Wales', 'unsophisticated', on the grounds that they tended to protect their intellectual property too fiercely in their attempt to make money from it. The Cardiff University approach to knowledge exchange, which is to say that universities are not businesses (University Respondent W1), would seem to contradict this view.

What is significant about this is not who is right or wrong in identifying the other party as unsophisticated, but rather the fact that there is mistrust between the University and Assembly Government. Tension was also identified between the thrust of central Government's knowledge transfer policy and the University's stance.

Expanding on his point, that 'I'm well aware that there are tensions,' University

Respondent W1 stated that:

Treasury and Lambert potentially went down this 'well, universities are there for economic benefit' route. ... There's always a risk that monies will be moved, let's say at a central Treasury level, only into areas of universities where there is an obvious economic benefit. And that has led to tensions, I think, in discussions about the missions of universities in the UK.

Although University Respondent W3 believed an economic focus by Government to be acceptable – because economic development is an 'important activity' – even this respondent thought it true only '[a]s long as it doesn't take over everything else', making it clear that such a focus was, from the University's point of view, only partial.

The partial nature of central Government's approach was also alluded to by respondents at the University of Leeds. For University Respondent E4, the Government's recent interest in the more social outcomes of knowledge exchange is merely a response to the 'backlash from various people saying 'well what about arts, and what about social sciences?'. Ultimately, however, the Government is 'still on the same mantra really, but then they all say 'oh, and by the way, by 'science' we mean the broad bases of science – arts, humanities...'. The notion that a broader definition of knowledge exchange remains an add-on for Government also rang true for University Respondent E1, who '[couldn't] imagine why higher education policy wouldn't strive to try and support that kind of activity across the board', but thought that currently policy 'is not explicit enough for us' on this point. From these responses and from that of Respondent E3, who described government policy on innovation as 'fantastically aligned' with the University's knowledge exchange strategy, it is apparent that the suspicion exhibited by Cardiff University respondents towards their Government is

not replicated at Leeds. However, this is not to say that there is the same degree of consensus as in Scotland. Distinguishing between the University's policy focus and the Government's, University Respondent E3 said:

There's quite a lot of overlap [between government and university policy], but there definitely are some territories that we [Leeds] look in different spaces – basically non-economic examples of innovation and our international influence.

Whereas respondents from the University of Edinburgh made claims for a close relationship between their institution and the Scottish Government, in both Cardiff University and the University of Leeds respondents made some attempt to distance themselves from their Government's stance on knowledge exchange. In Wales this manifested itself in criticism of the Assembly and, although at Leeds there was greater acknowledgement of overlapping priorities, both here and at Cardiff University priorities were identified as being more wide-ranging. This is reflected in the universities' knowledge exchange strategies, each of which includes a broader range of researchers and audiences than is in evidence in government policy.

There are several possible explanations for the closer relationship between the University of Edinburgh and the Scottish Government, and the associated similarities in their knowledge exchange policies. The first is that the University could be behaving in a conservative manner in simply following existing government policy. However, the University's pursuit of *public* engagement, not a subject with which the Government has particularly concerned itself, suggests that the University is willing and able to pursue its own agenda when it chooses. It therefore seems more likely that, where the values of the University and Government coincide it is because those values are shared. Whether this results from a common belief in deep seated, and

distinctly Scottish, ideals – as references to the Enlightenment and the civic tradition in Scotland's universities might suggest – or whether Scotland's small size allows each party to bring its influence to bear on the other is not wholly certain. In practice, it is probably through a combination of both, which are in any case probably not entirely distinct effects, that such consensus is reached.

What respondents from all three universities were at pains to point out was that higher education institutions retain autonomy, and are not subject to direct intervention from Government. This enables them to develop strategies according to priorities that they themselves define. At the University of Leeds, Respondent E3, having previously noted that the principal driver for knowledge exchange recognised by Government is economic, argued that that driver 'need not jeopardise the essence of what a university is'. Indeed, as University Respondent E1 pointed out, one of the seven impacts identified by the University is 'Informed Government', and Leeds therefore has a role to play in informing government policy – a role that the then DTI was apparently open to. At Cardiff University, Respondents W2 and W4 also agreed that, whilst government policy 'guided and helped and supported' the University, and could not be ignored, it was important for the University to not 'just be reactive'. In Scotland, too, this need for universities to balance demands from Government with their own objectives was apparent. University Respondent S1 reported that:

...we're very much aware of the [policy] trend if you like. And we kind of monitor it. ... So, you know, we follow what we think is right basically. We remain a wee bit flexible, as I say, that we can ... shift as well if need be.

That independence continues to be an essential, and presumed upon, element of the modern university was highlighted by University Respondent S4 who, when asked if

the University of Edinburgh retained autonomy from the Scottish Government to operate as it saw fit, replied simply: 'Well of course we have the autonomy'. This assertion was endorsed not only by colleagues in the universities of Edinburgh and Cardiff, but also by Government and Funding Council respondents in England and Wales. One Cardiff University respondent, responsible for developing the current knowledge exchange strategy, described this autonomy in action: 'it could have gone a different way, it could have gone totally down the commercial route...'; only through individuals' choice within the institution did a more wide-ranging policy develop. Nevertheless, the Government, 'because they control the purse strings, exert a huge amount of influence' (University Respondent W2). It is consequently not always easy for universities to behave independently. According to University Respondent E4:

it is difficult, when all the funding streams are pushing in one direction, to try and open it out. So I suppose it does feel in that sense that you are going a bit against the grain from where the funding is taking you.

More recently, however, the respondent has observed a shift within the Research Councils towards supporting knowledge exchange in a format relevant to their specific research areas. Although 'the DTI ... has been exhorting us for many years, and funding efforts in that direction [towards economic impact]', and although changing habits and practices is 'a long process', the support of the Research Councils has led the respondent to conclude that 'different elements of the tide are now lining up'.

Whether or not this proves to be the case in the long term, it is crucial to remember that, whilst governments and universities set knowledge exchange policy, it is academics who practise it. Just as government policy influences universities, so

government and university policy impacts on academics but, like universities, academics have autonomy: there is no simple relationship between policy in and actions out. The complicated picture at the interface between policy and practice was registered by Government Respondent S1:

It's difficult, because you can't really talk in any sensible way about the university sector. You can't even really talk about a university. Most of the time it comes down to maybe departmental head, or even lower than that, in terms of the cultures, the attitudes and the behaviours that people will exhibit.

Whilst it is important to understand the policy context precisely because it is the framework within which practice occurs, academics have the ability within those constraints to exhibit a range of behaviours. Thus policy has the potential to alter behaviour over time but, at any one point in time, it is existing behaviours that define what knowledge exchange 'is'. Some policy makers also regard academics as important because they can exert a greater influence over fellow academics, and hence over knowledge exchange practices, than can management:

I think the champions and the enthusiasts will do a lot more to change the culture than anything that we can do centrally. (University Respondent E1)

It won't be the likes of RACD that will make that kind of culture change happen or work. It's got to come from the coalface if you like, from where the expertise exists within the academic environment. (University Respondent W4)

Given academics' power to influence our understanding of what knowledge exchange is, and is for, it is to the experiences of a sample of academics engaged in a variety of knowledge exchange projects that Chapter 8 is addressed.

7.6 Key findings

Respondents from all three study institutions recognised a need to broaden the definitional scope of knowledge exchange to encompass activities undertaken across the entire university. At the University of Leeds, the development of a strategic direction for knowledge exchange focuses on seven potential areas of impact. The adoption of the term 'impact' was described by University Respondent E2 as a 'eureka moment', because it has allowed the University to promote knowledge exchange to all of its academics. This strong rebranding of knowledge exchange activity, combined with the creation of a single Enterprise and Innovation Office to provide support to academics and the publication of Insight and Impact magazines, are all designed to ensure that the entirety of the academic community is engaged.

Cardiff University has similarly developed a series of objectives for knowledge exchange that covers a wide spectrum, from public engagement to consultancy services and contributions to government policy development. Knowledge exchange activity is now referred to as 'innovation and engagement', reflecting the University's valuation of a broad range of outputs. Although the University's Board structure now incorporates both the business and enterprise and the society and community aspects of knowledge exchange, the associated administrative structures for academics remain less well developed than at the University of Leeds.

Whilst the knowledge exchange strategies of both the University of Leeds and Cardiff University refer to knowledge exchange in the broadest terms – as a means of encompassing all forms of activity – the approach at the University of Edinburgh is somewhat different. An implicit classification of three types of knowledge exchange,

namely technology transfer, public engagement and policy development, emerged. The focus on technology transfer reflects the historical privileging of such activity. Public engagement is regarded as important because the educational ideals of the Enlightenment and the Scottish universities' founding principle of civic engagement are still strongly felt within the University. Close links with the Scottish policy community are facilitated by the institutions' collective ability to act as a 'fairly local community' (University Respondent S1), a consequence of Scotland's size. University of Edinburgh academics' role in establishing the mechanisms of the Scottish Parliament and the Parliament's desire to engage with academia (see Section 5.5.1) have strengthened these links.

The broad-based strategies developed by each of these institutions demonstrates that universities have the autonomy to define knowledge exchange according to their own values. However, this does not mean that their Governments' narrower conceptions, referred to by the majority of university respondents, are not having an impact. The Funding Councils' knowledge exchange metrics are particularly problematic according to respondents from all three universities. These metrics are 'kind of income driven' (University Respondent S1), and hence favour income-generating activities. Attempts to record other forms of knowledge exchange are made difficult by the fact that 'we are in a measures kind of society now' (University Respondent W5), resulting in qualitative assessments of impact being labelled 'soft' or 'anecdotal'. Although university respondents feel the pressure to perform against income based metrics, however, it is not necessarily the case that the same pressure is felt by academics. It is therefore academics' perspectives on the policy and practices of knowledge exchange that must next be considered.

Chapter 8: Academics' perspectives on knowledge exchange

8.1 Introduction to the study projects

To provide a framework for the investigation of academics' views on knowledge exchange, six examples of knowledge exchange activity were chosen, two from each of the study universities. As described more fully in Section 4.4, one example from each institution had a predominantly scientific focus, and one took a more social scientific perspective. The use of this system not only provided a mechanism for identifying individual academics and non-academic partners who could be interviewed, but also ensured that opinions were sought from academics engaged in a variety of knowledge exchange activities. Beyond the fact that they embody different types of knowledge exchange, it is not the focus of each project per se that is of interest here; rather, each respondent's experiences of, and attitudes to, knowledge exchange are of principal concern. The projects cited below formed much of the context for discussions. Although respondents also drew on experiences from throughout their careers to explain their attitudes and motivations, the importance of the six projects as illustrative examples necessitates a brief description of each.

At the University of Leeds, the Yorkshire Centre for Health Informatics (YCHI) is engaged in an ongoing and 'fluid' relationship (Academic Respondent E Sci 2) with a number of organisations, including the Health Informatics Service and Intel. One of the strengths of the network was identified as access to members' other contacts; Intel, for example, had been introduced to the YCHI by Accenture and had, in turn, introduced the YCHI to Dell. Whilst individual projects are undertaken by the network, on a day-to-day basis no specific outcomes are identified. The network is

maintained on the understanding that networks 'all lead on to other things' (Respondent E Sci 2), which have included joint workshops, masterclasses and brainstorming sessions.

The second example of knowledge exchange at Leeds is a series of five workshops collectively entitled 'You and Your Body'. Focusing on the joints, heart, brain, liver and guts, the free events were open to the public on Saturday mornings and comprised four twenty minute talks by academics, together with demonstrations and hands-on exhibits. The events were designed to increase public awareness of and confidence in the University's research. However, these were not solely public information events. They were undertaken on the understanding that the public's expertise and experience can help to develop avenues of research, and that engagement facilitates a more rapid uptake of research by society (Howdle et al. 2007a).

At Cardiff University, the young spinout MedaPhor was the subject of investigation. The company provides e-learning modules and virtual reality simulation training for users of medical ultrasound. The idea for the company sprang from a recognised need within the NHS to improve efficiency by steepening the learning curve of trainees and reducing reliance on patient contact. MedaPhor was created as a spinout from the University as a means of balancing the principal inventor's wish to retain control of the project with the need for financial input to bring the product to market.

Research into deaf individuals' interaction with genetic counselling services, funded by the Department of Health, formed the second project studied at Cardiff University. The project seeks to understand the reasons behind low uptake of counselling

services, in order to provide recommendations for the improvement of services. Anticipated end users are the NHS, genetic counsellors and members of the (medically) deaf and (culturally) Deaf communities. Since these latter groups also represent the subjects of the research, this project simultaneously combines elements of research and knowledge transfer.

Investigation into scientific knowledge transfer at the University of Edinburgh focused on a project undertaken by the Edinburgh Parallel Computing Centre (EPCC) for a Glaswegian SME called Dimensional Imaging. The company has developed a system for 3D facial modelling which can be used in the planning of facial reconstructive surgery. Dimensional Imaging had identified a need to reduce the processing time involved in this and, following an introduction by Scottish Enterprise, the EPCC undertook an experimental project to port the company's software to a new type of computer. The EPCC was set up to conduct knowledge transfer and so, where experimental research such as this occurs, it is only as a result of an initial knowledge transfer request by a company.

The final project chosen was the 'Knowledge and Policy' project, which is currently taking place under the European Commission's 6th Framework. The project will run for five years, and covers the health and education sectors, with six teams investigating each sector across eight countries. The teams, one of which includes the respondents from the University of Edinburgh, are aiming to understand more about how 'knowledge flows through a policy domain' (Respondent S Soc 1), and how it is produced and used by Government. Outcomes will be shared between the teams, within the academic community and with the policy community. As such, the project

is similar to the genetic counselling project, with research and knowledge transfer being closely linked.

All of the academics involved in these projects are engaged in some form of knowledge sharing activity. It is clear from discussions with them, however, that the ways in which they define this activity, within the context of their academic work as a whole, are as varied as the projects themselves.

8.2 The concept of knowledge exchange

Like many of the government respondents, a number of academics described knowledge exchange with reference to their own experiences of it. Academic Respondent W Sci 2, for instance, described it as the 'transfer of knowledge or ... skills into a wider commercial environment', and Respondent W Soc 2 discussed it in terms of patient engagement in the commissioning of research by the NHS. This approach was also adopted by external, non-academic partners such as Respondent S Sci 3, for whom knowledge exchange is 'basically getting technology from the labs into companies, as far as I can tell', and Respondent E Sci 3, whose organisation uses the term specifically in relation to the need for colleagues to share their knowledge with each other as a means of 'back-up'. This final respondent had never before considered his organisation's interaction with the YCHI as knowledge transfer, although he supposed that 'the fact that we're trying to impress knowledge from projects and experiences' did mean that the relationship constituted a form of transfer.

Other respondents immediately identified a much broader scope for knowledge exchange. Respondent W Sci 1 argued that '[i]t can mean many things', including the

creation of products that are transferred to industry, public lectures and collaborative research with industry, before concluding that '[i]t's so broad'. Respondent S Soc 1 defined a 'default' position that 'knowledge transfer is all those things we do ... that are not either RAE-led research or teaching registered students'. The recent focus at the University of Leeds on 'impact' had made an impression on two academics, one of whom said that 'we've always had it [knowledge exchange] in the University, but it's always been very much geared to things like spinout companies ... it's just been totally irrelevant'; this was changing, however, and 'now we're gearing it to talk about 'impact', what's the impact of your research'. Respondent E Soc 4 also reported that, at a meeting with the Faculty Director of Enterprise and Knowledge Transfer, 'we clicked, and I realised that the things that she was talking about, which is about making a difference with research..., that was actually what I was passionate about...'.

Not all respondents, however, found the term 'knowledge transfer' a relevant one. For some, the term was not one to which they had given real thought. Respondent W Sci 3 felt that the term means something only in a 'vague, nebulous sort of way', whilst Respondent E Soc 2 was 'not sure whether I'm a great expert on KT'. Given that all of the respondents were engaging with external parties, this at first appears surprising. However, other responses shed light on this lack of identification with the term. Four respondents – three engaged in social research projects and one in more scientific research – made comments to the effect that research and engagement were not discrete activities. Three respondents, who were familiar with the term knowledge transfer, noted only that '[r]esearch and engagement are fairly inseparable' or that 'knowledge transfer isn't separate from research and teaching; it's there underneath it'. For Respondent W Soc 3, though, the concept of 'knowledge transfer' was entirely

problematic. Having been asked if terms such as 'knowledge transfer' or 'third mission' meant anything to her, she replied: '[k]nowledge transfer? ... Um, I don't know', before going on to say:

I've never really seen it as anything separate really from what I do, it's just all integral, it's all part of it. ... I wouldn't see the point of doing research if you didn't have knowledge transfer. It's just exactly the same thing.

This suggests that, although research sharing and engagement with non-academic audiences comprises a significant part of some academics' activities, they do not necessarily regard it as a distinct activity, and have thus not needed a term to describe it. That this should be the case was confirmed by two academic respondents:

Much of the University [of Edinburgh] hasn't, I suspect, not actively, reflected or thought about it [knowledge transfer]. ... But that's actually slightly something of a misrepresentation, in that many of those people are actually fabulously engaged, creative knowledge transfer activists. (Respondent S Soc 1)

...I didn't realise I was doing it. (Respondent E Sci 2)

While some respondents positively identified with the term 'knowledge transfer' and others, although not recognising the relevance of it as a distinct concept, raised no particular objections to it, some were openly ambivalent about, if not antagonistic towards, use of the term. Only one respondent from this final group was currently in a science department, although another had moved from directly scientific research into the study of the history and philosophy of science. Of these two respondents, the former 'hate[s] the term knowledge transfer', because 'I don't see how you really transfer knowledge'; instead, he regarded 'technology transfer' as a more appropriate term, since 'a lot of the time ... it's actually something technological that's being transferred'. Whereas this respondent objected to the 'knowledge' element of

knowledge transfer, for others the term 'transfer' proved problematic. Two respondents in particular raised the point that knowledge cannot be 'transferred unproblematically to other places' because 'it's transformed as people work with [it]' (Respondent S Soc 2).

An ambivalent attitude to knowledge transfer is perhaps most clearly exemplified by Respondent S Soc 1, who actually prefaced his own definition of it by saying that 'I am ambivalent and I think we should be'. For this respondent, his ambivalence was linked to a concern that 'incipient institutionalisation' of knowledge transfer was already occurring and that, if academics allowed 'discussion to be foisted on us', it would become about accountability and measurement rather than being a creative process. It is apparent from other respondents' comments not only that they are 'gloomy' about being 'additionally burdened with auditing, describing, counting, measuring' (Respondent S Soc 1), but that they are happy to rely instead on alternative, non-statistical, indicators of their success.

8.3 Assessing the success of knowledge exchange

That the current metrics based system for 'measuring' success did not chime with many academics' preferred approach was made clear by a number of respondents, of whom – in addition to Academic Respondent S Soc 1 – only one was engaged in social research. Respondent W Soc 1 argued that 'you can't impose the same set of criteria to judge and assess everybody', but saw signs that 'that's going to happen'. Although Respondent W Sci 1 thought that there was now greater recognition across the sector of the need to record activities at 'the society and community end' that had

hitherto not been measured, others found existing measures flawed even for the sciences:

The big worry that I have with the whole knowledge transfer thing is it doesn't reward me for doing what we do. It doesn't reward us for going out and meeting companies and talking to them about how to solve their problems... But of course because the income to University is governed by this ... we just play the game and we gather these silly metrics.
(Respondent S Sci 4)

Respondent W Sci 3 also found that 'the mechanisms and the efforts and the rewards associated with it [knowledge exchange] I think are less developed [than for research]'.

However, in spite of the unsuitability of existing metrics and of concerns over a looming audit regime for knowledge exchange, academics show by their own actions that alternative approaches to assessing knowledge exchange activity can and do exist. When asked how they determined whether an interaction had been successful, two respondents replied that 'I guess you never really know' and 'you'll never know how much benefit it's been for some people will you?'. What is most interesting about this is that neither respondent saw this as problematic. Although two further respondents noted that many measures of success are 'woolly', and that the social sciences struggle to demonstrate impact because their indicators are largely 'anecdotal', this did not deter even them from employing such indicators. Indeed, half of all respondents volunteered that positive feedback on their knowledge exchange activities was a significant indicator of their success. Of these, over half were engaged in scientific research. Two were external partners who operate in a commercial environment; these included Respondent E Sci 1, who described feedback as 'fairly unscientific' but nevertheless valued its role in shaping future activities.

Other measures of success were employed by respondents and, for those engaged in more scientific research, this included some of the official measures used by Funding Councils to assign knowledge transfer funds, such as sales of products (Respondent W Sci 2), and measures of consultancy levels and of work in continuing professional development (Respondent E Sci 2). The metrics introduced by the three Governments reward, directly or indirectly, universities' performance in generating income from knowledge transfer. However, the high degree of outright scepticism about existing metrics, combined with the widespread use by academics of more 'anecdotal' indicators for their own benefit, suggests that the official metrics are not measuring those things that academics regard as important. Whether or not income generation is a primary motivating factor for individual academics, and what other motivations drive them, is the subject of the following section.

8.4 Valued outcomes and motivating factors

From academic respondents' discussion of their reasons for undertaking knowledge exchange, four main rationales emerged. One of these was a financial rationale although, as will be seen, this tended to take second place to the other factors. The three other motivating factors most often mentioned were making a difference to the collaborating partner or to society at large, increasing personal or institutional kudos, and having the opportunity to undertake interesting or exciting new work.

8.4.1 Making money

Respondents from all six of the projects under investigation made mention of the financial aspects of knowledge exchange, although references by those engaged in scientific research were far more numerous. Only three out of nine respondents

interviewed for the social research projects mentioned the commercial angle of knowledge exchange. Of these, none referred to making money as a personal motivation for engaging with non-academic parties; instead, they discussed financial rewards in the context of their University's motivations, and those of the Government, for promoting knowledge exchange. These comments will be explored in subsequent sections.

It would perhaps be expected that scientific researchers would be more likely to refer to financial gain, since their work is more traditionally regarded as suitable for commercialisation. This indeed proves to be the case for the projects studied here, but the context in which the references are made reveals some potentially surprising attitudes. Two respondents from MedaPhor, the spinout from Cardiff University, did mention financial gain as a motivating factor. However, both regard it as of secondary importance. Academic Respondent W Sci 2 said that:

...yes I'm doing it for educational purpose [sic], but at the end of the day I can foresee that there may be some degree of financial benefit. It's not the primary, it's the secondary.

Financial benefit would be welcome but, ultimately, 'education was the driving force'. Respondent W Sci 3 also 'would hope [for] monetary [reward] at some point', but concedes that 'I think that's less clear'. Instead, he is involved for 'the experience'.

Respondents from the Universities of Edinburgh and Leeds revealed making money to be less a personal motivation and more an imperative. The Edinburgh Parallel Computing Centre was described as 'not focused on' profit, but engaged with industry 'to balance the books' (Respondent S Sci 4). This respondent's colleague also reported

that 'if you're on time and to budget then ... the Centre stays afloat'. In the Yorkshire Centre for Health Informatics, too, academics engage in knowledge transfer as 'a way of bringing in income', which accounts for fifty percent of the Centre's total operating income. Although the academics recognise the importance of making money, it is as a means to other ends – which are discussed below – rather than as an end in its own right.

It is finally worth noting that the firms with which the academics were collaborating also did not focus exclusively on the financial aspect of the relationship. For Dimensional Imaging, the 'commercial reality' was that the venture had to be profitable; despite the fact that no financial gain had arisen from the EPCC collaboration, however, learning about a new technology and generating marketing collateral were both deemed beneficial. For Intel, the relationship was more explicitly about more than the financial: '[h]ard cash is okay, but ... it's much more fun to come up with new ways of doing things' (Respondent E Sci 3).

8.4.2 Making a difference

Respondents from all six study projects referred to 'making that big difference' (Respondent E Soc 4) as a part of their rationale for undertaking knowledge exchange. For some this represented their primary motivation: as Respondent W Soc 3 explained, '[w]hat drives me is making a difference'. For others it represented one of several motivating factors. Those respondents who described making money as of secondary importance, or as an imperative for the continuance of their work, also described 'on an altruistic level ... trying to help the people out there' (Respondent E Sci 2), 'doing good by working with the companies' (Respondent S Sci 4) and making

the customer happy (Respondent S Sci 1) as important aspects of their work. For members of the EPCC, working with small businesses is 'more rewarding' (Respondent S Sci 2) because they are more likely than larger firms to value the outcomes.

It is notable that even those respondents engaged in *commercial* interactions with external parties define their role in terms of 'helping' or 'doing good'. Although in a commercial environment this in practice will tend to mean helping to increase profit, it is having provided an effective product or piece of knowledge to do that which motivates them:

...if you can [make a difference to a company], that really gives, you know, that gives you the buzz. You say '*that's* why I'm doing this. Now I remember why the hell we're here!'. (Respondent S Sci 1)

Even for MedaPhor which, as a spinout company, appears to be a classic vehicle for commercial knowledge transfer, improving ultrasound training in the NHS and globally is the principal goal. The idea behind MedaPhor was principally only turned into a spinout to allow the inventor to retain control of it, as well as to ensure that sufficient money could be found for development.

8.4.3 Kudos

Although there were intended to be benefits to external parties from all of the studied projects, academics were not only motivated by altruism. Two thirds of respondents named increasing their or their institution's kudos as a rationale for conducting knowledge exchange. Academic Respondents W Sci 1, W Sci 2 and E Soc 4 all identified a reputational benefit to their institution, internationally and in higher

education rankings, from knowledge exchange activity. In addition, three further respondents mentioned the improved standing of their own faculty or research centre either within their institution or outside it.

Most importantly, however, respondents identified enhancing their own or their university's reputation as not just an institutional but a personal motivator. Respondents from all three scientific projects and from the You and Your Body team at the University of Leeds identified positive feedback on their work as a sign that their work was a success. For Academic Respondent S Sci 1:

[w]hat really makes us all glow is ... to go into typically a small company that has a real problem that's affecting their business, to solve it for them, to give them a piece of software which they use and come back and say 'this is really good, it's improved our business ... we use this all the time'. That's the best project.

Helping to give their University world standing in their discipline (Respondent W Sci 2), publishing in journals read by every practitioner in a particular field (Respondent W Soc 3), or receiving feedback from satisfied customers all contribute to the 'glow' that keeps academics going. Respondent W Sci 2 summed up precisely how important kudos is when asked what one measure of success would, if achieved, make him happiest. Describing the ultimate indicator of academic esteem in two words, he replied: 'Personal Chair'.

8.4.4 Interest and excitement

The final motivation for, and desired outcome from, conducting knowledge exchange mentioned – directly or indirectly – by three quarters of respondents was the opportunity to engage in interesting or exciting research and knowledge sharing

activities. Although '[i]t's often a case of needs must, because we need to bring in the projects [to break even]' (Academic Respondent S Sci 1), it was apparent that, whenever possible, these academics sought engagements that interested and stimulated them. Respondent W Sci 3, for example, became involved with MedaPhor because there was 'quite an interesting bunch of people' already involved; he would not have joined them, he continued, had they not been doing something 'interesting and inherently quite challenging'. For Respondents S Soc 1 and S Soc 2, their decision to become involved in researching mental health policy also stemmed from it being 'an area of interesting, vibrant activity'.

In the EPCC, the Commercial Group are, whilst having to balance their books, most concerned to bring in 'projects that enthuse, engage and give our staff interesting jobs to do' (Respondent S Sci 4). Respondent S Sci 1 reported that the fact that 'we get to do a lot of interesting things' is '[o]ne of the big things that everyone here says they enjoy...', and the varied and interesting nature of the work was responsible for attracting and retaining the best software engineers. Each respondent repeatedly stressed that they were more motivated by projects that interested them, as were the staff for whom they had responsibility. The interest value of their knowledge exchange activities is described not as an added bonus, but as a critical part of their – and others' – rationale for working within the EPCC.

The centrality of enthusiasm as a motivating force for engagement is evident also amongst the social research projects. Respondent W Soc 3 described how 'the dissemination bit of it is the exciting bit of it', whilst Respondent E Soc 4 was not only 'passionate' about making a difference through knowledge exchange herself, but had

also formed the impression that 'there are a lot of really passionate people around the University ... who want to get out there and be involved'. Both of these responses demonstrate that enthusiasm for knowledge exchange itself can be a driving force, but Respondent E Soc 4 also described how the content of the You and Your Body events had further inspired her:

But what we really wanted to do as well was blow them [the audience] away with some of the science we've got here. ... I think because what we've got going on here is exciting ... and the one extreme privilege I've had of doing these events has been to go out into wildly different departments and see what people are doing. And it's amazing, it's just so cool...

Having seen what motivates academics to engage in knowledge transfer, and how enthused by it they can be, it is helpful next to examine their views on university and government knowledge transfer policies. It is already apparent that academics' motivations for engagement do not show the same degree of economic focus as is found in government policy. Assessing academics' understanding of policies should allow a still clearer understanding to emerge of the extent to which academic respondents' views of knowledge exchange accord with those of policy makers.

8.5 Attitudes to university knowledge exchange policy

As one would expect from a relatively random sample of academics, attitudes towards university knowledge exchange policy were many and varied. Each university received both positive and negative comments, but some patterns did emerge within each institution. The most marked of these was that academics from the University of Leeds showed the most awareness of an overarching strategy for knowledge exchange. Three academics noted the attention paid to such activities by their Vice Chancellor. One of these referred to the Vice Chancellor's attendance at the final You

and Your Body event, suggesting that 'in a sense, the University at the highest level showed its interest'. Two further academics confirmed this:

It's certainly part of the University strategy, and I'm very well aware of that, and it's something that's being driven from the top level. (Respondent E Soc 4)

I think, as often these things are, it's very person driven isn't it? Because we've got it from that sort of level at Leeds. (Respondent E Sci 2)

Although two respondents from the University – who were based away from the main campus, on hospital sites – showed little clear idea of the University's knowledge exchange policy, for those who were aware of the strategy it was well received. Both Respondent E Sci 2 and E Soc 4 felt that support for knowledge exchange at management level made it easier to justify spending time on it than was previously the case. The fact that Leeds is 'not *as* focused' as are other universities on 'the financial side of things', and the 'large part in [the strategy map] about making a difference to society' (Respondent E Soc 4) also created a supportive environment for non-commercial knowledge exchange activities.

Opinion of the University's policy was not, however, unequivocally positive. Three academics expressed some concern that knowledge exchange activity was not sufficiently joined up between schools, faculties and administrative departments. The comment of one external partner that he was engaging with the YCHI, and not the University, supports this view. The University's Knowledge Transfer Unit is 'somewhere it could join up through', but in practice 'there's still very much a sense of nobody quite knows what they're doing or what they're for' (Respondent E Soc 4). That neither Respondent E Soc 2 nor Respondent E Sci 2 could identify any instances in which the Unit had actively supported them – with the latter even criticising the

Unit for 'saying things like academics should be businessmen' – suggests that the support side of knowledge exchange has not yet entirely matured to academics' liking. Whilst the practical side is lacking, however, it is clear that the strong strategic position on knowledge exchange is widely welcomed.

By contrast with their Leeds counterparts, academics at Cardiff University were not aware of any particular strategic position on knowledge exchange. In stating that 'I don't know what the University is trying to achieve', Respondent W Sci 3 echoed the sentiments of a number of his colleagues. Respondent W Soc 1, for example, also felt disconnected from decision making, saying that 'I'm sure there is some thinking, but you don't feel part of it. You pick up bits and pieces by talking to people, but not through any proper channel', and Respondent W Soc 3 felt '[q]uite isolated' as a researcher. With the management of the Third Mission Fund allocations devolved to school level, Respondent W Soc 1 found himself wondering '[w]hat's the University's thinking about knowledge transfer at a strategic level?'.

The impression given is also that knowledge exchange at Cardiff is seen as of secondary importance to research and teaching. According to Respondent W Sci 1, '[e]verything flows from the research and teaching people do within the University. So those are our core things'. This is also the feeling of Respondent W Sci 3, because '...the University wants to be a world class institution. ... Now, you know, it seems to me that the bedrock of that must be research'. For Respondent W Soc 1, the upshot of this is negative. Since there is no apparent strategic direction and few resources at school level, 'I feel I shouldn't have more ambitions. ... I should leave my ambitions behind, as they can't be taken on board'. Although he is not *prevented* from

conducting knowledge exchange activities, he feels unable to develop them as much as he would like.

Respondents from the University of Edinburgh, meanwhile, expressed a broad range of opinions regarding their institution's knowledge exchange policy. The University was described by Respondent S Sci 4 as 'quite organised in knowledge transfer' and 'tak[ing] it very seriously', while Respondent S Soc 1 believed that 'current talk about knowledge transfer ... has been sort of reasonably confidently developed locally'. Respondent S Soc 2 also identified a supportive environment within the University – through fora such as the Public Policy Network, established by the Office of the Principal to promote the transfer of policy research – for conducting policy related knowledge exchange.

However, the reception given to the growing focus on knowledge exchange was described as 'patchy', with Respondent S Soc 1 noting that the 'enthusiasts' are largely those promoting business and enterprise engagements. As described briefly in Section 8.2, this respondent had already encountered 'suspicion' and 'gloom' among colleagues with regard to knowledge exchange, who had expressed the opinion that:

[i]t's people ... trying to make us do stuff on top of all the things we already don't have time to do. It's another distraction from what we should really be doing, teaching and research.

More positively, and despite incipient institutionalisation, evident in, for instance, the creation of Faculty Directors of Knowledge Transfer, he stated that 'I think there is a window, which will surely close in the end'. During this period of opportunity, he wanted 'to help the School think, to take the maximum, innovative, creative option in

knowledge transfer... I think knowledge transfer is an invitation to think again about what we do'. What is not yet clear is how that conversation will be received within the University: 'I know the conversation – it's this ambivalence again – could go the way of creativity, which actually in the end nobody's got time for, [or the way of] accountability, measurement'.

'Enthusiasts' in the Edinburgh Parallel Computing Centre identified a greater degree of congruence between the University's desired strategic direction and the Centre's work, to the extent that 'the University loves us at the moment' (Respondent S Sci 1), but even here the strategic approach had critics. Criticism was not at such a fundamental level as that levelled by Respondent S Soc 1, focusing instead on administrative matters. For Respondent W Soc 1, devolving management of Third Mission Funds to school level means that resources are spread too thinly; for Respondent S Sci 4, the opposite is the problem. A strategic decision within the University of Edinburgh to assign its last Knowledge Transfer Grant allocation to 'departments that were failing' (Respondent S Sci 4) meant that the EPCC received none. This is something of an irony, given that the Centre continues to perform against and record 'these silly metrics', and the EPCC is 'arguing very hard that that's completely unfair'.

It is clear that whatever method of distribution is employed, there will always be some who are left feeling aggrieved. Of greater concern is that Respondent S Soc 1, an academic who rates knowledge exchange as '[q]uite important' amongst all his responsibilities and who 'would like to think' that his research and engagement activities are closely intertwined, has doubts about the future direction of policy.

Where he would wish to see innovation and creativity, he in fact sees knowledge exchange being reduced to a system of measurement and audit. This has the potential to consume the enthusiasm of academics, and to limit the breadth of knowledge exchange which stems from it.

8.6 Attitudes to government knowledge exchange policy

Whilst virtually all of the academic respondents gave an opinion on their own institution's knowledge exchange policies, their perceived fitness to judge government policy on the subject was considerably less. A substantial minority of respondents – over one fifth – were 'not sure [they] can answer' (Respondent E Soc 2) what government policy is, and had 'no idea how it all works' (Respondent W Soc 3). A third of respondents discussed policy in very general terms. Their statements can be divided into two types. Two thirds of the group knew that their Government wanted to see *more* knowledge exchange activity, but did not give detail of what this meant. Responses such as 'there's not a day that you go by without reading the new sort of government initiative for making universities more ... relevant' (Respondent W Sci 3) characterise this group. In the second group, three respondents reported that government policy had an *impact* on their activities although, again, its nature was not entirely clear. Nor was this impact directly felt:

[Policy] does impact, but it's not a huge kind of 'oh my god, I can't do that because the Assembly said we can't'. It's not like that. There's a lot of discussion about 'okay, how can we achieve this in the light of what the Assembly think?'. (Respondent W Sci 1)

The mediation of government policy by those within academia was also mentioned by one respondent with faculty-level responsibility for knowledge exchange. Government policy, the respondent argued, is 'something that I guess I'm mediating in

these conversations that I have with my colleagues, in going around talking about knowledge transfer'. A second respondent suggested that this process can be a difficult one, because it can be hard to 'balance ... trying to hit your targets ... while at the same time you're also trying to develop the University'.

Although those who did give more detail on their grasp of government knowledge transfer policy comprised only one fifth of the total respondents, all revealed the same understanding: as Respondent E Soc 4 described it, 'I'm very much aware that it's about the economic sustainability of the country'. A second respondent noted that the financial sustainability of the higher education sector was also a driving force for the Government; Respondent W Sci 1, speaking specifically about the commercialisation of research, concluded that 'the Government expect universities to be more sustainable by doing this kind of activity'.

One further respondent, a collaborating partner from a commercial organisation, saw a situation in which 'there's certainly a drive ... by [the RDA] ... and I know there is some pressure or incentivisation for universities to commercialise, or at least I think there is'. This uncertainty is, of course, indicative of the general lack of detailed understanding of government policy among respondents engaged in knowledge exchange. In addition, however, the respondent could not identify any contact between his company and universities that resulted from government knowledge transfer policies. This is particularly noteworthy because the company is, as a high-technology SME, in the principal category identified by the Lambert Review as a target for R&D and knowledge transfer support (HM Treasury 2003: 25-27).

While, in this case, policy appears not to be affecting its intended target, elsewhere concern was expressed that an economic rationale is beginning to pervade where it should not. Respondent W Soc 1 observed that, for Government, 'knowledge and economy are becoming intricately inseparable'. This presented a potential problem:

Surely it has implications for disciplines such as philosophy or literature, or even language, or social sciences generally. ... If you are going to be always driven by economics and the politics of economics, then it raises very strong question marks about the status of disciplines. ...[I]t's the task of sociologists and social scientists to ask questions: Is that the right thing? Is that knowledge good or bad? Rather than its economic impact as such.

Mirroring the ambivalence of Respondent S Soc 1, whose hopes for the future direction of knowledge exchange are tempered by his expectations of the likely course, Respondent W Soc 1 concluded that:

I feel I welcome such an agenda as long as it is not very narrowly defined and becomes a kind of a trap to obstruct different kinds of research and promote certain types of research, which is likely to happen.

If this sounds a pessimistic note about the future of knowledge exchange activity in higher education, then the final comments of Funding Council Respondent 2, who is also an academic, provide a hint of optimism. Having raised concerns that universities could 'go much more down the marketised road', he concluded by saying: 'Is that bleak or is it not? The fight's still to be had, it's not over yet'. In describing their projects and discussing future plans, the academic respondents certainly showed no sign of wanting to stop their knowledge exchange activities, whatever barriers to it they identified.

8.7 Necessary factors for effective knowledge exchange

For all that the respondents were not consistently certain about the nature of government, or even their own institution's, policy on knowledge exchange, they were clear about what they would need in order to conduct their engagement activities more effectively. Three things emerged as desirable, if largely lacking. These were more resources – most commonly described as a lack of money – as well as better communication and more time. Each of these is treated in turn below.

8.7.1 Resources

Lack of resources was cited by six respondents as a limiting factor on their ability to conduct knowledge exchange. Of these, two mentioned a lack of funding in relation to the specific projects discussed here. Respondent S Sci 3 thought that the reason for the lack of satisfactory completion of the project run by the EPCC for Dimensional Imaging was that 'really just possibly the time and money had run out'. In Leeds, the You and Your Body events had been run on a limited budget, with funding from the Wellcome Trust for five events. In spite of overwhelmingly positive feedback and a high level of repeat attendance, with thirty-nine percent of audience members attending more than one event (Howdle et al. 2007b: 24), the University failed to secure funding for an additional three events. Respondent E Soc 4 reported that 'everybody there on Saturday [at the final event] was going 'you are gonna have more aren't you? Please say that you're going to have more. You will do more?', and they're *desperate* to come back in'. Thus the demand for greater engagement exists, as does the willingness to run more events – 'I'm prepared to give my time ... whilst I'm doing other stuff' (Respondent E Soc 4) – but the problem is that 'we've got to find money from somewhere and I don't quite know where to start'.

Other respondents described a lack of resources as a more general problem. Respondent W Sci 3 argued that, in the UK, 'nobody's got the resources to do these two things [research and knowledge exchange] properly. So you end up with a sort of hybrid that's nothing at all'. This situation he compared unfavourably with the German model, in which universities act as the 'academic engine' whilst Fraunhofer Institutes exist as centres for the development of research. The benefits of this model, he concluded, were that academics could focus on 'interesting things', without being 'driven by an industrial need', and that separate resources could be allocated for the two activities of research and knowledge exchange.

Respondent W Soc 1 also described the amount available for knowledge exchange as 'peanuts'; as already discussed, this is a contributory factor to his feeling that he should 'leave my ambitions behind'. Also as previously set out, Respondent S Sci 4 thought it 'completely unfair' that the EPCC was not rewarded for its knowledge transfer activities with a portion of the University's Knowledge Transfer Grant. Respondent S Sci 1, meanwhile, demonstrated the power of resource constraints to affect decision-making when he noted that the interest value of a potential project, although important, always came second to the need to 'pay the bills'.

8.7.2 Communication

A second factor that emerged, from the responses of six academics at the Universities of Cardiff and Leeds, as important – and in some cases lacking – was communication. On a positive note, Respondent E Soc 4 stated:

There's that real open communication going on, so it's very positive personally I find. I feel like I know what's going on in the University [of

Leeds] and I feel quite a sense of ownership by the University of what I'm doing, and me of what the University is doing as well.

Communication is regarded here as being important in establishing a feeling of ownership, but it should further be noted that ownership contributes in turn to the creation of trusting relationships. Communication is thus important not only because it is directly through dialogue that consensus on the future direction of knowledge exchange can be reached, but also because, indirectly, it helps to establish the relationships through which that consensus can be turned into action.

However, it is clear from other respondents' comments that communication between them and both their universities and government representatives can be poor. The lack of direct communication between civil servants and academics had been alluded to by Government Respondents W1 and W2, one of whom described Assembly Government interactions with academia as comprising quarterly meetings with university Vice Chancellors, while the other said:

Because I'm a policy wonk rather than a coal-face worker, I don't have too much sort of face to face experience. (Government Respondent W2)

In expressing their lack of knowledge of government knowledge transfer policy – as discussed in Section 8.6 – a number of respondents confirmed that communication, either direct or indirect, is either not happening or is not proving effective.

The level of communication between university management and academics was also deemed insufficient by some respondents. Respondent W Soc 1, who 'pick[s] up bits and pieces by talking to people, but not through any other proper channel', argued that communication of his university's strategic direction to academics was poor. Besides

the morale-sapping effect of this, there is clear potential for misinformation to circulate where no official communication channels exist. Even where active engagement with university officials has been sought, breakdowns of communication have occurred. Respondent W Sci 3, for instance, having made technological disclosures to Cardiff University's Research and Commercial Division, had subsequently heard nothing more about them. This had left him feeling that 'if I put it in and so what, you know, I'm less inclined to do it again'. One can ultimately appreciate his conclusion that this is 'a bit of an own goal, really'.

8.7.3 Time

The final, and most frequently mentioned, barrier to greater engagement in knowledge exchange activities was lack of time. Over forty percent of respondents referred to the time-consuming nature of knowledge exchange. Respondent W Sci 3 emphasised the 'surprising ... amount of time and effort' required to run MedaPhor, whilst Respondent W Sci 1 described 'trying to divide up the time' as the 'real challenge' for the company. To fit in the commitments of the company's staff, all but one of whom hold another full-time job, 'the majority' of meetings are held 'out of hours', during the evenings (Respondent W Sci 1).

The day-to-day time commitment required for knowledge exchange is not solely an issue for those involved in running a spinout. Respondent E Sci 3, one of the YCHI's partners, identified 'no downside [to the relationship] to be honest'. However, in this otherwise harmonious relationship there was one shortcoming:

I'd like to do more with them, and I'm sure they'd like to do more with us,
but it's just finding the time.

Respondent E Soc 3 also '[hadn't] really been involved in that [knowledge exchange] at all. Just because of time'. As both an academic and NHS consultant, the respondent found the prospect of undertaking knowledge exchange one commitment too many, despite showing an obvious interest in engaging children and young people in the work of the University. It was nowhere more apparent that the time available to academics is finite than in the case of Respondent S Soc 2. With a significant current commitment to knowledge exchange, he 'miss[ed] having a lot of time to devote to research'; however, 'there's only so many hours in the day, and at the moment they're all very full'. That academics can be compelled, like Respondents E Soc 3 and S Soc 2, to choose where their priorities lie or, like the academics running MedaPhor, must devote their free time to their knowledge exchange activities, demonstrates the singular importance of making time to ensure that research can enter society.

Knowledge exchange requires not only a day-to-day commitment of time, but can also involve long term commitment. Two respondents engaged in the ongoing collaboration between the YCHI and its external partners highlighted the importance of time in allowing relationships to develop. Respondent E Sci 2 argued that 'you have to spend a lot of time ... building the networks'. The benefit of taking this time was described by Respondent E Sci 1:

I think over time we have learnt a bit more ... and I guess the relationship, like any other, has become a more trusting relationship. So I don't think we could've contemplated doing some of the things three years ago that we're talking about doing now.

Clearly the long-term nature of the relationships means that there will not necessarily be obvious outputs at the beginning of it. As Respondent E Sci 2 pointed out, 'you can't put a money value on it. It costs actually. But at this stage we're still building'. In

a climate where outputs are increasingly being monitored so that universities and funders can demonstrate value for money, this model of knowledge exchange is unlikely to sit comfortably.

8.8 Key findings

Three main features of these academics' perspectives emerge from their discussion of knowledge exchange. Firstly, there are clear similarities in the value systems adopted by the respondents. Regardless of the type of transfer – if, indeed, they agree that this is an appropriate characterisation of their activities – undertaken, respondents are motivated by making a difference to others, by enhancing their own or their institution's kudos, and by interesting and exciting activities. This is equally true of academics engaged in knowledge exchange that generates money as of those engaged in non-economic activities. The former group are motivated by the promise of financial gain, but are *more* motivated by other factors. There is thus a discrepancy between the values of academic respondents and those of government sources. Whereas the latter privilege predominantly economic ends, this is not the case for respondents engaged in social knowledge exchange, and only partially the case for academics undertaking potentially lucrative scientific work.

Respondents were largely unaware of current government knowledge transfer policy. This does not imply that policy is not having an impact but, since it does not impinge greatly on the respondents' consciousness, it does suggest that its effects are indirect. Although there was greater awareness of university policies, even this was not complete. Academics are therefore clearly acting without regular interaction with their university or government masters. However, this independence is not total. Over the

longer term policy does impact: whilst, as at the University of Leeds, this can be regarded as positive, some respondents are aware of what they perceive to be worrying trends in knowledge exchange policy.

Finally, respondents shared a desire for three things to support their knowledge exchange goals. More resources were named by a third of academics. Crucially, money should be seen here as an enabler of knowledge exchange, rather than as a motivating factor for respondents. Its importance is as a means, not as an end. Good communication was also highlighted as central to some respondents' motivation to engage in knowledge exchange. The most widely cited factor in respondents' ability to participate in knowledge exchange, however, was time. Academics such as these, with a strong personal motivation to engage, will find the time to do so, but time pressures prevent them from capitalising fully on available opportunities. Extrapolating to those academics without such a strong drive to undertake knowledge exchange, it seems likely that significant amounts of socially valuable knowledge remain untapped.

Section III

Conclusions

Chapter 9: Redefining the value of knowledge exchange

9.1 Synthesising the data

The data presented in Chapters 5 to 8 highlight a number of important issues about the current policy and practice of knowledge exchange, which together raise questions that demand further attention. These questions will be treated in the current chapter. Chapter 10 will present a summary of the research findings, their limitations and some potential future avenues of research, together with concluding remarks on the findings' implications.

From analysis in Chapter 5 of government knowledge exchange policy, it is apparent that the UK, Welsh Assembly and Scottish Governments all make claims for the broad-based nature of university knowledge exchange. However, a distinction can be drawn between these broadly defined purposes of knowledge exchange and a de facto prioritisation of economic ends. This prioritisation is apparent from scrutiny of the functions of departments with an interest in knowledge exchange, from detailed reading of relevant policy documents, and from the observations of government respondents. In addition, the nature of the metrics which govern the allocation of knowledge exchange funds was examined in Chapter 6; this showed that universities are predominantly judged according to their performance in knowledge exchange activities which produce income. Since Chapter 6 also revealed that Funding Council respondents would prefer to measure the full range of activities, the first questions to arise concern the impact that the prioritisation of economic ends is having on the recording process, and the resultant impact on knowledge exchange activity. Accordingly, Section 9.2 addresses these questions.

It will be argued that the existing metrics are both indicative and partly constitutive of a value system that privileges economic ends over other values. From the comments of academic respondents in particular, it is clear that alternative valuations of knowledge also exist. In citing making a difference to others, enhancing personal or institutional kudos and engaging in interesting and exciting work above making money, these academics contributed to an alternative understanding of the purpose of knowledge exchange. In Section 9.3, these alternative values are located within the context of existing research on the importance to society of non-economic value systems. In particular, drawing on the experiences of academic respondents, the case is made for a recognition that it is not the *economic* value of knowledge that creates opportunities for exchange, and thus that universities have the potential to make contributions that far exceed the economic.

This is an important point to note if the 'full complement of riches' (British Academy 2004: vi; see also Smith 1993: 91) to be found in universities is to be fully exploited. However, at the same time as recognising the non-economic values of knowledge, economic concerns cannot be ignored. The enduring power of the economic value system, which is so predominant in government approaches to knowledge exchange, is discussed in Section 9.5. Before this, Section 9.4 sets out arguments for according parity of esteem to economic and non-economic values, made by Engell and Dangerfield (2005) in relation to the academic mission, and by Sen (2001) with regard to the development of society. As subsequent sections show, this approach has much to recommend it as a means of accommodating the different values accorded to knowledge by government and academic respondents.

Although the evidence from the Funding Councils and study universities presented in Chapters 6 and 7 suggests a consensus among respondents on the need to broaden the definition of knowledge exchange, it is also apparent that according equal value to non-income generating activities is proving problematic. Whilst Section 9.2 deals with the practical implications of a metrics-based approach, Section 9.5 addresses a more fundamental issue: in spite of – sometimes successful – attempts to redress the balance in favour of non-income generating knowledge exchange, government policy and the funding mechanisms continue to privilege economic outcomes. Why this should be so is explained with reference to the twin concepts of structure and agency. The funding and audit structures, the constitution of university knowledge transfer offices, and the dominance of neoliberal ideology are identified as structures that serve to perpetuate the status quo. It is suggested that universities inhabit a powerful position between Government and academics, which they can use to sustain or alter what Bourdieu terms the 'habitus'.

Why universities, and others, should choose to act in a way that alters the bias towards economically valuable knowledge exchange is the subject of Sections 9.6 and 9.7. As demonstrated in Chapter 8, academics are able to conduct knowledge exchange with a variety of outcomes, in spite of the current policy direction. One might therefore justifiably question the extent to which the divergent value systems of government and academic respondents constitute a problem. Section 9.6 focuses on the principal reason for universities to listen not only to their funders but also to their academics; as the 'talent' in universities, academics are in the strong position of being able to seek work elsewhere if their institution fails to pay heed to their values.

Following on from this observation, Section 9.7 addresses the importance of making space for academics to engage in knowledge exchange. Academic respondents expressed the need for good communication, (financial) resources and more time to conduct knowledge exchange activities. Together, these are theorised as constituting the 'space' within which knowledge exchange takes place. This space must be created, which is to say that resources such as time, finances and support must be made available for knowledge exchange; if this does not happen, then the other academic spaces of research, teaching and administration will begin to encroach upon knowledge exchange activities. Such an encroachment would prevent the optimisation of these activities. It is in universities' interest, in order to retain talented individuals, to accommodate academics' need for a space of knowledge exchange, but it will be argued throughout this chapter that there are also benefits for Government and for society in this approach. These benefits are summarised in Section 9.8.

9.2 The measurement of knowledge exchange

As shown in Chapter 5, the UK, Welsh and Scottish Governments' rhetoric of a broad-based understanding of knowledge exchange belies the reality of their priorities. From their higher education strategies alone, a bias towards the economic valuation of academic knowledge emerges. Of the three strategies, the Welsh document 'Reaching Higher' makes the most explicit link between academic research and economic value. Its section on knowledge exploitation highlights 'economic and market gain' from research commercialisation as an imperative and, despite mention of the 'importance of research to Welsh public services' (Welsh Assembly Government 2002a: 12) and to policy making, the white paper's recommendations refer only to this narrower,

commercial application of knowledge. A similar picture emerges from the 2004 Nexus Report.

The English and Scottish strategies make greater play of the social benefits of knowledge exchange but, although less explicit, a bias towards economic ends is no less apparent. In his foreword to 'The Future of Higher Education' (DfES 2003: 2), Charles Clarke referred to the need for greater progress in 'harnessing knowledge to wealth creation' in England. As in the Welsh policy documentation, in spite of references to the potential roles of knowledge exchange in improving 'quality of life' (2003: 23) and making a 'social and cultural contribution ... to [universities] communities' (2003: 36), the white paper's eight 'key points and proposals' do not develop these roles in greater detail. The 'Framework for Higher Education in Scotland' (Scottish Executive 2003) similarly lacks concrete proposals for developing its commitment to using more research in policy making and service delivery. Of the Framework's ten commitments on knowledge exchange, all refer to improving business links and commercialisation activity.

Further evidence of the Governments' predominantly economic valuation of knowledge is provided by documentation produced within the wider policy sphere. In one recent example, the 2008 DIUS white paper 'Innovation Nation', a goal of 'broaden[ing] the traditional knowledge exchange agenda' is set (DIUS 2008: 42); however, it is clear that a large part of this goal is concerned with encouraging the arts and humanities to generate *economic* impact. By contrast, government departments not engaged in science, innovation and economic policy making make infrequent – if any – reference to universities, and do not expand upon the potential role of

knowledge exchange in addressing the diverse social needs for which they have responsibility.

The comments of government respondents from England, Scotland and Wales also serve to uphold the view that the principal value assigned to university research by the three Governments is economic. This is not to say that alternative valuations do not exist amongst government respondents, as they do elsewhere; as Section 9.5 explores, tensions can, and do, exist between individual and institutional approaches to knowledge exchange. However, government respondents from departments with both economic and non-economic functions expressed the opinion that their Government's *priority* for knowledge exchange is an economic one. That this reality differs from the rhetoric was highlighted by responses such as: 'I don't think you'd see that [prioritisation] written down that often' (Government Respondent E1).

Although not an explicit part of government knowledge exchange policy, it is clear that the prioritisation of economic ends is having a real impact on the way that policy is enacted. This is particularly apparent in relation to measurement of the 'success' of university knowledge exchange activities. As discussed in Chapter 6, the metrics employed in the allocation process for the Funding Councils' knowledge exchange funding streams rely on either direct income measures or other measures – principally numbers of engagements – that relate predominantly to income-generating activities. For a number of respondents with responsibility for defining and reporting against the metrics, both within the Funding Councils and in university management, this was a cause for concern. The common reason for this concern can perhaps best be summed

up by the aphorism, often attributed to Einstein, that not everything that matters can be measured, and not everything that can be measured matters.

Those involved in the measurement of knowledge exchange recognised that the metrics were imperfect but, because 'we are in a measures kind of society now' (University Respondent W5), felt under pressure to demonstrate to the Government that knowledge exchange activities were a success. The problem with employing proxy measures like those currently used by all three Funding Councils is twofold. Firstly, an immediate bias in favour of those activities that can be readily quantified occurs. As witnessed in responses from representatives of the Funding Councils and the Universities of Leeds, Edinburgh and Cardiff, a distinction is frequently drawn between the 'hard' economic activities – those that can be quantified – and 'soft' activities, the impact of which cannot be assigned even the most basic of numerical values. If knowledge exchange activity is rewarded based on 'performance' or 'success', with respect either to an absolute standard or to other activities, then those activities that cannot be readily compared in this way cannot be rewarded.

Secondly, the use of language such as 'hard' and 'soft' reflects a common misperception that statistics present an objective truth, unlike descriptive or 'anecdotal' representations which are subjective and hence potentially flawed. In its 2008 report 'Citation Statistics', the International Mathematical Union (IMU) cautions against reliance on statistical measures in assessing the import of research. The report notes that '[w]hile numbers appear to be "objective", their objectivity can be illusory' (Adler et al. 2008: 2), before arguing that 'faith in the accuracy, independence, and

efficacy of metrics is misplaced' (2008: 4). In fact, over-reliance on metrics merely 'replaces one kind of judgment with another' (2008: 4).

Whilst the IMU report focuses on the use of statistical citation data as a means of assessing scientific research, its conclusions also have a bearing on the issue of knowledge exchange metrics. 'Research is too important to measure its value with only a single coarse tool', states the report (2008: 3), a claim that could equally be made for knowledge exchange. Indeed, the brief given to the report's authors by the IMU committee contains a description that would be familiar to those respondents who decried the rise of an audit regime encompassing knowledge exchange:

The drive towards more transparency and accountability in the academic world has created a "culture of numbers" in which institutions and individuals believe that fair decisions can be reached by algorithmic evaluation of some statistical data; unable to measure quality (the ultimate goal), decision-makers replace quality by numbers that they can measure. (Adler et al. 2008: 3)

According to Best, this trend is nothing short of a fetishisation of numbers:

We tend to regard statistics as though they are magical, as though they are more than mere numbers. We treat them as powerful representations of the truth; we act as though they distill the complexity and confusion of reality into simple facts. ... We think of statistics as facts that we discover, not as numbers we create. (Best 2001: 160)

As creations, rather than objective facts, statistics reflect and reproduce particular preferences. Thus the measurement of knowledge exchange income both reveals an existing preference for activities generating financial returns and reinforces those activities' privileged position. If the subjective nature of statistics is lost sight of, it is a relatively small step to drawing a distinction between 'good' activities, which produce 'hard', measurable results, and 'less good', or even 'bad', activities which do not. In

respect of this, Section 9.5 looks at the role of knowledge exchange metrics as one of the structuring elements which shape how knowledge exchange is conceptualised and practised.

This is not to say that measurement is necessarily a damaging process: as Best acknowledges, '[w]ithout statistics, we limit our ability to think thoughtfully about our society' (2001: 168). However, as the IMU report observes, '[r]esearch usually has multiple goals, both short-term and long, and it is therefore reasonable that its value must be judged by multiple criteria' (Adler et al. 2008: 5). Attempts, described by government, Funding Council and university respondents, to adjust the current metrics to take account of a wider range of knowledge exchange activities thus appear misguided. What is needed is not to bring statistics to bear on a greater number of occasions, but to accept that statistics represent only one form of judgment. Alternative forms of judgment can be equally valid, and are no different from statistics in the sense that they have both strengths and weaknesses. The approach being advocated by senior management at the University of Leeds of recording 'the anecdotal stuff that isn't about numbers' (University Respondent E1) is a recognition of this. It also benefits from being an approach with which a number of academic respondents and their non-academic collaborating partners identify (see Section 8.3), since it allows them to record activity of importance to them.

As discussed in Section 6.2.3, despite efforts to redefine the metrics for knowledge exchange, a preference for 'bean counting', linked to the dominance of economic priorities within Government, makes it difficult to create a new approach to reporting success. The tensions between the different actors – the Governments, Funding

Councils, Universities and academics – will be explored further in Section 9.5. First, the implications of non-economic valuation of knowledge and knowledge exchange will be discussed in more depth.

9.3 An alternative value system

Efforts to develop a new set of metrics that can be applied to a greater range of knowledge exchange activities suggest a dissatisfaction with the predominance of economic factors in the valuation of knowledge exchange. That the encroachment of the market into value systems might not be an entirely positive development is, of course, not only of concern in academia. In his 2005 book 'Happiness: lessons from a new science', Layard considers the disconnect between per capita incomes and levels of happiness. In spite of rising incomes in the United States over the past sixty years, he finds, the proportion of people reported to be 'very happy' has remained stagnant. Layard contends that happiness depends on a variety of factors, of which an increase in absolute income is not one; in fact, individuals often adapt so well to their newfound wealth that they eventually take it for granted and come to want more – this is good for the market, but not for personal happiness. Over the long term, social ties, trust, familiarity with and stability of personal circumstances, personal status and religious or spiritual beliefs all contribute more to happiness.

Whilst Layard's utilitarian position that 'we should rededicate our society to the pursuit of happiness' (2005: 235) overstates the case for the importance of happiness as society's goal, his thesis is certainly helpful in highlighting the equally erroneous pursuit of wealth. Elsewhere, commentators have been more directly critical of the lack of attention paid to 'conceptions of the good' (O'Neill 1998: 16) in market

economics. According to O'Neill, the fact that 'market decisions are not constrained directly by ethical considerations', that they are neutral with regard to different conceptions of the good, makes market economies 'ethically indefensible' (1998: 5). In adopting this position, one must be careful not to deny that individuals who engage in market interactions can be motivated by ethical considerations; however, as Sayer has explained, '[i]n a market situation, the *dominant* question is not what is right or good but what will sell' (2000b: 87, emphasis added).

In contrast to Layard's utilitarian standpoint, Sayer argues that what is needed, given 'the persistence of economic problems and their effect on the quality of life' (2000b: 79), is the reintroduction of morality into the economic equation:

If we fail to acknowledge that economic activity is at least, in part, morally guided, and that even where it is not, it has moral implications, economic action appears to be wholly a matter of power and self interest. If this happens, political economy reflects the domination of the lifeworld by the economic system, accepting the latter's priorities... (Sayer 2000b: 98)

Although differing in their opinions of what constitutes 'quality of life', what Layard, O'Neill and Sayer have in common is their belief that economic considerations alone are insufficient to secure it. This premise is one that will be discussed in greater detail below with reference to Sen's compelling theory of development as freedom. Before this, however, it is interesting to pursue the role of non-economic values in the context of academic research and knowledge exchange.

O'Neill (1998: 2) argues that 'the incursion by both market and state is quite properly seen as a threat to [the scientific community's] integrity'. That such incursions can prove damaging to the quality of academic research has been discussed in Section 2.8.

What is apparent from the testimony of academic respondents in Chapter 8 is that economic considerations not only fail to best serve the outputs of academic endeavour, but also do not act as a principal motivating factor for it to begin with. Where making money was mentioned as a motivation by academics, it was either a secondary consideration – '...I can foresee that there may be some degree of financial benefit. It's not the primary, it's the secondary.' (Academic Respondent W Sci 2) – or a financial imperative – 'to balance the books', as Academic Respondent S Sci 4 explained.

Instead, academics valued making a difference, receiving kudos for their work, and undertaking interesting, exciting, enjoyable knowledge exchange activities. This list is not dissimilar to Layard's (2005) constituent elements of happiness, with especially close links between Layard's emphasis on social relations and the value placed on making a difference by academics, and between the former's reference to personal status and the latter's discussion of kudos. The findings presented in Chapter 8 are also supported by a recent study conducted at King's College London into the experiences of young academics in Britain (Archer 2008). Archer's respondents 'alluded to notions of 'self-fulfilment' (2008: 397) in their definitions of success, and:

[t]hey [young academics] were highly critical of the pervasive pressure on academics to 'bring in the money' for its own sake, suggesting that this represents an 'un/anti-academic' ethos which is symptomatic of the attempt to make universities more corporate and 'business-like'. (2008: 389)

Archer's research, through a broad focus on all aspects of the academic project, empirically demonstrates that non-economic values are important to academics. This supports Ziman's (2003: 18) contention that '...apparently "useless" knowledge is not

necessarily valueless'. As discussed in Section 2.8, however, much of the debate about the introduction of knowledge exchange as an explicit mission in universities revolves around the extent to which an increase in instrumental research impinges on the pursuit of non-instrumental research. In so doing, this debate tends to conflate 'instrumental' with 'economically valuable'. What is clear from Chapter 8 is that academics specifically engaged in knowledge exchange activities are not as motivated by economic gain as this debate might suggest. Rather, they retain a number of non-economic values.

That there is a poor fit between government views on the nature and purpose of knowledge exchange and those of academics is apparent from a comparison of the data presented in Chapters 5 and 8. As explained in Section 2.9, discussions on academic value systems tend to view knowledge exchange as a threat; this perception is based on the assumption that it is the *economic* value of knowledge that creates opportunities for exchange, and thus that the only possible model for knowledge exchange is the one currently espoused by the UK, Scottish and Welsh Assembly Governments. Yet this need not be the case, and a fascinating array of literature on values exists which serves to demonstrate as much. This literature has hitherto been under-used in the knowledge exchange debate.

Thirty-five years ago, when Schumacher first set out his thesis of 'economics as if people mattered', he was clear that society's greatest resource is education. He did not, however, mean this in an economic sense. Whereas great store is today placed by the sciences because of their potential for economic return, Schumacher argued that:

[s]cience cannot produce ideas by which we could live. Even the greatest ideas of science are nothing more than working hypotheses, useful for purposes of special research but completely inapplicable to the conduct of our lives or the interpretation of the world. (Schumacher 1993: 67)

More valuable than such 'working hypotheses' is 'a clarification of metaphysics, ...of our fundamental convictions' (1993: 72). 'Education which fails to clarify our central convictions', he concludes, 'is mere training or indulgence' (1993: 80). As O'Neill (1998: 16) has reported, liberalism proposes that '...political and social institutions should be neutral between different conceptions of the good', and Schumacher's conviction that 'striving after something thought of as good' (1993: 74) should be the goal of human activity and of education is thus regarded by some as unfashionable. It is, however, a view that chimes with those of Layard (2005) and Sayer (2000b) and, especially pertinently, with the views – expressed in Chapter 8 – of a number of academic respondents.

Schumacher's standpoint is also mirrored in the 2006 book 'Planet U', by M'Gonigle and Starke. The remit of 'Planet U' is consciously limited to environmental issues, but it is apparent that the authors regard environmental awareness as one element of a wider 'responsible citizenship' (2006: 16). The university, they believe, can and should be a site for the mobilisation of responsible citizens in pursuit of a socially and environmentally sustainable future. In Ozga and Jones' (2006) terms, M'Gonigle and Starke are appealing for university policy to be 'embedded' in an institution's local environment, rather than responsive to the 'travelling' policy associated with global economic demands. Given the context of continuing encroachment of market forces into the higher education sector (see Section 2.4), this is a deliberately radical proposition. What is particularly important for knowledge exchange policy, however,

is that M'Gonigle and Starke hint at the possibility of combining an alternative, sustainability-based value system with the existing functions of the university:

Universities have long been special places, places of both innovation and resistance. (M'Gonigle and Starke 2006: 10)

This is a fascinating juxtaposition of the concepts of 'innovation' and 'resistance'. Whereas the former has been co-opted as part of the rhetoric of the knowledge economy, and as such is one element of the economic and political status quo, the latter implies a questioning and potential rejection of current conditions. What this juxtaposition should remind us, however, is that innovation is itself a transformative, and potentially radical, process. Innovation is a term that can be as readily applied to politics and the arts as – in its currently dominant meaning, at least in political circles – to technological advancement and activities that generate economic gain.

Such a reading of the term is reminiscent of the broad definitions of knowledge exchange put forward by many respondents. This broad view is encapsulated in the 'default' position, defined by Academic Respondent S Soc 1, that knowledge exchange is 'all those things we do ... that are not either RAE-led research or teaching registered students'. The Welsh Funding Council's strategic aim of 'delivering more productive relationships between higher education institutions and the public and private sectors, other agencies and local communities' (HEFCW 2006b: 6), highlights the wide range of potential beneficiaries of knowledge exchange.

What these respondents have demonstrated is that no clear distinction can be made between them on the grounds of whether their knowledge exchange activities produce income or not. Far more important to them is that they are engaged in exciting,

interesting work that makes a difference and increases their kudos. Thus both the Government and many critics of knowledge exchange are wrong. The Government is wrong in defining income generation as a, if not the, primary end of knowledge exchange when, in practice, the evidence suggests that it is at best only an enabler for it. Critics, too, have often fallen into the trap of conflating the process of knowledge exchange with economic ends and the commercialisation of academia. By taking a wider definition of the value of academic research, what constitutes 'useful' knowledge becomes almost infinitely broad, to the extent that the discovery of 3K cosmic background radiation (Mulvey 2002: 61; see also Section 2.8), in contributing to our understanding of our place in the universe, can be regarded as inherently useful.

9.4 The need for parity of esteem

Redefining knowledge exchange to encompass a full range of values is not simply a matter of definitional nicety, however. The knowledge that a society chooses to value and the reasons for that valuation affect the outcomes of that society as experienced by its members. Current theorisation of the purpose of knowledge exchange – by both proponents and critics – is based on a belief that the principal exploitable value of academic research is economic. However, the valuation of knowledge and its benefits as expressed by academic respondents clearly cannot be theorised with reference to the economic principles employed by government respondents and throughout much of the knowledge exchange policy literature.

As has been shown above, alternative, non-economic value systems have been developed, both theoretically and in pursuit of actual change. In highlighting non-economic concerns, and potentially sidelining the economic, these approaches risk

...overlooking the fact that economic issues do matter to people, even if not to the exclusion of all else – as shown in Section 8.4.1 – not to mention the practical need to work within the constraints of a neoliberal economic system. It is possible, however, to incorporate economic goals within a value system which also recognises the equal importance of non-economic concerns. Engell and Dangerfield (2005) propose that higher education predicates its existence on three instrumental functions. Of these, one is economic, one social and one civic. In turn, these functions underpin two ultimate goals of higher education. The first 'concerns the ethical application of knowledge and its relationship to human conduct', while the second goal 'is intellectual, the fundamental search to discover and to order knowledge and ideas' (2005: 24).

It is, argue Engell and Dangerfield (2005: 24), inevitable that education acts as an instrumental economic good, because a sound education equips people for future employment. To this can be added the observation that a proportion of knowledge produced within universities similarly contributes to economic goals. Nevertheless, the economic function is but one of three, each of which contributes to the higher goals; moreover, even the former goal should be regarded as subservient to the latter.

Focusing on any one function in isolation risks serious consequences:

...higher education can be saved only if its multiple goals – individual, social, economic, civic, ethical and intellectual – form a set of mutually reinforcing aims. Placed in a stark winner-takes-all competition with the others, any one goal would ultimately gorge itself on the others, ensuring its own eventual demise as well. (2005: 21)

If a narrow focus risks precipitating the demise of higher education, what then should be its objective? Here Engell and Dangerfield propound a vision that accords with the

broadly defined notion of knowledge exchange emerging from the data presented above, and particularly in Chapter 8:

[A]bove all, the university ... provided [throughout its history] a common, learned discourse about the *use* and *value* of various kinds of knowledge, knowledge to which the university contributed. At its best, that common discourse never relied on agreement and conformity. ... Any beneficial unity comes from accepting and protecting an environment favourable not only to the pursuit of knowledge but also to the debate over the applied value of many different kinds of knowledge and their relevance in human affairs. This recognizes the pursuit of knowledge for its own sake as a good but also recognizes that *knowledge is applied in various ways, with varied benefits and liabilities*. (2005: 132, emphasis added in final sentence)

The approach advocated by Engell and Dangerfield permits economic valuation of knowledge, but never at the expense of alternative values. They argue that this is essential for the long-term health of higher education but, by applying the approach specifically to knowledge exchange, it is possible to develop the argument further. A broad-based definition of knowledge exchange is beneficial not only to the higher education sector, but also to society as a whole. Like Engell and Dangerfield's approach, Sen's 'Development as Freedom' (2001) provides a framework for theoreticians of knowledge exchange that incorporates the alternative values expressed here by many respondents, whilst simultaneously accommodating economic concerns; it also demonstrates how such an approach is important for the development of society.

At the heart of Sen's conception of development lies the idea that individual freedoms are the 'basic building blocks' of development, and that the role of freedoms is to allow people 'to lead the kind of lives they value – and have reason to value' (2001: 18). According to Sen, there are five instrumental freedoms that facilitate the living of

a valued life: these are *political freedoms*; *economic facilities*; *social opportunities*, in respect of, for example, healthcare and education; *transparency guarantees*, by which Sen means trust, openness, and freedom from corruption; and *protective security*, which provides a social safety net.

What is significant about this approach is that it values a *range* of factors as both the means to and ends of development. From an evaluative perspective, a society's degree of development can be judged according to the freedoms of its citizens, but possessing freedoms also allows individuals to engage in the ongoing process of helping themselves and others towards a more valued life. As both the means to and ends of development, these instrumental freedoms 'directly enhance the capabilities of people, but they also supplement one another, and can furthermore reinforce one another' (Sen 2001: 40).

The relationship between economic and non-economic freedoms is critical if Sen's thesis is to be taken seriously in the context of a neoliberal market economy. Public education, for instance, is cited by Sen as one factor that can enhance economic development; attention to the former can hence be justified with reference to its impact on the latter. Whilst this is a helpful approach in 'selling' the concept of development as freedom to those enamoured of market mechanisms, it is worth noting that Sen does not rely on such connections. Widespread public education can also contribute to significantly reduced mortality rates; in human terms this is undoubtedly a valuable end, but it is one which does not need to make a contribution to economic gain in order to be so. This non-reliance on economic justifications is interesting when

set alongside academic respondents' non-economic motivations for undertaking knowledge exchange activity.

Sen's approach is important to the knowledge exchange debate for two reasons. Firstly, if development is about facilitating the living of valued lives, and if what people value is more than simply wealth – as Layard (2005) and others have also suggested, albeit from a utilitarian perspective – then Sen's five instrumental freedoms need to be pursued simultaneously. The lack of any one freedom compromises the development goal. If the purpose of knowledge exchange is 'to inform the ... wider public good' (Government Respondent W1), then knowledge that addresses each of the five freedoms has a value. According to this view, all disciplines are potentially equally valuable. Secondly, in recognising that knowledge which is politically and socially valuable is equally as important as economically valuable knowledge, the approach accords more readily with the viewpoint of the academic respondents than does one that privileges economic ends. As discussed in Section 9.6, below, there is good reason to believe that listening and responding to academics' views is necessary.

It is clear that the alternative value sets discussed above better describe the values held by the academic respondents. Proponents of these values also argue that they are better suited to effecting beneficial change in society than are purely economic goals. To understand academic values in the context of this values literature is therefore to appreciate the potential of academic research to contribute to social as well as economic change. Engell and Dangerfield (2005) make the case for the practical benefit of pursuing multiple goals when they state that only by doing so can we ensure that higher education continues to prosper. Sen (2001) makes an equally compelling

case for the importance to development – and the living of lives we have reason to value – of supporting multiple freedoms. Section 9.7 explains further why a narrow conception of the value of knowledge is damaging to the pursuit of knowledge exchange, and thus of these broader social goals.

In a system dominated by a neoliberal economic ideology, it is difficult to argue for the importance of alternative values and the pursuit of alternative goals. However, Sen's case is strengthened by the fact that his appeal is not *solely* a moral one, but is also inherently practical. Under his approach, non-economic goals, far from subsuming economic means and ends, are accorded parity of esteem with them; moreover, since the goals are mutually reinforcing, there are economic gains to be made by developing non-economic freedoms. Engell and Dangerfield (2005) and Sen (2001) provide strong practical, as well as moral, arguments for the simultaneous pursuit of economic and non-economic goals. In spite of these arguments, as well as of the efforts by university respondents to accord parity of esteem to each of these goals and of academic respondents' pursuit of non-economic goals in practice, a narrow conception of knowledge exchange remains widespread. It is therefore helpful to consider the reasons for this continued predominance of economic valuation – what, after Marx (2003: 689), might be termed 'the dull compulsion of economic relations'.

9.5 The dull compulsion of economic relations

The divide between government respondents' views on the nature and purpose of knowledge exchange and those of the academic respondents is the most striking to emerge from analysis of the various respondents' views. Nevertheless, tensions exist

at the boundaries between each of the four groups surveyed in Chapters 5 to 8, as well as between individuals' views and those of their parent institutions. Thus, for example, University Respondent W5 described how 'there has been a bit of tension I think between the approach that we've taken in relation to our Third Mission Funding ... and what [the Department for the Economy and Transport] area of the Assembly seems to want out of this'. Similarly, academics expressed concerns that an economic rationale, driven by Government, is beginning to pervade academia (see Section 8.6).

The Funding Councils have perhaps the most complicated role with respect to managing different priorities. In 'closing the loop' (Funding Council Respondent 2) between the Government and higher education institutions, a 'complex picture' (Funding Council Respondent 1) is created. Although responsive to the HE sector's views, the Funding Councils are accountable to Government, and must put into practice the requirements of their remit letters. Because of this, a number of tensions are apparent within the Funding Councils themselves: although the Councils' knowledge exchange funds cover all forms of activity, the metrics remain biased towards economic forms of knowledge exchange and, whilst attempts have been made to weight the metrics in favour of activities which are 'for the public good' (SFC 2006a: 116), continued reliance on metrics perpetuates the imbalance discussed in Section 9.2.

Internal tensions are also apparent elsewhere. From discussion of the various policy documents relating to knowledge exchange published by the three Governments (see Sections 5.3 and 5.4), a gap between the rhetoric of a broad-based knowledge exchange and the reality of a predominantly economic focus – expressed in the

documents' detailed recommendations – emerges. In the Scottish Government this tension was particularly noticeable. Respondents from economic and non-economic areas of the Government noted that the Analytical Services Group, responsible for social research across the Government, plays an important role in promoting knowledge exchange in Scotland; however, Government Respondent S4, a member of Analytical Services, believed that '[i]t's much easier to make arguments for investing in science and technology than it is in the softer sort of social science, social policy type activity', and reported a bias within the Scottish Government and Funding Council towards the former type of activity.

The tensions between individual and institutional conceptions of knowledge exchange, and the dominance of economic valuations of knowledge, even in spite of support for alternative value systems, can be explained with reference to the twin concepts of structure and agency. The two principal theorists of structure and agency, Pierre Bourdieu and Anthony Giddens, approach the concepts somewhat differently, but their theories are not without similarities; in the following discussion, reference will therefore be made to both Bourdieu and Giddens. It should nevertheless be noted that Bourdieu has criticised Giddens on the grounds that he has tended to legitimise rather than criticise the existing social order (King 2005).

In the first sentence of the quotation below, Marx clearly defines, if not in those terms, the interplay between individual agency and the constraining influence of pre-existing structures. In the second sentence, however, he betrays his tendency to overstate the importance of structural factors in determining – as opposed to constraining or influencing – individual actions:

Men make their own history, but they do not make it just as they please; they do not make it under circumstances chosen by themselves, but under circumstances directly encountered, given and transmitted from the past. The tradition of all the dead generations weighs like a nightmare on the brain of the living. (Marx 1954: 10)

The problems associated with, on the one hand, determinism, which understates individuals' ability to affect their circumstances and, on the other hand, individualism, which overstates the extent of individuals' free choice, are what both Bourdieu and Giddens seek to overcome. Theories of structure and agency propose that humans have agency, which is to say that they can undertake actions that affect the course of their own lives and the lives of others; the actions that individuals can take, however, also tend to be constrained by 'structures'.

For Giddens (1984), the structures which influence human actions are understood not in a physical sense as institutions – indeed Giddens distinguishes between structures and systems, the latter being a given society's major institutions (King 2005) – nor as existing externally to human action. Rather structure 'refers to the structuring properties', comprising rules and resources, 'which make it possible for discernibly similar social practices to exist across varying spans of time and space...' (Giddens 1984: 17). Structure exists 'only in its instantiations in ... practices and as memory traces orienting the conduct of knowledgeable human agents' (1984: 17) and, through this existence, it serves to produce and reproduce social systems.

Bourdieu similarly proposes that social norms are reproduced through individual action. This process he described with reference to the concept of 'habitus', which 'overcomes subject-object dualism by endowing subjective bodily actions with objective social force, so that the most apparently subjective individual acts

necessarily assume broader social significance' (King 2005: 222). This 'objective social force' is the essence of habitus, and comprises what have been termed 'dispositions and generative classificatory schemes' (Jenkins 1992: 74) or 'perceptual structures and embodied dispositions' (King 2005: 222). The habitus provides a common language by which we can understand the world, but through its associated rules it also serves to promote that understanding over possible alternatives. The power of the habitus, argues Bourdieu, lies in the thoughtlessness of habituation; social rules are not consciously learnt and taught with reference to a body of codified knowledge, but instead are followed as a matter of unconscious routine (Jenkins 1992). This is not dissimilar to Schumacher's (1993: 63) contention that our adult thoughts and actions are shaped by ideas transmitted to us in the 'Dark Ages' of our youth, before the 'critical mind' takes shape. Where Schumacher implies that we move away from our Dark Ages, however, Bourdieu argues that the habitus continues to shape our actions throughout our lives.

Drawing on Bourdieu's theory, it is possible to develop a habitus of knowledge exchange. This contains those factors which serve to structure the ways in which knowledge exchange is conceptualised and practised. Firstly, there are the measurement and audit structures, defined by the Funding Councils and followed by universities. As discussed above, these not only serve to value activities that fall within their classification of knowledge exchange relative to each other, but also devalue unmeasurable, and therefore excluded, activities.

Secondly, university departments of knowledge exchange structure the ways in which academics understand knowledge exchange. Although these are physical structures, in

the sense that they exist in offices and are run by people, this is merely an embodiment of a particular understanding of knowledge exchange. Cardiff University's Research and Commercial Division (RACD) and Edinburgh Research and Innovation (ERI) both began as technology transfer offices, and have retained that role even as each University has sought to broaden understandings of knowledge exchange. With the principles of technology transfer embedded in the working practices and memories of each office's employees, not to mention in something as seemingly innocuous as the units' names, those employees – together with each institution's academics – become habituated to the existing order. This complicates efforts to institute new principles associated with knowledge exchange. The University of Leeds' creation of a new unit encompassing all aspects of a broadly defined knowledge exchange can be seen as a means of reconstituting the habitus.

A third, and extremely dominant, element of the habitus relates to the fact that the government departments with the greatest interest in university knowledge exchange are those associated with science, innovation and the economy. This has an impact on how knowledge exchange is practised, through the systems of audit described above and through the policy documents and remit letters that shape Funding Council and university policies. However, it is itself only a manifestation of a far more pervasive element of the habitus. Neoliberal ideology, with its insistence that a free market represents the most efficient and effective way to structure social interactions, generates a set of perceptual structures that, far more readily than a non-economic reading, facilitate an economic reading of the value of knowledge. It is a case made by Fahey et al. which, although already quoted in Section 2.4, bears repeating:

Every presence defines an absence. When knowledge economy policies define worthwhile knowledges, they leave out those knowledges deemed marginal to current economic growth. They legitimise particular kinds of knowledge whilst ignoring and thus diminishing others. (Fahey et al. 2006: 287)

The loose definition of terms discussed in Section 5.5.4 also serves to support this tendency. Although claims are made that terms such as 'economy' and 'science' are shorthand for a broader meaning than would be understood from their dictionary definitions, not all respondents shared this shorthand. In practice, confusion surrounding the meaning of terms potentially allows economic ends to be pursued unchallenged, because critics can be appeased by reference to a 'broader' meaning.

This is not to say that the practices that constitute the habitus, even where their influence extends globally, cannot be overturned. The other side of structure-agency theories is, after all, agency, the ability of individuals to act. The creation of a new Enterprise and Innovation Office at the University of Leeds is one instance of such action, but other examples also emerge from the data. As detailed in Section 5.4.2, the Higher Education Funding Council for Wales responded to concerns raised by the higher education sector about the overemphasis of wealth creation by developing the Third Mission Fund; unlike its forerunner, the Higher Education Economic Development Fund, its stated purpose is to act as an infrastructure fund for *all* forms of knowledge exchange. The fact that the metrics employed in determining its distribution continue to privilege economic forms has already been discussed, and serves to highlight the ongoing pressure from the habitus. This notwithstanding, it is instructive that academics and their universities were able to move funding towards a regime that provides them with greater scope for conducting a range of activities. A further example of the power of agents to effect change is provided in the admission

by the Vice Chancellor of Leeds that his view on the purpose of knowledge exchange had been altered by the comments of his academics (see Section 7.2).

Theories of structure and agency serve to explain how, in spite of – sometimes successful – efforts to redefine knowledge exchange such that it takes into account a broader range of values than simply the economic, economic value continues to dominate. Although individual agency does occur, 'the habitus *disposes* actors to do certain things' (Jenkins 1992: 78) and, through unconscious force of habit on the part of actors, makes the pursuit of the status quo a more probable option than change. This insight brings us once again to the practicality of Sen's approach to development as freedom, as applied to knowledge exchange. Given the power of neoliberal ideologies in Britain at present, an approach to knowledge exchange that continues to acknowledge economic goals, at the same time as introducing important new ones, works at least partially within the context of the existing habitus. Thus change is made more probable, because current understandings and dispositions do not need to be entirely overturned.

9.6 Nurturing talent

Using Sen's theory of what constitutes development to broaden our understanding of the desirable ends of knowledge exchange might help to make change more *probable*, but it only partially explains why that change is *necessary*. There are two further reasons why it is. Section 9.7 deals with the crucial issue of providing academics with the space to engage in a broad range of knowledge exchange activities. First, the importance of nurturing academic talent will be addressed.

Respondents from Government, the Funding Councils and university management were all clear that universities have a great deal of autonomy to determine their own policies. The power to influence the future direction of knowledge exchange is therefore held not only by the Government and Funding Councils, but also by the university sector itself. Since academics also have agency, they too have the means to affect policy. However, although university management can play an important mediatory role between academics and government officials – the lack of direct contact having been attested to by Government Respondents W1 and W2 as well as by academic respondents – it is not immediately clear why they should do so. Certainly it is in a university's interest to maintain good relations with the Government and Funding Council, since they are its paymasters, but why should universities push for knowledge exchange policies that satisfy the values of their academics?

The first reason, that there are significant benefits to be gained for academia and for society from doing so, has been discussed in Sections 9.3 and 9.4, but there is a further, practical imperative. With growing recognition of the role of knowledge in the current economic order has come a focus on talent as a source of competitive advantage. Such is the extent of the belief in its importance, that some commentators have described an ensuing 'war for talent' (Brown and Hesketh 2004: 65). Although Brown and Hesketh argue that much of this war is based on an irrational assumption that 'a talented few matter more' in the generation of reputation and success (2004: 84), their attention is concentrated on the business world. Here success is as much dependent on the successful management of a company as a whole than on the recruitment of talented individuals. By contrast, universities are, at their best, collegial

– comprising collections of like-minded individuals – and their reputation and financial success do indeed rely on the talents of those individuals: the more talented an institution's academics, the higher the reputation and the greater the financial rewards.

Academics are a highly mobile group, as witnessed by the fact that just one academic respondent felt that her knowledge exchange activities were made possible only because a distinctive policy was being developed by her institution. Other respondents referred to the possibility of conducting their activities at any other (equally prestigious) university. Florida's (2007) work on the mobility of talented individuals suggests that competition for talent now operates on a global scale and, given that British universities like Leeds now define their goals in relation to their global ranking (University of Leeds 2006a), it seems likely that their search for the talent to fulfil those goals will also extend worldwide.

That academics belong to a 'mobile', as opposed to a 'rooted', group is a theory given credence by Florida, who notes that people who move location 'tend to be highly educated people whose careers require them to do so' (2008: 81). Academics also fulfil the criteria for mobility of possessing 'the means, resources, and inclination to seek out and move to locations where they can leverage their talents' (2008: 79). Florida's point is not always as clear as this initial reading might suggest. Having cited the fact that people who move tend to be those 'whose careers require them to do so', for instance, Florida goes on to claim that, in the United States, moving for work in fact rates as only the third most cited reason for moving, after housing and family-related reasons.

What emerges from an argument sometimes lacking in clarity, however, are two apparent points. Firstly, '...more people may feel compelled to join the ranks of the mobile in order to prosper economically' (2008: 89). In other words, career choice will cause some people to become more mobile. Secondly, this fact needs some qualification. The locations that people choose to move to are not simply the result of a binary distinction between 'job' and 'no job', because *where* we live has a significant impact on 'how much we make, how much we learn, how healthy we are, how stressful we feel ... and the people we meet' (2008: 148), in other words on how happy we are. With a globalised 'creative economy' opening up a greater choice of locations, people can increasingly move to maximise these other factors. As a call to people everywhere to choose locations that make them happy, 'Who's Your City?' rather overstates the case for the transformative power of the creative economy in facilitating the mobility of the masses, and Florida's point is better made in his earlier work:

Talented people ... will go to places that offer abundant economic opportunity, exciting cultural and social environments, world-class amenities, and the freedom to be themselves and realize their dreams.
(Florida 2007: 145-6)

The foregrounding of talent is significant, because it highlights the fact that only a minority of people are highly mobile. Not only do they have the means and resources to move, but they also have the choices. Although Florida's 2008 work does refer to the mobility of well-resourced and talented individuals, it is an important distinction that is underemphasised. As already alluded to, academics comprise one group that has this kind of choice over its location, with a global network of universities from which to choose. Florida's thesis is helpful not only because it highlights the mobility

of academics, but also because it suggests that, in choosing a university, academics are influenced by more than just the job per se.

This is why university managers need to listen not only to civil servants but also to academics. Whilst universities alone do not have control over the wider environment in which they are located, they can influence those factors which academic respondents deemed to be important within an institution. These also include an exciting environment, with respect to the type of research and knowledge exchange opportunities available to them, as well as sufficient resources and good communication. Academics *are* the university. This was true of the original collegiate institutions that pre-dated managerialism, and it remains true now. Without academics and their talents, and without their RAE returns and successful grant applications, universities would not just fail to compete but, ultimately, would not exist. Since academics are among the world's most mobile people, each university must give thought to how best to retain them.

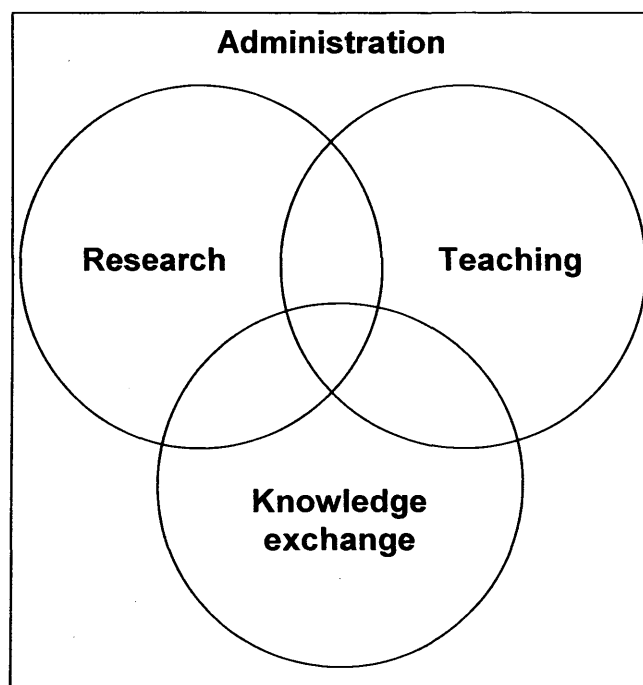
9.7 Making space for knowledge exchange

This observation brings us to the second reason why it is necessary to redefine knowledge exchange. It is both a reason in its own right and a means of accommodating academic viewpoints in order that universities can retain their talent, and it hinges on the need to make the space for knowledge exchange to occur. At first sight, it might seem that the gulf between academic and government valuation of knowledge is not problematic. From the responses of the academic respondents, it is apparent that they are able to pursue a wide range of knowledge exchange activities, not all of which generate economic returns, in spite of a bias in the measurement and

funding mechanisms towards economic knowledge exchange. If academics can engage in non-economic knowledge exchange in spite of a bias against it, then is this bias really a problem?

To answer this, an understanding of the spaces of academic activity is necessary. Figure 9.1 shows the four principal activities of an academic – research, teaching, knowledge exchange and administration. This is, of course, an idealised diagram, in which research, teaching and knowledge exchange receive equal weight, and administrative tasks are pushed back into the interstices. Although it is often claimed that seeing knowledge exchange as a distinct, third activity can be damaging, because it fails to allow for overlap between each activity, it can be helpful to recognise it as distinct.

Figure 9.1: Spaces of academic activity



Thus in the diagram the three spheres of research, teaching and knowledge exchange have areas of overlap, but are also shown to exist separately from each other. Together, all four spaces of academic activity sit within a single bounded space; this can be understood as the total available resources, including time, money and support, for all activities. Given that these resources are limited, an increase in the amount of a resource, for instance time, allocated to one activity results in a reduction in the amount of that resource available elsewhere, and hence a squeeze on the other activities.

It is important to recognise knowledge exchange as a distinct activity because, in doing so, it can be understood as something that doesn't just 'happen', but must be 'done' by academics. This seems like an obvious point but, in fact, it is easily forgotten. In order to engage in knowledge exchange, academics need resources, often in addition to those needed for teaching and research. In other words, space needs to be created for knowledge exchange to happen. If it is not, then the demands of research, teaching and administration will tend to squeeze knowledge exchange activity. In emphasising a lack of time, financial resources and communication, the comments of academic respondents cited in Chapter 8 confirm this view. They are well characterised by Academic Respondent W Sci 3's observation that 'nobody's got the resources to do these two things [research and knowledge exchange] properly. So you end up with a sort of hybrid that's nothing at all'.

The UK, Welsh Assembly and Scottish Governments all make claims in their policy documents for the broad-based nature of knowledge exchange. If knowledge sharing activities of *any* kind – non-economic as well as economic – are to take place in

universities, it is therefore agreed that they will occur under the heading, and therefore within the space, of 'knowledge exchange'. However, it has been shown that, in practice, government policies tend to favour activities with income-generating potential. This manifests itself in the resources – both financial and, in structures such as university knowledge transfer offices, administrative – made available for income-generating activities, and in the kudos awarded to those engaged in them. Selective provision of these resources serves to enlarge the space available for economic knowledge exchange relative to that available for non-economic exchange activities. A narrow definition of the purpose of knowledge exchange can therefore have a real impact on academics' ability to engage outside the confines of that definition.

Each instance of knowledge exchange requires different resources in varying quantities, but it was clear from respondents that, in all instances, providing a space for it to occur is essential. The impact of financial resource shortages was described by Academic Respondents S Sci 4 and W Soc 1, both of whom felt sidelined by their institution's allocation system for knowledge exchange funds. A lack of clear incentives for conducting knowledge exchange – be that career progression, financial rewards, or support from senior colleagues – was also referred to as a check on activity. Academic Respondent W Sci 3 stated that '...the mechanisms and the efforts and the rewards associated with [knowledge exchange] I think are less developed', whilst Respondent W Soc 1 felt that a lack of strategic direction on knowledge exchange, combined with limited resources, meant that 'I should leave my ambitions behind, as they can't be taken on board'. The most frequently cited resource shortage was a lack of time. Academics found themselves forced to choose between research,

knowledge exchange and teaching, or spent time on projects outside working hours in order to fit in all of their commitments.

The commitment of these academics to knowledge exchange and the flexibility which they exhibit in striving to engage in it are both notable. However, not all academics can, or will, go to these lengths. In their recent report 'Developing Dialogue', Benyon and David (2008) explore the role of the learned societies in supporting and developing academics' knowledge exchange and public engagement activities. The report contains a series of recommendations for the societies themselves, for the Academy of Social Sciences and for the Economic and Social Research Council. From this report, one finding was considered sufficiently relevant to academics to warrant inclusion in the Times Higher Education: this was the fact that the RAE has left academics 'so tied up in pursuing ratings ... that they have been unable to commit time and energy for other important elements of their work' (Fearn 2008: 11). In terms of Figure 9.1, the research space has been expanded at the expense of the other activities. The money and kudos associated with a good RAE performance have in turn resulted in academics spending time on research that is consequently not available for other activities.

The implication is clear. At best, knowledge exchange activity will not be optimised, especially in those disciplines which fit least well with an economic model of knowledge exchange, because the space available for it – the financial resources and other rewards, the time, the good communication which creates a supportive environment – is insufficient. The possibility of knowledge exchange taking place will not be entirely precluded and, because academics will want to engage, some

knowledge exchange will undoubtedly take place. However, its quality and quantity will not be as great as if more space was made available. The fact that academics cited these factors not only as necessary but also as frequently lacking, suggests that this state has already been reached in some cases. At worst, the space will become so squeezed as to render knowledge exchange non-existent.

9.8 Implications of the findings

The principal value placed on academic knowledge within the policy community at present is economic and, despite individuals' efforts, both within that community and outside it, to broaden the definition of knowledge exchange, this narrower view persists. The metrics used to measure knowledge exchange and determine the allocation of Funding Council monies for it serve to perpetuate the privileging of economic ends. If this continues to be the case, there are two potential implications for universities.

Firstly, institutions that fail to provide a space for knowledge exchange which recognises academics' needs and value systems risk losing talented individuals to other universities or organisations. Secondly, failure to provide space will prevent the knowledge exchange activities of those who remain from being optimised. Those academics who do engage with external parties will do so under constrained circumstances. Other academics will fail to engage. A broad understanding of the purpose of knowledge exchange, extending beyond merely the economic, is as important a part of that space as are time, understanding and good communication. Narrow definitions are not only the result of structures which privilege economic ends, but also serve to feed back into the sustenance of those structures. By contrast, a

genuinely broad understanding of knowledge exchange, extending beyond rhetoric into practice, could overcome these two problems.

Adopting a broader definition would also serve to better align policy drivers with academic motivations. In so doing, the UK, Welsh and Scottish Governments would be more likely to achieve their desired ends. The current promotion of financial gain as the principal rationale for knowledge exchange fails to take into account academic respondents' failure to cite this as a primary motivating factor. A less economically focused approach would seem more likely to motivate academics, and would thus increase all outputs of knowledge exchange, both the economic and the non-economic.

Moreover, the benefits accruing from this approach could be expected to extend beyond the university and Government, to society as a whole. That this should be so is a point forcefully argued by Sen (2001). From an ideological viewpoint, Sen maintains that his freedom-based approach to development, which it has been shown here can be applied within the knowledge exchange debate, is best suited to enabling the living of lives we have reason to value. From a practical point of view, this approach also benefits from incorporating economic ends alongside the non-economic; this allows the case for multiple ends to be made more readily in the context of a prevailing neoliberal ideology.

Embracing a truly broad definition of knowledge exchange will nevertheless require certain structural changes. Not least of these would be the acceptance that statistical measures of value and success are no more 'factual' than are qualitative assessments

and, given the 'culture of numbers' (Adler et al. 2008: 3) that we have created, this is a significant demand. However, as the redefinition of the University of Leeds' knowledge exchange mission to encompass all forms of 'impact' – with its associated approach of 'collect[ing] the things that aren't measurable' (University Respondent E1) – has shown, universities are well placed to commence such a process.

Chapter 10: Concluding remarks

10.1 Review of research and findings

A review of the existing literature on knowledge exchange and universities showed that there are two principal camps in the knowledge exchange debate. The first of these accepts that it is a worthwhile activity, and is therefore concerned with improving the efficacy of exchange techniques; as a result, a significant proportion of the knowledge exchange literature is devoted to this topic. There are, however, also those who question the impact of knowledge exchange on academia and, associating it largely with commercialisation, argue that it is damaging to the pursuit of disinterested knowledge. It is striking that both of these groups tend to take as their starting point the assumption that it is the *economic* value of knowledge that produces opportunities for exchange. As long as this remains the case, it would seem impossible for those in favour of economically valuable knowledge exchange to engage with their more sceptical counterparts in a dialogue that leads to the accommodation of both viewpoints.

Although the majority of the knowledge exchange debate centres on the economic value of knowledge, a small body of literature exists that calls into question this focus. Ozga and Jones (2006), for instance, argue that the 'travelling' policies which site knowledge exchange activity within a framework of global economic activity are often mediated by 'embedded' policy, which is responsive to local needs. The local use of knowledge breaks the bonds that link it 'to the economy within a wholly commercializing framework' (2006: 14). Bond and Paterson's (2005) research found that this process was indeed occurring in practice, their respondents having declared

the various civic roles of the university to be at least as important to them as its economic role. The British Academy has also questioned the economic focus of the knowledge exchange debate, claiming that 'it is illogical and damaging to equate a real return [on investment in research] solely with a measurable, immediate economic return' (2004: 62). Instead, the Academy makes the case for a broader definition of the value of knowledge that takes into account the fundamental contribution made by higher education to a 'civilised, liberal and enlightened society' (2004: 63).

That potential might exist within universities to make such a contribution is an appealing prospect; moreover, experience suggests that it is one which academics are already endeavouring to realise. In spite of this, the dominant discourse that links knowledge exchange to the economy has remained largely unchallenged. Taking as a starting point Ozga and Jones' contention that the value of knowledge need not be tied to the economy, and drawing inspiration from literature – including Schumacher's (1993) 'Small is Beautiful' and Sen's (2001) 'Development as Freedom' – that explores the importance of non-economic value systems, it was determined that the nature of university knowledge exchange and its value to society should be examined afresh.

Accordingly, the purpose of the research having been determined as being 'to explore the ways in which the role of the university, and specifically of knowledge exchange, is conceived', a central research question and five ancillary theory questions were identified. Following a programme of qualitative research, involving interviews with fifty respondents and analysis of documentary evidence, it is now possible to provide answers to these questions. Section 10.2 discusses conclusions drawn in answer to the central research question. Since Theory Question 5 draws on the previous four

questions for its answer, and forms part of the response to the central research question, this will also be discussed in Section 10.2. Findings associated with the first four theory questions, which contributed to the answering of this principal question, are described below.

Theory Question 1 sought to determine the nature of knowledge exchange policy as expressed by the UK, Welsh and Scottish Governments, and by the Universities of Leeds, Cardiff and Edinburgh. Each Government's policy documents make reference to a variety of purposes of knowledge exchange activity, including wealth creation, support for policy making and the enrichment of culture. The wide range of definitions of knowledge exchange given by government respondents, often with reference to their own spheres of influence, went some way to validating this vision of a broad-based knowledge exchange policy. In Scotland, universities' engagement specifically with both policy makers and the public appeared as a stronger component of policy than in England or Wales; this focus was explained by respondents with reference to notions, apparently deeply embedded in the Scottish psyche, firstly of the nature of Scottish statehood and, secondly, of the civic foundations of Scottish universities, bolstered by eighteenth century Enlightenment ideals.

As with government policy, university policy referred to a range of outcomes of knowledge exchange. At the University of Leeds, these outcomes were universally known as 'impacts', with seven areas of impact having been identified and enshrined in the University's 2006 'Enterprise and Knowledge Transfer White Paper'. The publication of this document is part of efforts by the University to define a genuinely broad-based knowledge exchange and to ensure that all of its academics know about

and feel able to contribute to at least one area of impact. Although not publicising the fact as strongly as the University of Leeds, Cardiff University also advocates the pursuit of a wide range of knowledge exchange objectives. As at Leeds, respondents from Cardiff acknowledged that this broader focus is a new and conscious attempt to move away from a previous focus on the economic value of knowledge. A similar process was described by University of Edinburgh respondents, although here an implicit classification of three end user groups emerged, mirroring those identified by Scottish Government sources.

Whilst government and university policies all appeared from an initial reading to advocate a range of social and economic outcomes from knowledge exchange, it became clear that not all outcomes are equal and that not all groups agree on the resultant prioritisation. These findings served to answer Theory Question 2: What are the (different) priorities for knowledge exchange in the UK, and are tensions apparent between them? From examination of the detail of the various government policy recommendations and from discussions with government and university respondents, it emerged that, in all of the study regions, a distinction can be drawn between the Governments' view of the broadly defined *purposes* of knowledge exchange and their *prioritisation* of narrowly economic ends. The focus on economic value is also apparent in the metrics employed by the Funding Councils in the allocation of their knowledge transfer funds.

However, in the views of the Funding Council respondents, one finds evidence that the Councils sit at a point of tension between different viewpoints on the nature of value. Whilst Funding Council and university respondents – and, indeed, individuals

within Government – expressed a desire to broaden the metrics, economic values retain an enduring power. This power can be understood with reference to the structuring properties of a prevailing neoliberal ideology; it is not without opposition, though, and the agency of academics acts as a countervailing tendency, which serves to mitigate some of its effects.

In exploring different forms of knowledge exchange activity – in answer to Theory Question 3 – the gap between the dominant tendencies in academic and government ideologies became clear. The study projects covered a range of knowledge exchange mechanisms and non-academic partners, and yet four common motivations for engaging in knowledge exchange emerged. Academic respondents engaged in activities with potential for financial gain are motivated by this potential, but they, along with colleagues engaged in non-economic activities, are *more* motivated by making a difference to others, enhancing personal or institutional kudos, or engaging in interesting and exciting projects. In fact, it transpired that financial gain is regarded by the majority of respondents who mentioned it as an essential resource, and therefore as an enabler of their activity rather than a motivator for it.

As to whether knowledge exchange policy is addressing the needs of practitioners (Theory Question 4), the first point of note is that many academics were not aware of the detail of policy at a university or government level. This independence can be viewed in a positive sense, in that academics are able to operate without interference from policy makers. It also has a negative consequence, however. At the Universities of Leeds and Cardiff, six academics reported communication as being a crucial element in the creation of a positive atmosphere for knowledge exchange. Several

respondents noted a lack of good communication, which they felt to be problematic. Although they were often not directly aware of the nature of policy, respondents were clear that better communication, more resources and, particularly, more time would all contribute to making their knowledge exchange activities easier and more effective. This suggests that knowledge exchange policy is not addressing these respondents' needs.

Returning to the question of the differing priorities of and potential tensions between different groups, a comparison of policy and practice highlights two points in particular. Firstly, the prioritisation of economic ends over other goals by the three Governments is not apparent at the Universities of Leeds, Cardiff and Edinburgh. University respondents expressed the need to meet expectations placed on them by Government – particularly by performing against the Funding Council knowledge exchange metrics – at the same time as developing this broader vision. Attempting to balance these goals creates tensions, but it should be noted that the autonomy granted to universities in spending their knowledge exchange allocations presents them with significant power to develop their own approach to knowledge exchange.

Secondly, whereas universities, in mediating between the economic values of Government and a broader 'academic' value set, sit at a point of tension, academics were subject to such concerns to a lesser degree. However, despite the mediatory role played by their universities, and to some extent by the Funding Councils, some of the needs of the academic respondents remain unmet. Although there is little apparent *direct* tension between the Governments and academics, this discrepancy between the focus of government policy and academic needs – which directly relate to the value

attributed to knowledge and the desired outcomes of knowledge exchange – has a number of implications. These are set out below.

10.2 Summary of implications

The aim of Theory Question 5 is to synthesise the findings of the previous four questions, in order to address the central research question ('What can we learn about the possible future directions for knowledge exchange, and by extrapolation for the university as an institution?'). It is already apparent from these findings that the UK, Welsh and Scottish Governments all wish to expand university knowledge exchange activity, and that their priority outcome from this is economic growth. It is also clear, however, that a broader understanding of the value of knowledge exists, and that personal and social outcomes from knowledge exchange are of greater value to academics than are economic ends. The fact that the Governments are drawing on a different rationale in setting policy than are academics in conducting it matters in three senses. These impact on the future activity of universities but also, because of that, on society at large.

Firstly, the mismatch between the valuation of knowledge as theorised in policy and as realised in practice should be of concern to Government. The lack of alignment between policy drivers for knowledge exchange and the motivations of academics makes it less likely that policy will achieve its desired ends. Promoting financial gain as the principal rationale for knowledge exchange fails to take into account the fact that academic respondents did not include this as a primary motivator for their engagement in it. If, as Sen (2001) argues, economic ends can also be achieved through the development of other instrumental freedoms – some of which might tally

better with academic motivations – then from a purely practical point of view it would seem preferable to target knowledge exchange towards reinforcing those freedoms.

The Governments' adoption of a predominantly economic focus in their knowledge exchange policies matters, secondly, to academia. The Governments' claim that knowledge exchange encompasses *all* knowledge sharing activity implies that the necessary resources will be provided for all academics through this funding stream. However, in practice, resources are made available based predominantly on contributions to wealth generation. The result of this is an uneven space for knowledge exchange, in which financial resources, support services and kudos are more readily available to those engaged in economic than non-economic activities.

Universities have the autonomy to develop an institutional approach to knowledge exchange which better takes into account academics' needs and value systems. Moreover, the evidence presented here suggests that advances are being made in this regard. Unless universities continue to act in this way, a climate will prevail in which the dominant expectation is that knowledge exchange will be conducted for economic ends, and resources will be allocated accordingly. This will have two potential implications. The first is that individual universities, and even the higher education system as a whole, will risk losing talented individuals who feel that their values are not being upheld and their needs not met. The second is that, for those who remain, knowledge exchange activities will not be optimised. Those academics who do engage with external parties will do so under constrained circumstances. Others will fail to engage. It is not enough for policy simply to *say* that non-economic forms of knowledge exchange are desirable; unless the space is made available for them to

occur, they are liable to be squeezed by the demands of research, teaching and administration.

The breadth, or otherwise, of the scope of knowledge exchange matters in one final respect. It matters to society. According to Sen (2001), a well-functioning economy is an important but not sufficient condition for a developed society. Human beings also have reason to value factors such as education, health, culture, and community. These are facilitated by five instrumental freedoms – political freedoms, economic facilities, social opportunities, transparency guarantees and protective security – to all of which academia can contribute. Although, even with a policy focus on economic knowledge exchange, non-economic forms of engagement can, and do, take place, it has been argued that, under these conditions, they will not be optimised. As a consequence, beneficial social gains will not be realised.

There are therefore both practical reasons and reasons relating to the maximisation of the social good for seeking a genuinely broad-based policy on knowledge exchange. Although structural factors relating to the prevailing neoliberal ideology make this difficult to achieve, the universities studied here show that change is possible. Nevertheless, in the current climate, universities and their academics will need to be bold in asserting their alternative value systems. In the long term, it would seem that, for the sake of political goals, academia and society, they are values to which Government would also do well to aspire.

10.3 Future avenues of research

These observations are, of course, based on a relatively small study of current knowledge exchange activity in the United Kingdom. Whilst each respondent's view is, in and of itself, valid, there are several reasons why one might wish to conduct a more wide-ranging study. Firstly, although the range of academic knowledge exchange activity examined here has been necessarily limited, it would be interesting to compare a greater array of subject areas. By speaking to more academics, a more complete picture could be developed of the values held by academics, their understanding of the ends of knowledge exchange, and the factors that contribute to their pursuit of these ends.

Secondly, this study engaged only with academics who are already undertaking knowledge exchange activities. From this, it is apparent that the knowledge exchange capacity of even these academics is limited by insufficient resources, poor communication and lack of time. However, it is anticipated that there remains a significant proportion of academics not yet involved in knowledge exchange. Whether this represents a missed opportunity, and what, if anything, could be done to facilitate their involvement, would be a research topic of considerable practical interest.

A third limitation on the research is that it explores experiences relating to only three higher education institutions in the United Kingdom, each of which belongs to the Russell Group. This was a deliberate research method, intended to ensure that the study did not contain so many variables as to obscure its conclusions. This notwithstanding, there are important questions that could be asked about the knowledge exchange roles of less research intensive universities. Such a study might

also seek to examine the part played by teaching-based as well as research-based knowledge exchange.

Perhaps the most exciting opportunity suggested by the current research is the possibility of researching knowledge exchange activities in other countries. In view of the importance of different value systems in the way that knowledge exchange is understood and practised, investigation of different political and cultural contexts could be expected to shed further light on the role of values and, potentially, on alternative approaches to knowledge exchange to those discussed here.

Each of these lines of enquiry would serve to increase our understanding of how knowledge is valued and for what ends it is exchanged. However, if the case made here for the benefits of redefining knowledge exchange – such that it encompasses a genuinely broad vision of the value of knowledge – is accepted, then more research into the mechanisms by which policy is put into practice in the university environment would also be beneficial. In particular, understanding how academics are able to influence their universities, and how both groups can influence Government, would provide important direction to ensure that the necessary changes in knowledge exchange policy are effected. This, as argued above, would be to the ultimate benefit of Government, of academia, and of society.

Appendices and Bibliography

Appendix 1: Interview respondents

England

Institution	Respondent
University of Leeds	Vice Chancellor Pro-Vice Chancellor for Enterprise and Knowledge Transfer Director of Enterprise and Innovation Programme Manager, Enterprise and Innovation Office Programme Manager, White Rose Health Innovation Partnership
Yorkshire Universities	Chief Executive Officer Business Development Manager, KnowledgeRICH programme
Department for Innovation, Universities and Skills	Assistant Director, Knowledge Transfer Policy and Programmes
Government Office for Yorkshire and Humberside	Education Adviser
Yorkshire Forward	Project Coordinator, Science and Innovation
Higher Education Funding Council for England	Head, Business and Community Policy Team
Study Project 1	<i>Academia/industry/NHS research network</i> Enterprise and Knowledge Transfer Lead and Senior Lecturer, Yorkshire Centre for Health Informatics, University of Leeds Director, The Health Informatics Service, NHS UK Healthcare Solution Specialist, Digital Health Group, Intel
Study Project 2	<i>You and Your Body public events series</i> Principal Investigator, You and Your Body events and Professor of Clinical Medicine, University of Leeds Senior Lecturer in Rheumatology, University of Leeds Project Support and Research Officer, Centre for Health Enterprise, University of Leeds Administrator, Centre for Health Enterprise, University of Leeds

Scotland

Institution	Respondent
University of Edinburgh	Principal Vice-Principal for Community Relations Director, Edinburgh Research and Innovation Head of Media and Communications
Scottish Executive	Research Manager, Chief Scientist Office Director, Analytical Services Group Chief Researcher, Analytical Services Group Head of Innovation, Innovation Policy Unit BT secondee, Innovation Policy Unit
Scottish Funding Council	Chair, Research and Knowledge Transfer Committee
Study Project 1	<i>Dimensional Imaging collaboration (DI3D)</i> Commercial Director, Edinburgh Parallel Computing Centre, University of Edinburgh UK Business Development Manager, Edinburgh Parallel Computing Centre, University of Edinburgh Software Development Group Manager, Edinburgh Parallel Computing Centre, University of Edinburgh CEO, Dimensional Imaging, Glasgow
Study Project 2	<i>Knowledge and Policy project (EC 6th Framework)</i> Faculty KT Director and Senior Lecturer, School of Social and Political Studies, University of Edinburgh Deputy Director, ESRC Genomics Forum, University of Edinburgh

Wales

Institution	Respondent
Cardiff University	Vice Chancellor Pro-Vice Chancellor for External Affairs Director of Strategic Development Deputy Director Commercial Development, Research and Commercial Division Business Services Manager, Research and Commercial Division
Welsh Assembly	Head of Higher Education Group, Department for Education, Culture and the Welsh Language Director of Policy and Strategy, Department for the Economy and Transport Policy Lead for Research and Technology, Department for the Economy and Transport
Higher Education Funding Council for Wales	Chair, Third Mission Committee Senior Economic Development Manager
Study Project 1	<i>MedaPhor, Cardiff University spinout</i> Technology Transfer Officer, Research and Commercial Division, Cardiff University CEO, MedaPhor and Senior Lecturer, Cardiff University MedaPhor researcher and Board member, and Cardiff University Research Professor
Study Project 2	<i>Genetic counselling and the deaf community project</i> Principal Investigator and Consultant Research Genetic Counsellor, Cardiff University Project Advisory Board member and Director, Health Communication Research Centre, Cardiff University Senior Programme Manager, Patient and Public Involvement, National Institute for Health Research Central Commissioning Facility

Appendix 2: Interview schedules

Question guide for interviews with government respondents

What do you understand by the term knowledge exchange/transfer?
Are you aware of (competing) definitions other than your own?

What is the current government vision with regard to knowledge exchange?
Is this distinct from policy more broadly directed at promoting the sharing of academic research?
How is policy formulated? In conjunction specifically with whom?
What is policy trying to achieve?

What is the role of universities in society?
What are/should be the goals of university interactions with external parties?

What are the current priorities for the future of HE?
Where in the priority list does university engagement with external parties lie?
What are the priorities for such engagement? To whom precisely do these apply?

Who does/should determine priorities for a) research, and b) interactions between academia and other parties?

What are the benefits of academics sharing their research?
To whom do they accrue?

What are the current problems with/barriers to academics interacting with external parties?

How should universities' external activity be recorded?
Should there be targets for this activity? If so, what form should these take?

What characterises 'successful' external activity by universities?

What can be done by whom to improve upon the relationship between academia and external parties?

Question guide for interviews with university respondents

What do you understand by the term knowledge exchange/transfer?

Are you aware of (competing) definitions other than your own?

What is university-wide policy on knowledge exchange?

Is this distinct from a more general policy on interactions with external parties?

What are the priorities with respect to a) subject areas? b) outcomes?

How are these policies formulated? In conjunction with whom?

How far are external interactions the concern of a) individual academics, and b) central administration?

When/why does admin become involved? How should this change, if at all, and why?

What impact is government policy having on knowledge sharing activities at your university?

To what extent does government policy affect your ability to create institutionally specific policies on knowledge sharing activities?

What is the role of the university in society?

What obligations and responsibilities does the university have?

What challenges and opportunities does this present?

Is the role of the university changing? If so, how and as a result of what?

What personal goals do you have for the future of knowledge-sharing activities at your university?

Where does policy on external activities fit into the university's mission?

Importance (in practice)? To whom?

Why conduct third stream activity?

What makes research/research collaborations valuable?

What are the benefits of interacting with external parties a) to university and b) more generally? Which of these are most important?

Which departments are the principal actors in external activity at present?

With whom are collaborations taking place (public/private/voluntary etc)? From a strategic, university-wide perspective, which departments are most important in terms of their external activities? Why?

Does admin concern itself predominantly with particular types of interactions?

Are other forms monitored/assisted? How is external activity monitored/recorded?

What, if anything, is measured (inputs/outputs/outcomes)?

What characterises 'successful' external activities?

How could the relationship between the university and external parties be improved upon?

Question guide for interviews with academic respondents

What do you understand the term knowledge exchange/transfer to mean?
Are you aware of (competing) definitions other than your own?

By your definition, do you undertake knowledge exchange/transfer?
[If 'no'] Do you interact in any way with external parties through your research?

Please give current/recent examples of ways in which you are sharing your research outside the academic community. Refer to chosen study project.
[Ask for detail on type of collaborating partner (how chosen), nature of collaboration, why collaboration undertaken].
What are/were the pros and cons of this process?
In what ways have your expectations for this process/partnership/interaction been met or confounded?

How important are such knowledge-sharing activities a) to you, and b) in academia generally in your opinion?

What is the purpose of research-sharing activities?
What are the benefits of interactions between universities and external partners? To whom do they accrue?

What characterises 'successful' external activities?

What do you consider your priorities as an academic to be?
What value or values do you place on your research?
What is the status of your external interactions within your overall responsibilities?

What motivated you to be an academic?
What motivates you as an academic? What do you value most in your role?
What motivates you to share your research with non-academic partners?

How is your time divided between roles? How would you like your time to be spent?
What causes differences between the reality and this ideal?

Are you aware of the detail of government/university knowledge exchange policies?
How do policies impact on your ability to interact with others outside the university, through your research, as you see fit?
What role has the university administration played in your interactions? What role would you like it to play?
What impact do you envisage current HE policy having on your research over the longer term?

How could the relationship between you and external parties be improved upon?

Question guide for interviews with non-academic partners

Have you encountered the term knowledge exchange/transfer before?
If so, what do you understand it to mean?

How would you describe the relationship between you/your organisation and the individual/department with whom you are working at the University of Leeds/Cardiff/Edinburgh?
What is the purpose of your interaction? What form does it take?
What do you hope to achieve?

Have you worked with a university or individual academic before? Details.
What made you decide to work with a university/academic in this instance?

How did you come to be working with this particular person/research group?
Who made the initial contact?

What has been successful about the interaction to date?
What, if any, problems have you encountered in your relationship? Has anything acted as a barrier to you working together?
What benefits do you envisage reaping for you/your organisation?

Under what circumstances would you work with an academic/university again?
How would you go about finding an appropriate partner?

What do you think is the purpose of having universities? What are they/should they be for?
What part do you think universities should play in society (nationally and locally)?

Should academics be required to interact with non-academics, or to undertake research that can be used by non-academics?
If so, who should they be required to work with, and for what purpose?
If no, why not?

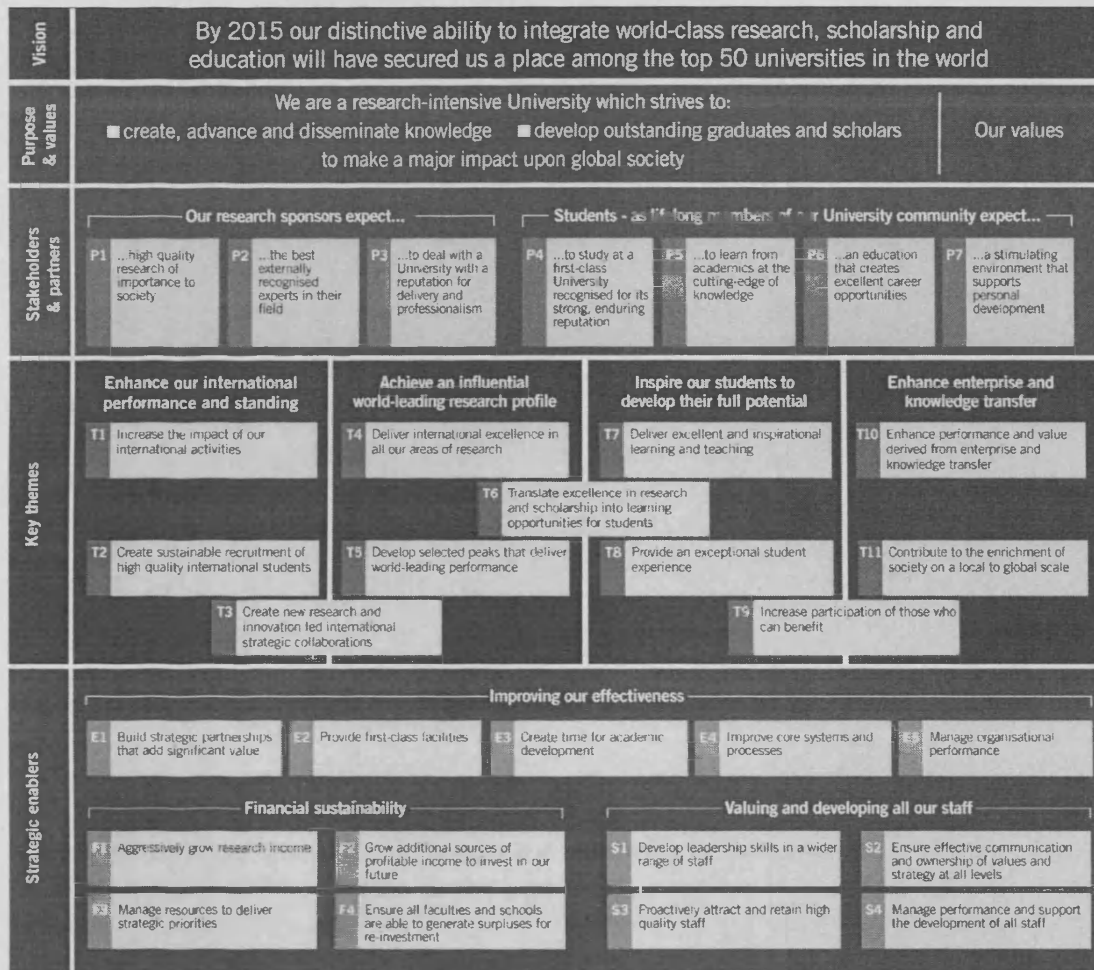
Who should determine what research academics undertake?

How important are universities' knowledge-sharing activities a) to you, and b) to society in general in your opinion?

In general terms, what factors comprise a 'successful' interaction between you and an academic partner?

How could the relationship between you and your academic contact(s) be improved upon?
What would help to better facilitate relationships between you and academia in general?

Appendix 3: University of Leeds strategy map



Source: University of Leeds (2006a: 9)

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