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From outcomes to process: Evidence for a new approach to research impact assessment

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This paper reports evidence from two studies conducted in nine British universities into individual academic and institutional perspectives on research impact. We analyse our findings in the context of global developments in performance measurement. Mechanisms for assessing the quality of research and associated knowledge exchange serve a dual purpose: used retrospectively, they enable public funding agencies to hold universities to account for the monies they have received and, looking forward, they allow those same agencies to incentivise desired activities or outcomes. Whilst existing mechanisms offer seemingly attractive, albeit contested, ways of pursuing the former, we particularly question their effectiveness in achieving the latter goal. We observe among our respondents a wide variety of intended impacts and mechanisms for pursuing them, and argue that this renders any monitoring and reward system based on achieved outcomes prone to complexity and lack of comprehensiveness. By contrast, a high level of consistency in motivations – across institutions and disciplines – points to a focus on the process of knowledge exchange as a far more effective driver. We identify a key role for university managers in fostering academic engagement in knowledge exchange. Ultimately, however, we conclude that effective incentivisation is likely to depend on the replacement of impact-based evaluations with a new, process-based approach.
1. Introduction

In academic and policy circles worldwide, the importance of universities sharing their research for wider, extra-academic benefit – a process which we shall here refer to as ‘knowledge exchange’ – persists as a subject of intense interest. (For markedly different stances on this phenomenon, contrast, for example, Collini 2012, or Nussbaum 2010 and Brewer 2013, with Etzkowitz 2008. For recent policy directions, see European Commission 2011, 2012; BIS 2013a). A new imperative is emerging for universities to ‘maximise the public benefits arising from publicly funded research’ (Commonwealth of Australia, 2013: 3; see also, for example, HEFCE et al. 2011a) and attention has accordingly turned towards mechanisms for assessing and incentivising such activity. After more than a quarter century of research assessment exercises, the UK is now in the vanguard of countries seeking ways to assess research ‘impact’.

This paper employs data gathered in nine British universities to test the foundations on which assessment and incentivisation systems are being built. Our analysis focuses on the twin perspectives of academics and the institutions in which they conduct their research and knowledge exchange activities. We study the former because, we contend, only by understanding the foci of academics’ activity, the mechanisms they adopt, and their motivations can we effectively support them to engage with their intended audiences. Institutional attitudes towards knowledge exchange form the second focus of our analysis because of the university’s potential to modulate the effects on academics of government policy. Having identified problematic aspects of prevailing approaches to assessment and incentivisation, we go on to argue that the direction of university policy offers one opportunity to shift attention from the outcomes to the process of knowledge exchange. Whilst the conclusions we reach refer to the country where our research was conducted, our findings seem likely to prove applicable wherever a similar approach is under consideration.

2. Incentivising knowledge exchange: understanding an evolving debate

Following early policy preoccupations with technology transfer (for a discussion of which see Bozeman, 2000), much attention has continued to be paid to university-industry interactions (e.g. D’Este and Patel 2007; Geuna and Muscio 2008. A comprehensive review of other literature in this field has recently been provided by Perkmann et al. 2013) and the generation of economic value from university-generated research (Mueller 2006). As such, focus has often centred on a subset of academic disciplines, including engineering, the physical sciences and fields related to biotechnology (e.g. Perkmann and Walsh 2009; Tartari et al. 2012; De Laurentis and Cooke 2009; Casper and Karamanos 2003). Universities have also been positioned as important institutional actors in national and regional innovation system models (Mowery and Sampat 2005). Here, too, a bias has been evident towards technology-led innovation as the main driver of territorial development (see Mouflaert and Nussbaumer 2005).

For many years, funding streams aimed at incentivising university knowledge exchange largely mirrored these preoccupations. In England’s longstanding direct funding stream for knowledge exchange, the Higher Education Innovation Fund (HEIF), for example, data used to assess institutional funding allocations are performance-based and use income measures as a proxy for impact (HEFCE 2011). This inevitably tends to foreground the work of the sciences, central as they are (Jensen and Thursby 2001) to generation of income in many of the measurement streams – including licensing, spin-out and start-up creation, and facilities rental. There is, however, something of a disconnect between those activities which contribute to the awarding of funds and those which the funding is intended to support. The
higher education funding council has reaffirmed a ‘long-standing commitment to supporting the social, as well as economic, contributions of HE’, and has committed to improving measurement of ‘non-monetised benefits’ (HEFCE 2011: 20). Until then, ‘HEIF is expected to support HEIs in the broad range of KE activities that result in economic and social impact to the UK’ (2011: 8). It is in this context that a more discipline-neutral term, ‘knowledge exchange’, has gained currency.

HEIF, however, accounts for just 3.6 per cent of the 2013-14 HEFCE funding allocation (HEFCE 2013). At 34.8 per cent of the allocation, the research grant is worth £1558 million to English universities. Across the UK, some £1900 million of quality-related research funding is distributed to universities each year. In addition, the UK’s seven research funding councils have an annual budget of £2.6 billion (BIS 2010). After running costs, this is predominantly allocated to research funding. But while the magnitude of funds dedicated to knowledge exchange – such as the research councils’ Follow-on Funding for unanticipated external engagement arising from council-funded research – is dwarfed by the funding available for research, it is in the criteria for research funding that we are increasingly seeing the drivers of knowledge exchange.

The research councils have for a number of years required academics applying for research funding to supply a statement addressing the potential impact of their research. Since 2009 this has been known as the ‘Pathways to Impact’ statement. The choice of the term ‘pathway’ emphasises a required focus on how researchers will engage with the potential beneficiaries of their research. Reference to ‘impact’ reflects a desire for demonstrable change arising from that interaction. Although this constitutes only a part of the submission, it signals the councils’ clear intent to see such demonstrable change arising from the research they fund. Now the Research Excellence Framework, the mechanism for assessing research quality on which the distribution of block grants to UK universities is based, has followed suit. In 2010 the funding councils announced that, in REF2014, they would ‘aim to identify and reward the impact that excellent research has had … and to encourage the sector to build on this to achieve the full potential impact’ (HEFCE et al. 2010: 7). For all units of assessment, this review of research impact now carries a twenty per cent weighting within the overall REF assessment (HEFCE et al. 2011a). The UK government has therefore come to implicate the full range of disciplines in its policies on university knowledge exchange. This comes alongside identification in the academic literature of the conditions that lead to a variety of types of knowledge exchange. Gunasekara (2006), for instance, has described the difference between universities’ generative and developmental roles, while Boucher et al. (2003) have identified how different institutional and locational characteristics promote different forms of engagement. Meanwhile Kroll et al. (2013) demonstrate variations in the knowledge exchange activities undertaken by German academics based on their field-specific and organisational backgrounds.

Although the research councils, funding councils and Universities UK (UK higher education’s representative organisation) are working to align their knowledge exchange policies (Research Councils UK 2012), assessment remains in its relative infancy. From the income-based metrics of HEIF to the narrative approach favoured for Pathways to Impact and the REF returns, a range of methods for assessing the quality of knowledge exchange is in place. What constitutes an effective method remains in question. To answer that question adequately, we first have to understand what we hope to achieve from the assessment. The ultimate goal of knowledge exchange policy is to increase the ‘positive impact [of research] on the world external to HE’ (HEFCE 2011: 5). But research funders, and the academics they fund, are also increasingly coming under pressure to prove impact as a means of justifying receipt of government monies (Sá et al. 2013; Arts and Humanities Research Council 2010).
Assessment, then, is required both to demonstrate the ‘success’ of past engagements and to incentivise future ones.

Existing mechanisms offer seemingly attractive (albeit contested) ways of achieving the former, but to what extent do they serve the latter function? Based on the factors that motivate academics to engage in knowledge exchange, what are likely to be the most effective, and efficient, drivers? This paper sets out to explore these questions through reference to two complementary sources: a quantitative survey of academics’ perceptions of the impacts of their research and a qualitative study of academic, university administration and government interpretations of the value of university research and knowledge exchange activity. In total, the research involved respondents from a selection of nine British universities. Each study is outlined in greater detail in the following section.

Much like the literature and policy debates, our own research has variously referred to ‘knowledge exchange’ and ‘research impact’. Our changing use of terminology has reflected the rapidly shifting debate in the UK over the past five years. The government-led move towards research impact as the preferred term has not, however, been unproblematic, and has been widely discussed and challenged within the academy itself (Martin 2011; Smith et al. 2011; Penfield et al. 2014). Our focus in this particular paper on the process of achieving, and not just the outcomes of, research impact helps to emphasise the continuity that exists with the concept of knowledge exchange, and therefore the complementarity of our respective work. Throughout this time our main interest has been in the same thing: the sharing and use of academic research for the benefit of society. However, we recognise that when it comes to issues of research evaluation, these respective terms do carry significantly different implications. We use our findings to reflect on this in the second half of this paper.

Our sources are combined in a two-stage analysis. First, at the level of individual academics, we contrast a high level of observed variation in the anticipated impacts of their research with remarkable consistency in their motivations for seeking impact. Second, we examine the perspectives of university management on the role of the institution in the knowledge exchange process. We conclude by discussing current approaches to knowledge exchange assessment in the light of our findings. We argue that university managers are in a position to facilitate and incentivise academics’ engagement in knowledge exchange activity. Ultimately, however, we conclude that effective incentivisation will depend on a shift away from ex post, outcomes-based evaluation, towards ex ante considerations of process.

3. Methods

The quantitative data used in this paper are from a 2010 survey of academics in six universities, the older, research-intensive ‘pre-1992’ and the newer, former polytechnic ‘post-1992’ institutions in the three cities of Bristol, Newcastle upon Tyne, and Sheffield¹. These universities were selected due to their inclusion in a related programme of research that was concerned with the relationship between pre-1992 and post-1992 institutions in English cities (see Goddard and Vallance 2013). The survey explored the ways in which academics across different disciplines and different types of universities understood their research to have an ‘impact’. While prompted in part by the early proposals for the introduction of impact criteria into the REF, this research was not directly concerned with measuring or evaluating the research impact of participants. Instead, it aimed to inform the emerging policy debate by contributing to a better understanding of the range of both academic and societal impacts that result from different forms of research and their possible relationships to activities such as teaching, professional or clinical practice, commercialisation, and various forms of knowledge exchange or public engagement (Vallance, Goddard and Kempton 2011).
The first part of the questionnaire consisted of questions about the respondent, including home institution, discipline, and position. The second part consisted of questions about the areas of the respondent’s research impacts, the groups or organisations who were beneficiaries of the research, and the ‘mechanisms’ they used to deliver these impacts. The third and final part consisted of questions about the personal, institutional, and wider environmental factors that encouraged or supported the respondent’s research and its intended impact, and the factors that they had experienced as barriers to their research and its intended impact. The survey questionnaire was iteratively designed and tested to ensure as far as possible that responses would not be skewed towards favouring one particular form of research impact or set of factors. Additionally, to encourage a broad respondent base the invitation to participate stressed the study’s interest in “‘impact” in the broadest possible sense … both academic and non-academic’.

Invitations to participate in the survey were sent to a stratified random sample of one third of all academic staff (including research staff) from the six universities. The population was divided into strata based on institution and three broad academic position groups (professors and readers, lecturers, and research fellows and associates). In total 711 responses were received from a sample of 2,372, giving a healthy overall response rate of thirty per cent. Table 1 shows the number of participants by their response to three questions in the first part of the questionnaire: their university, their academic position, and their broad disciplinary area. The differences in numbers of participants between the pre-1992 and post-1992 universities largely reflect the different population sizes of eligible academic staff in these two types of institution, rather than large disparities in response rates (which were slightly higher in pre-1992 universities). There is a small level of respondent bias here, with professors and readers slightly overrepresented in the data and research associates and fellows slightly underrepresented.

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<th>Table 1. Number of participants by university, academic position, and disciplinary area</th>
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The qualitative findings used in this paper are based on semi-structured interviews conducted in 2008 to inform research into the differing ways in which academics, their research partners and beneficiaries, and policy-makers value research outputs. Having been interviewed prior to unveiling of the Research Excellence Framework, we must acknowledge that these respondents do not directly address the REF’s impact agenda. The direct link made by the REF between the conduct of ‘impactful’ research and the level of institutional funding has significantly raised the profile of knowledge-sharing activities. In turn, one might anticipate that this would be reflected in respondents’ views were they to be re-interviewed. Yet despite this substantial recent policy shift, we maintain that our original findings remain pertinent. Not least because of the measured pace of change in higher education – universities are, not unreasonably, oft-characterised as ‘institutionally conservative places’ (Wildavsky et al. 2011: 244) – we do not believe that views on knowledge exchange today are fundamentally different from those at the time of the interviews. Moreover, government pronouncements on the wide-ranging scope of knowledge exchange activity pre-date the REF (see Upton 2012 for examples), and have thus formed a backdrop to thinking in this area for some time. Viewed in this light, the introduction of the REF would not appear to constitute a paradigm shift so absolute as to invalidate our earlier findings.

This research was carried out in the Universities of Cardiff, Edinburgh and Leeds (Upton 2009). These institutions were chosen primarily for the centrality of their research mission as well as, originally, to allow identification of any differences in the policy contexts
of the Welsh, Scottish and English governments. Although distinctions between administrations were ultimately, through the research, found to be of less moment than those between government and academic respondents, this accounts for the cross-national selection of universities.

At the heart of the qualitative study was an examination of knowledge exchange activity through in-depth review of six case study examples. Two examples were selected at each institution, one drawn from a broadly social-scientific discipline and one scientific. The purpose of the case study research was to examine the ways in which knowledge exchange is practised, uncovering the underlying reasons for knowledge exchange activity along with factors considered by academics to help or hinder their efforts. The cases were not intended to be representative of activity within their respective departments or institutions. Instead they are illustrative of the motivations of, and challenges facing, academics with an active interest in pursuing research impact. To these ends, currently operational or recently completed knowledge exchange projects, covering a range of mechanisms, were selected following discussion with academics and university administrators. 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 being practised in universities, and partly exploratory, seeking to identify the interplay between knowledge exchange policies and practice.

Academics and non-academic partners involved in each case study were interviewed, and in many cases respondents also provided supporting documentary evidence. In addition, contextual information was obtained through interviews with senior officers of each university, including the vice chancellor and relevant pro-vice chancellors, and with senior civil servants in government departments and university funding bodies. These were supplemented with a review of the documentary evidence on the universities’ knowledge exchange policies. In total, some fifty interviews were conducted.

The two studies are brought together here because the complementarity of their respective findings pointed us towards a single, clear set of conclusions. Key results are presented in sections four and five. Section 4.1 is based on part two of the quantitative survey, which covered the perspectives of academics on the impacts of their research. Section 4.2 combines material from both projects on research drivers and motivating factors. In Section 5.1 we present material drawn solely from the qualitative study that considers institutional perspectives on research impact.

4. Academic perspectives on research impacts

4.1. Research impacts and mechanisms for pursuing them

We turn first to academics’ perspectives on their research impacts. Three questions were posed to the survey respondents about the perceived impact of their research. They were asked about the broad areas in which they thought their research was having an impact, the groups or organisations that are beneficiaries of their research, and the mechanisms they use to deliver these impacts. For each question a distinction was made between ‘primary’ and ‘secondary’ research impacts or beneficiaries, to reflect the different, more and less direct, ways in which research can lead to societal or academic impact (see Perez Vico 2014). This distinction was presented in the questionnaire using the following definitions: ‘By a primary impact or beneficiary we mean the main areas or groups for which your research is designed to directly and intentionally result in benefits. By a secondary impact or beneficiary we mean the other areas or groups that your research may indirectly benefit, even if this impact is not one of the main aims of the research.’
The options from which respondents were able to select were chosen to cover as broad and inclusive a range of impacts as possible. They can be seen as representing both ‘academic’ impacts (benefiting the academic community) and ‘non-academic’ impacts (of broader social, environmental or economic benefit) and mechanisms for their achievement.

**Figure 1.** In which of the following areas do you think your research is having either a primary or secondary impact? (n=711)

As Figure 1 shows, by far the largest number of respondents regarded contribution to the stock of knowledge as a primary impact of their research. Nearly one third also stated that they regarded their contribution to educational development as a primary impact of their research. This figure rises to eighty per cent when one also considers the proportion of respondents seeing an indirect educational impact arising from their research. This high positive response is perhaps unsurprising if we consider both the centrality of these forms of impact to the academic mission and their general applicability across all disciplines.

The remaining eight areas of impact can be regarded as broadly ‘non-academic’ in focus, in that they have a wider societal benefit. In contrast to the ‘academic’ forms, none is identified as a direct primary impact by more than twenty-five per cent of respondents, or as a primary or secondary impact by more than sixty per cent. However, if we disaggregate the data by discipline we find that, although overall the positive response is low, most of these areas of research impact have one or two disciplines with a cumulative primary and secondary positive response markedly higher than the rest, and in some cases above eighty or ninety per cent.

Variation in response levels between disciplinary areas can in large measure be seen as reflecting different areas of specialisation and engagement across different academic fields. For instance, impacts in ‘healthcare or public health and wellbeing’ were identified by 91.6 per cent of respondents from the medical and health sciences. This figure is thirty percentage points higher than for the biological sciences and over fifty points higher than for the physical sciences. ‘Informing public policy’ rated particularly highly for social scientists, planners, lawyers and economists: in each case 38-52 per cent of respondents cited it as an area of primary impact, and upwards of seventy per cent listed a primary or secondary impact. For ‘cultural development or enrichment’, only four disciplines had a total positive response of over thirty per cent, all of them in the humanities and social sciences. The greatest cumulative primary and secondary impact was in the humanities and languages, at ninety per cent, whilst arts and design had the largest proportion of respondents citing a primary impact in this area, at seventy-three per cent of the total positive response.

Given such marked differences between disciplines, the responses for the ‘contribution to the economy’ area of impact are of some interest. In Table 2 we see that secondary impacts account for the great majority of the impact identified by respondents from all disciplinary areas. In all cases primary impact accounted for less than one third of the total, and in one third of disciplines made up less than ten per cent. Only in engineering did more than fifteen per cent of respondents identify contribution to the economy as an area of primary impact. This is the sole area of research impact for which so high a proportion of total respondents cite a secondary impact.

**Table 2.** Proportion of respondents identifying ‘contribution to the economy’ as an area of research impact, by discipline
The relatively low primary importance of economic impact to respondents across all disciplinary areas is confirmed by their responses to the survey question on mechanisms for delivering research impact (see Figure 2). These show that those mechanisms orientated towards direct economic activity – ‘commercialisation of intellectual property’ and ‘spin-off firms’ – are less commonly used than most other mechanisms. This is the case even for the two disciplinary areas where these mechanisms are used most: out of the thirteen categories for this question, commercialisation of intellectual property ranks (by total percentage citing it) 6th for engineers and 4th for computer scientists, and spin-off firms rank only 10th and 9th respectively. Such mechanisms thus appear to be as specialised as those used by respondents in the creative arts to disseminate their work.

**Figure 2.** Which of the following mechanisms do you use to deliver either the primary or secondary impacts of your research? (n=711)

In addition to engaging with other members of the academic community through teaching and conferences, over one third of respondents acknowledged the primary importance of ‘writing or speaking for non-academic audiences’ and ‘collaborating with research users/participants’. This rises to over three quarters of respondents when dissemination to unanticipated beneficiaries is also accounted for. These mechanisms were consistently highly ranked: the former rated in the top four out of thirteen categories for every discipline, the latter in the top five. As Figure 2 shows, a further nine mechanisms for achieving intended impacts – from public policy input and consultancy, to blogging and spin-off firm creation – were identified on a far more limited basis.

To a large extent, distinctions between responses from universities established before 1992 and those identified as post-‘92 institutions are less marked. Nevertheless, some notable differences do emerge. For the ‘contribution to knowledge’ area of impact, identification of primary impact by respondents in the pre-‘92 institutions exceeded that in the post-‘92s by twenty-two percentage points. In contrast, the positive response to ‘helping socially excluded or disadvantaged groups’ as a primary impact was fourteen percentage points higher in newer institutions. These distinctions are mirrored in respect of primary beneficiaries. Respondents from the pre-‘92 institutions were more likely to identify academics in their own discipline, and less likely to identify local government or third sector beneficiaries, than their post-‘92 counterparts. A more fine grained analysis suggests that these distinctions do not arise from the different disciplinary make-up of the respondent groups in each institution. These few correlations between institution type and response levels notwithstanding, however, it is between disciplines rather than between institutions that the greatest differences are seen.

4.2. Research drivers and motivating factors

We find, then, that there are considerable variations in the cited impacts and beneficiaries by both discipline and, to a lesser extent, institution type. With the exception of the more ‘academic’ indicators, respondents share neither a common set of beneficiaries nor a single set of mechanisms for reaching them. To what extent is this also true of the factors which motivate them to initiate such engagements? In fact, the two available datasets on this question – the survey data and results of in-depth interviews – show a clear correspondence. In the former case, respondents were given a series of options from which to choose, but in
the latter they were free to identify whatever factors they regarded as important. Taken together, these data, conducted in a total of nine institutions over a three year period by two separate research teams, point towards a common set of motivating factors for knowledge exchange activity.

Asked about their personal motivations for pursuing research impact, by far the most important factors for survey respondents were ‘making a contribution to scientific/academic knowledge’ and ‘intellectual curiosity or personal interest in the subject’. For both categories, 86.9 per cent of all participants responded that the factor was of high importance. This general finding also broadly applies for almost all individual disciplinary areas and at all levels of seniority (professors and readers, lecturers, and research associates and fellows). In the qualitative study, three quarters of academics identified engaging in interesting or exciting work as a motivating factor. This was true of those in all disciplines. In one computer science department, a senior academic reported his concern to bring in ‘projects that enthuse, engage and give our staff interesting jobs to do’, whilst a researcher involved in public dissemination events crossing the social and medical sciences explained how: ‘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.’

The next most important factors in the survey data, each with a modal response of ‘moderately important’ and more than thirty per cent of respondents according it high importance, were ‘boosting the status of your department, school, research centre or institute’ and ‘advancement of your career’. Similarly, two thirds of interview respondents identified increasing personal or institutional kudos as a driver for their research and knowledge exchange activities. Over forty per cent of professors and readers who responded to the survey regarded boosting their department’s status as a highly important motivator, compared with just one quarter of less senior staff, a significant distinction. In an inversion of this pattern, less established academics were, as one would expect, more concerned than their senior colleagues with advancing their own careers. This notwithstanding, having impacts valued highly by their immediate academic peers was more important to respondents than their being valued in either university promotion criteria or the Research Excellence Framework. The former had a modal response of ‘highly important’, the latter two of ‘moderately important’.

Also highly rated by survey respondents was delivering ‘the public benefits (social, economic, or other), nationally or internationally’ of their research. Forty-four per cent of all respondents stated that this was highly important. A further third accorded it moderate importance. This motivator was equally important for all academics: no significant distinction can be drawn along the lines of discipline, institutional type or degree of seniority. Delivering local or regional benefits was deemed somewhat less important, although three fifths of respondents still identified a high or moderate importance. Here we see one significant relationship: that between pre- or post-’92 affiliation and reported importance of local or regional benefits. Whilst equally as likely as their pre-’92 counterparts to accord them moderate importance, academics in post-1992 universities were more likely than those in older institutions to accord these benefits high importance (33 per cent to 24 per cent).

From the interview data, a similar concern with what one respondent termed ‘making that big difference’ is apparent. Interviewees from each of the six case studies highlighted it as a driver. It is notable that even those respondents engaged in commercial interactions with external parties defined 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 so which motivated them: ‘...if you can [make a difference to a company], that really gives you the buzz. You say “that’s why I’m doing this”’. Indeed, even for one medical spinout company observed in the
study, the principal goal was described as being to improve ultrasound training in the NHS. Thus although at face value it appears to be a classic vehicle for commercial knowledge transfer, the desire to retain control of the underpinning idea and to access sufficient development funds were the real drivers behind the company’s creation.

The interview data also brought to light three factors that respondents consistently held to be necessary for them to undertake knowledge exchange. One of these factors was availability of adequate resources, most commonly understood in financial terms. Valuation of financial gain as a facilitator, rather than motivator, of knowledge exchange activities was a recurring theme throughout the case study interviews. Respondents identified making money as a means to continue their research, not as a goal in its own right. Given the observed policy tendency to regard commercially valuable knowledge exchange in a rather one dimensional way, purely as an economic driver, the secondary nature of financial motivations in these cases is illuminating.

Common to both the qualitative and quantitative studies, the most cited requirement for (and frequently barrier to) knowledge exchange was time. Forty per cent of interview respondents identified it without prompting, whilst eighty per cent of survey respondents accorded it ‘high’ importance. The academics’ commitment to engaging with potential beneficiaries of their research was nowhere more apparent than here. Respondents reported wanting to engage further but being limited by the available time. Whereas some compensated by making a significant ‘out of hours’ commitment, others felt compelled to choose between knowledge exchange and further research activities.

4.3. From outcomes to process: a new focus

This draws attention to an important truth about knowledge exchange: we have rightly come to recognise that it is not simply an add-on activity to be undertaken at the end of a research project; yet unless we regard it as additional in the sense of needing further resources, it is likely to suffer in the face of other, better resourced, demands on an academic’s time.

Together, the findings point to two preconditions for academics’ engagement in knowledge exchange. Firstly, they must be suitably well resourced to do so. Money is a not-insubstantial part of the equation, but time and the promise of reputational reward also play a significant part. Secondly, they must feel sufficiently motivated to engage in this over any other activity. As the wide variety of activities identified in the previous section attests, academics find motivation in many different places. Contributing to the economy has its place, but as an impact pursued by a minority, not the majority. That three quarters of survey respondents identified achieving ‘public benefits (social, economic or other)’ as important to them, whilst less than ten per cent identified the economy as a primary area of impact, suggests that academics identify more closely with a broad-based understanding of value than with a purely economic interpretation. This is confirmed by the interview data. Even academics engaged in potentially lucrative activities couched their motivations in terms of ‘making a difference’ rather than in specifically financial terms.

The discovery that academics need adequate resources, rewards and enthusiasm in order for their research to benefit others is by no means unique (see, for example, Hughes and Kitson 2012). It is, however, in contrasting these universal motivators with the more discipline-dependent nature of specific impacts that we are able to identify an important issue. If the ultimate goal of knowledge exchange policy is to increase the uptake of research outside the academy for wider societal benefit (HEFCE et al. 2011a), then an approach to rewarding knowledge exchange that focuses on outcomes seems unlikely to be the most effective driver of such activity. As the results from the survey outlined in section 4.1 indicate, the ‘secondary’ nature of much impact outside academia means that it is not an
obvious direct outcome of individual research projects and related knowledge exchange activities. Not all impacts of research can therefore be traced (Arts and Humanities Research Council 2013; Brewer 2013) and, even among those that can be identified, certain outcomes lend themselves to measurement or assessment more readily than others (British Academy 2008). Since academics in different disciplines favour different knowledge exchange mechanisms, any monitoring and reward system based on outcomes is liable to be complex and unlikely to be comprehensive. As a consequence, distortion of behaviour to achieve reportable outcomes might be expected (Lowe 2013). The high level of consistency in motivations across disciplines, institutions and level of seniority points instead to a potentially more universally applicable driver. What might this new approach mean in practice?

Firstly, it would lend itself to a shift in focus from the outcomes of knowledge exchange to the process of engagement between academics and external audiences. There are good reasons to regard such a shift as desirable. Kao (2007: 190) has written of the innovation process that ‘those who would design a strategy for next generation innovation would be well advised to create the conditions for what is new and valuable to emerge, not to write the script’. And certainly examples of serendipitous benefits emerging from research abound (as discussed in Austin et al. 2012). Lester and Piore (2004) have theorised that one key condition for innovation is a system’s ability to engage in interpretation as well as analysis. In other words, to allow for ‘open-ended, unpredictable conversation’ as well as ‘the precise exchange of information’ (2004: 54). They contend that the university’s function as a public forum enables it to guide the conversations that facilitate innovation and that, distinct as it is from the operational practices of most businesses, the latter highly value this function. If ‘novelty and originality lie in the space of ambiguity’ (2004: 54) then by definition single-minded pursuit of immediate, predictable research impacts threatens to stifle the full potential of research.

The importance to the innovation process of providing space for interpretative conversations mirrors academics’ identified desire to be allowed the freedom to pursue individual intellectual curiosity, rather than being led by potential impact. The notion of the ‘conversation’ is also recognisable in the Arts and Humanities Research Council’s guidance for academics seeking to engage with public policy debates. The Council (2013: 1) has stated that it will look for ‘robust evidence of systematic policy engagement’ by policy-engaged academics but, acknowledging that academics have no direct control over policy change, will not expect to see evidence that research has had an impact on policy. Here the process of engagement is clearly of greater importance than a notional end result.

Another motivator of knowledge exchange activity is the expected conferral on an academic, or on that academic’s department, of reputational reward. Respondents also identified promise of this reward as one of the necessary preconditions for their becoming engaged in knowledge exchange. If the goal of knowledge exchange policy were to become motivating engagement, rather than achieving particular outcomes, we might wish to ensure that ‘resource’ constraints (understood in the broadest sense) did not stand in academics’ way at the outset. Reputational benefits can only accrue, and promotions be awarded, ex post, but other resources could be granted upfront. Time and money could both theoretically be made available, to enable already-enthused academics to further engage outside the academy and to encourage those not already engaged to become so. In a self-reinforcing process, evidence of that engagement could then be used to justify ongoing resource provision. Seen as a form of ‘pump priming’, undertaken in the expectation of future evidence of increased engagement, this upfront resource allocation is less of a leap of faith than it might at first appear.
5. Institutional perspectives on knowledge exchange

5.1 Universities at a point of tension

In the incentivisation of knowledge sharing activities, the motivations of individual academics are an important consideration, but only a partial one. No academic operates in an institutional vacuum. Noting a ‘re-allocation of power and influence’ to the centre, Pinheiro et al. argue that ‘the ability to reconcile conflicting values … is largely dependent on the type of university leaders…’ (2014: 3-4). In the UK, this power and influence is not inconsiderable, since vice chancellors have substantial autonomy in the management of their affairs. We therefore regard the part played by universities at the institutional level as being similarly important.

Academics’ activities are guided, on a day-to-day basis, at least as much by university policy as by national government policy. And these two policy streams are not perfectly aligned. Senior managers at each of the qualitative study universities – Cardiff, Edinburgh and Leeds – all explicitly asserted their independence from government. Thus respondents at Cardiff University 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’. This balancing act was also apparent at the University of Edinburgh, where the need to ‘remain a wee bit flexible’ and ‘follow what we think is right’ was identified. There was, however, acknowledgment from all quarters that government policy steers the sector. And because government departments ‘control the purse strings’ to a significant extent, that steer can be highly persuasive. As Table 3 shows, all three universities draw over half of their research income either directly from UK government bodies or via the seven research councils. Whilst large sums therefore remain entirely independent of government, this is a high proportion to be tied to a single source.

Table 3. Research income sources for the Universities of Leeds, Cardiff and Edinburgh, 2011-12

In all three cases, university respondents – who ranged from vice chancellors and pro-vice chancellors to administrators with a remit to support knowledge exchange – identified a bias in the focus of government policies on university knowledge exchange. The vast majority of respondents observed that achieving economic impact was a significant policy driver. In doing so, they noted that the promotion of knowledge exchange from within government was principally via departments with interests in trade and industry – departments, in other words, whose focus extended only as far as ‘looking at UK plc’.

Thus at Cardiff University one senior administrative officer issued a categorical ‘no’ when asked whether the institution had any contact with departments beyond those responsible for education and economic policy. At the University of Leeds, a high-ranking member of the management team argued that despite saying ‘all the right encouraging words’ about broad-based knowledge transfer activities, the government tended to revert to a narrowly economic definition of knowledge exchange ‘at the drop of a hat’. Meanwhile, one University of Edinburgh respondent observed that, despite a broadening of knowledge exchange policy in the early years of the twenty-first century to incorporate contributions to the nation’s health and welfare, including by the social sciences and via community engagement activity, ‘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’. Other colleagues agreed that economic development was indeed the main driver.

The evidence of a particular – in this case economic – bias in government agencies’ knowledge exchange policy is instructive: it points to outcomes, rather than the process of engagement, as being the principal object of that policy. If, as argued above, it is indeed the case that incentivising particular outcomes of engagement will prove a less effective driver of research impact than would incentivising engagement in and of itself, then a narrow (economic) focus might be regarded as especially problematic.

For all their independence, universities find themselves at a point of tension between academics and government, arising from the divergence of the latter’s policy from the former’s motivations. Drawing attention to the influence that the academic body can bring to bear on a university’s stance, one vice chancellor had this to say about his institution’s broad-based approach to knowledge exchange:

I wish I could take the credit for it, 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 extent to which the universities align themselves, as this vice chancellor had initially thought to do, with government policy appears non-uniform. By far the closest association was acknowledged by respondents from the University of Edinburgh: university and government policies were described as having ‘mostly areas of similarity’, and the impact of government policy on the University was described as being ‘positive’. In contrast, at Cardiff University a claim was advanced of a ‘lack of sophistication’ in government policy. Similarly, institutions can be seen to be relatively more or less aligned with the direction favoured by individual academic units. At Cardiff University, for instance, a distinction was drawn between the response to knowledge exchange policy from different disciplines. One senior officer saw tension manifested in a perception among humanities academics that the university favoured commercial knowledge exchange. They had interpreted historically high levels of spending on laboratory equipment as demonstrating a preference for scientific activities. Furthermore, they identified the knowledge exchange message conveyed by university management as being aimed at the sciences and engineering.

5.2 Promoting knowledge exchange: the importance of the institutional dimension

The role of the university at the institutional level is evidently far from clear-cut. As recent studies in both the UK (NCCPE 2013) and Scandinavia (Pinheiro et al. 2014) have identified, universities are subject to demands from multiple, sometimes conflicting, interests. Where motivations diverge, university management can and, as our research suggests, seemingly does choose between promotion of academics’ and government interests. This might provoke tensions, but it also gives universities considerable power to steer both the terms of the debate and the way in which policy goals play out in practice. Parker (2008: 238) contends that the ‘most important incentive wielded by universities to motivate academic staff is pay and reward’. Reputational rewards, funding and the need for dedicated time specifically for knowledge exchange activity can all be factored into a university’s resource allocation process. There is thus leeway, regardless of what approach government policy takes to
incentivising knowledge exchange, for universities to incentivise the process of engagement with external audiences. In light of our finding that focusing on process rather than outcomes is likely to more effectively incentivise academic knowledge exchange, this is a potentially highly significant role.

Further evidence for the importance of the institutional dimension comes from Bastow et al. (2014) who identify the significance of organisational structure to successful knowledge creation and dissemination. Here they translate existing work on organisational form and knowledge development in firms to the university environment. They argue that systems which in some measure counter centralist and managerialist tendencies (and which, high in trust, allow individuals the autonomy to pursue varied ends) are particularly conducive to knowledge production. Considered alongside the previously identified value of the ‘space of ambiguity’ (Lester and Piore 2004: 54), this leads us to conclude that institutional leaders have a key function as creators and guardians of these conditions.

For leaders pursuing this end, the concept of the ‘civic university’ might prove to be a useful model. With its conscious, institution-wide alignment towards the diverse needs of its community, the civic university combines a commitment to the process of engagement with a ‘matrix’-based management structure that ‘integrates teaching and research across disciplines and support services in a way that can respond to external needs’ (Goddard 2009: 22; see also NCCPE 2013). Without this mediating role, academics would seem especially vulnerable to the effects of external drivers which inadequately align with their own motivations. A further benefit of this model is its holistic treatment of knowledge exchange activity, where teaching links – for example through work placements with external organisations – can establish the social relations on which research links are built, and through which subsequent research impact may arise; and where, equally, research links can lead to teaching links (Ward and Hazelkorn 2012).

6. Improved incentivisation: some concluding remarks

The findings presented here show considerable variation in the intended impacts and beneficiaries of knowledge exchange activity between respondents in different disciplines and, to a lesser extent, in different types of institution. This is in marked contrast to evidence on the motivating factors, and associated necessary conditions, for knowledge exchange, which are held in common by respondents from across the disciplinary and institutional spectrum. We argue that evidence on the varied types of knowledge exchange activity undertaken by academics in different disciplines and institutional types calls into question the likely effectiveness of knowledge exchange drivers based on outcomes.

Our findings throw into relief clear differences between two different approaches: on the one hand the ex post assessment of the outcomes of engagement activities, and on the other an (often ex ante) appraisal of the process. The former approach has evolved in response to demands to evaluate the ‘success’ of past engagements, and hence to demonstrate the effective use of research funding. With its focus on successful outcomes, it has become closely associated with the concept of research ‘impact’. By contrast, the latter approach concentrates not on the outcomes themselves, but on the process by which those outcomes are sought. For this reason, the activity to which it relates is perhaps more accurately described by the term ‘knowledge exchange’ than by ‘impact’. Given our findings on shared academic motivations for engaging in knowledge exchange, we regard this process-based approach as a viable alternative to current impact assessment. We conclude with two reasons why this might be so. Firstly, it could overcome an overly narrow definition of the outcomes of knowledge exchange. Secondly, in doing so it could serve to better incentivise academics to begin the engagement process.
The shortcomings of an outcomes-based approach are twofold. The first concerns those outcomes which it is even possible to identify and begin to assess. ‘Information about outcomes can either be simple, comparable and efficient to collect, or it can be a meaningful picture… It cannot be both.’ (Lowe 2013: 214). An outcomes-based approach is caught between excessive complexity on the one hand, and lack of comprehensiveness on the other. Although a middle ground might be sought, the observation that certain forms of activity are highly discipline-dependent raises the prospect of particular disciplines being more readily identified as ‘high impact’ than others. The second shortcoming arises because some engagements will rarely, if ever, result in identifiable impact (as discussed, for example, in British Academy 2008). Associated with an outcomes-based approach is therefore the risk of activities skewing towards those that are, or are perceived to be, more readily subject to comparison.

University managers are, we argue, in a position to intervene on behalf of academics, promoting a process-based approach even as government policy favours outcomes-based measures of impact. Ultimately, however, the evidence suggests that effective incentivisation of broad-based knowledge exchange activity will be dependent on a shift away from ex post evaluations, and towards ex ante considerations of process. Reviewing recent developments in this regard, we would contrast the approach taken in the UK Research Excellence Framework, with that adopted in recent Arts and Humanities Research Council (AHRC) guidance.

The UK’s research assessment mechanism has, in its 2014 incarnation as the Research Excellence Framework (REF), been adapted to require evidence of research ‘impact’. Assessment of the quality of these impacts now accounts for twenty per cent of the overall assessment. This is a significant departure, both because of the financial implications for universities (REF assessments inform the distribution of the block grant allocations to UK higher education institutions) and because impact is expected to play an increasingly large part in future assessment exercises (HEFCE et al. 2011a; BIS 2013b). Each unit of assessment is required to submit examples of impacts arising from its research. Submissions take the form of narratives, underpinned by ‘indicators and evidence as appropriate to the case being made’ (HEFCE et al. 2011a: 4). For the purposes of the REF, impact is defined as an ‘effect on, change or benefit to the economy, society, culture, public policy or services, health, the environment or quality of life, beyond academia’ (HEFCE et al. 2011b: 26). In requiring evidence of a demonstrable change in a non-academic community, it takes an outcomes-based approach.

In contrast, the AHRC’s recently published guidance for academics on planning and demonstrating effective policy engagement (in the development of which one of the authors was involved) explicitly excludes the requirement to demonstrate impact. The shift in focus from impact to the process of engagement comes in recognition of the indirect nature of some policy contributions, the tendency for sources of policy change to go un-cited, and the fact that even the most well-evidenced recommendations might be ignored for political reasons. Highlighted within the guidance is the importance of academics engaging with policymakers ‘in a systematic and active way’ (Arts and Humanities Research Council 2013: 2). This qualification serves to emphasise the need for rigour in the demonstration of engagement, much as the REF case study approach does for demonstration of impact. The guidance provides a framework within which a range of qualitative and quantitative indicators, adapted to suit the engagement in question, can be combined. The claim is that robust evidence of active and systematic engagement with (in this case) policy-makers provides a good indicator of likely impact. Freed from concerns about the demonstrability of any eventual impacts, it seems plausible that academics would in fact be motivated by the possibilities presented by the engagement process – to pursue ‘personal interest’ in a subject, to enhance personal or
departmental status, or to deliver the ‘public benefits’ of research. Our findings also suggest that, by rewarding the **process** of knowledge exchange, rather than specific impacts, this approach would incentivise participation by a broader range of academics.

With its emphasis on demonstration of a coherent programme of engagement with potential stakeholders, the AHRC guidance echoes the attention paid to ‘productive interactions’ in the SIAMPI (Social Impact Assessment Methods for research and funding instruments through the study of ‘Productive Interactions’ between science and society) approach (Spaapen and van Drooge 2011; Molas-Gallart and Tang 2011). The SIAMPI approach assumes (i) that for social impact to occur, direct or indirect contact between researcher and stakeholder must first take place, and (ii) that the complexity of social and political processes means that it is often ‘inappropriate to seek the direct effect of research results on practices’ (Molas-Gallart and Tang 2011: 225). It therefore stresses the importance of interactions themselves, and looks to evidence of ‘productive’ interactions as an evaluative tool. A key area of difference is that, developed specifically as a tool to allow inter-case comparability (rather than solely, as in SIAMPI’s case, in-case learning and improvement), the AHRC guidance presents a structured framework within which to conduct such evaluations.

What the AHRC approach and SIAMPI have in common is the case they make for a focus on knowledge exchange over impact, on process over outcomes. Our research underlines the fact that this preference for ‘knowledge exchange’ is not merely semantic. In fact, it points us to an assessment method that could more adequately accommodate both policy-makers’ and academics’ goals.

**Notes**

1 The pre-1992 and post-1992 distinction refers to the year in which the ‘binary divide’ in the UK higher education system was abolished and polytechnics became new universities. Despite this reform, over twenty years later clear and consistent differences remain between these two types of universities in terms of their institutional missions, governance, and main funding sources. This means that in almost all cases (including those covered in this paper) pre-1992 universities are significantly more research-intensive than their post-1992 counterparts (see Goddard and Vallance 2013; Goddard et al. 2014).

2 The case study projects included one spinout, one collaboration with a local SME, one academic/public sector/multinational research network, an example of public engagement, a collaboration between academics, health practitioners and the community, and a project incorporating engagement with policy-makers.

3 All measures of significance referred to in this paper are based on Pearson’s chi-square tests at the $p < 0.05$ level. In this instance $X^2 (4, N = 695) = 15.227$, $p = 0.004$

4 $X^2 (4, N = 694) = 12.311$, $p = 0.015$

5 $X^2 (2, N = 701) = 8.439$, $p = 0.015$

**References**


Arts and Humanities Research Council (2013) *Guidance on planning and demonstrating effective policy engagement*. Swindon: AHRC.


HEFCE (2013) *Recurrent grants and student number controls for 2013-14 (March 2013/05)*. Bristol: HEFCE.


HEFCE, SFC, HEFCW & DELNI (2011a) *Decisions on assessing research impact (REF 01.2011)*. Bristol: HEFCE.


Tables

Table 1. Number of participants by university, academic position, and disciplinary area

<table>
<thead>
<tr>
<th>University</th>
<th>Number</th>
<th>Disciplinary Area</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bristol University (Pre-’92)</td>
<td>168</td>
<td>Medicine and Health Sciences</td>
<td>131</td>
</tr>
<tr>
<td>University of the West of England (Post-’92)</td>
<td>65</td>
<td>Biological Sciences</td>
<td>76</td>
</tr>
<tr>
<td>The University of Sheffield (Pre-’92)</td>
<td>157</td>
<td>Physical Sciences</td>
<td>65</td>
</tr>
<tr>
<td>Sheffield Hallam University (Post-’92)</td>
<td>56</td>
<td>Mathematics and Statistics</td>
<td>36</td>
</tr>
<tr>
<td>Newcastle University (Pre-’92)</td>
<td>190</td>
<td>Computer Science</td>
<td>20</td>
</tr>
<tr>
<td>Northumbria University (Post-’92)</td>
<td>75</td>
<td>Engineering</td>
<td>57</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>711</strong></td>
<td><strong>Business, Management, Economics</strong></td>
<td><strong>42</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>711</strong></td>
<td><strong>Architecture, Planning, Built Environment</strong></td>
<td><strong>40</strong></td>
</tr>
<tr>
<td><strong>Social Sciences</strong></td>
<td></td>
<td></td>
<td>116</td>
</tr>
<tr>
<td><strong>Law</strong></td>
<td></td>
<td></td>
<td>21</td>
</tr>
<tr>
<td><strong>Humanities and Languages</strong></td>
<td></td>
<td></td>
<td>80</td>
</tr>
<tr>
<td><strong>Arts and Design</strong></td>
<td></td>
<td></td>
<td>27</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Academic Position</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professors and Readers</td>
<td>245</td>
</tr>
<tr>
<td>Lecturers</td>
<td>313</td>
</tr>
<tr>
<td>Research Associates and Fellows</td>
<td>149</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>707</strong></td>
</tr>
</tbody>
</table>

Table 2. Proportion of respondents identifying ‘contribution to the economy’ as an area of research impact, by discipline

<table>
<thead>
<tr>
<th>Discipline (n)</th>
<th>Primary impact (%)</th>
<th>Secondary impact (%)</th>
<th>Total impact (%)*</th>
<th>Proportion of impact identified as ‘primary’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering (57)</td>
<td>24.6</td>
<td>61.4</td>
<td>86.0</td>
<td>0.29</td>
</tr>
<tr>
<td>Computer Science (20)</td>
<td>15.0</td>
<td>55.0</td>
<td>70.0</td>
<td>0.21</td>
</tr>
<tr>
<td>Physical Sciences (65)</td>
<td>10.8</td>
<td>56.9</td>
<td>67.7</td>
<td>0.16</td>
</tr>
<tr>
<td>Business, Management, Economics (42)</td>
<td>14.3</td>
<td>52.4</td>
<td>66.7</td>
<td>0.21</td>
</tr>
<tr>
<td>Biological Sciences (76)</td>
<td>6.6</td>
<td>55.3</td>
<td>61.8</td>
<td>0.11</td>
</tr>
<tr>
<td>Architecture, Planning, Built Environment (40)</td>
<td>5.0</td>
<td>50.0</td>
<td>55.0</td>
<td>0.09</td>
</tr>
<tr>
<td>Mathematics and Statistics (36)</td>
<td>2.8</td>
<td>50.0</td>
<td>52.8</td>
<td>0.05</td>
</tr>
<tr>
<td>Arts and Design (27)</td>
<td>14.8</td>
<td>37.0</td>
<td>51.9</td>
<td>0.29</td>
</tr>
<tr>
<td>Medical and Health Sciences (131)</td>
<td>3.8</td>
<td>40.5</td>
<td>44.3</td>
<td>0.09</td>
</tr>
<tr>
<td>Social Sciences (116)</td>
<td>4.3</td>
<td>31.9</td>
<td>36.2</td>
<td>0.12</td>
</tr>
<tr>
<td>Humanities and Languages (80)</td>
<td>1.3</td>
<td>30.0</td>
<td>31.3</td>
<td>0.04</td>
</tr>
<tr>
<td>Law (21)</td>
<td>4.8</td>
<td>23.8</td>
<td>28.6</td>
<td>0.17</td>
</tr>
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</table>

* Discrepancies in summing are due to rounding.
Table 3. Research income sources for the Universities of Leeds, Cardiff and Edinburgh, 2011-12

<table>
<thead>
<tr>
<th>Income source</th>
<th>Leeds</th>
<th>Cardiff</th>
<th>Edinburgh</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>£’000s</td>
<td>%</td>
<td>£’000s</td>
</tr>
<tr>
<td>Research councils</td>
<td>37,270</td>
<td>31</td>
<td>26,465</td>
</tr>
<tr>
<td>UK based charities</td>
<td>20,962</td>
<td>17</td>
<td>18,158</td>
</tr>
<tr>
<td>UK government bodies</td>
<td>33,436</td>
<td>28</td>
<td>25,231</td>
</tr>
<tr>
<td>UK industry</td>
<td>7,337</td>
<td>6</td>
<td>4,667</td>
</tr>
<tr>
<td>European Commission</td>
<td>12,027</td>
<td>10</td>
<td>8,542</td>
</tr>
<tr>
<td>Other</td>
<td>9,399</td>
<td>8</td>
<td>4,591</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>120,431</strong></td>
<td><strong>100</strong></td>
<td><strong>87,654</strong></td>
</tr>
</tbody>
</table>

*Note that figures do not total to 100 due to rounding.
All figures drawn from the institutions’ 2012 Financial Statements. (Cardiff University 2012; University of Edinburgh 2012; University of Leeds 2012).

Figures

Figure 1. In which of the following areas do you think your research is having either a primary or secondary impact? (n=711)
Figure 2. Which of the following mechanisms do you use to deliver either the primary or secondary impacts of your research? (n=711)