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Book Chapter

Research, policy and practice in university knowledge transfer: towards an all-inclusive approach

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Introduction

The agenda of university knowledge transfer is problematically characterised by heterogeneity. With apparent on-going issues of inconsistent engagement in this agenda, uncertain impact, and continued development of various government departments, policy mechanisms, white papers and research aiming to support, understand, measure or even just define the nature of impact of this agenda, a ‘one-size-fits-all’ approach seems problematic. This chapter questions the effectiveness of UK policy and research approaches to date, and aims to inform the role of research in supporting the policy agenda that must achieve the difficult balance of providing something implementable but meaningful, inclusive and accommodating the heterogeneity of activities, stakeholders and outputs.

Heterogeneity even in the terms given to describe this domain is illustrative, with interchangeable terminology commonplace: ‘third stream’, ‘third mission’, ‘knowledge transfer’, ‘knowledge exchange’ and ‘partnership’ to name a few. Uncertainty over terms to adopt and awareness of possible (mis)interpretation by the reader is indicative. A short explanation of definitions is important for contextualising the ensuing discussion.

The ‘third mission’ of universities, which is understood to have emerged following the ‘first’ and ‘second’ missions of teaching and research, dates back to the agreement of the European Councils of Lisbon and Barcelona in 2000 and 2002. A seemingly much used definition from that era by the Science Policy Research Unit considered something called the ‘third stream’ to be: ‘concerned with the generation, application and exploitation of knowledge and other university capabilities outside academic environments’ (Watson and Hall 2015). More recent definitions suggest that a broader scope has developed. The Head of Knowledge Exchange policy for the Higher Education Funding Council for England (Hefce), has described ‘the third stream (knowledge exchange) as the trend among many universities toward a third function, which has been described using a range of terms such as knowledge transfer, community service, community engagement and the third stream’ (Frost 2016). Essentially, university knowledge transfer, or the third stream, is now arguably a catch-all to describe the activity of universities engaging or even partnering with external stakeholders, for various reasons other than teaching and academic research, and which may be commercial or social in nature.

The scope of the third stream may have appeared to broaden over time but this agenda continues to be associated with innovation or at least positive outcomes of economic and social benefits, and hence stimulating academic research and governmental policy interventions which aim to support. Exactly what such innovation or positive benefits looks like is also however debated – and certainly heterogeneous.

There is need in both policy and research for an overarching approach but one that effectively incorporates the inherent heterogeneity of the domain: accommodating newer areas involved in innovation without excluding older ones; supporting innovating SMEs but also corporates; catering for innovation imperatives of the new economy and of ‘society’.

The critical review of policy and research provided in this chapter firstly aims to evidence that the domain of the third stream is problematically heterogeneous: it offers an array of definitions, typologies, approaches and conclusions. More significantly, it is critiqued for appearing to offer no coherent, over-arching view of the third stream nor associated inclusive, implementable framework of action for policy and practice. Given the heterogeneous nature of this agenda, that in turn involves the agenda of multiple different stakeholders (universities and others), working together, the core concepts of ‘partnership working’ are however identifiable as relevant and useful. It is argued that commonality, difference and inter-subjectivity, that are understood as inherent in and between universities and other stakeholders working in such a partnership activity are thus fundamentally important and valuable for policy-makers, practitioners and researchers to incorporate in their approach to this domain. If research aims to help inform policy and practice, it is suggested that an approach is needed that goes beyond simply acknowledging heterogeneity: indeed, one should incorporate understanding of inter-subjectivity and ‘variation’ in the very design of the approach. The phenomenographic research method, which is based on the assumption that variation exists, but thus far not adopted in the field of university knowledge transfer, may consequently offer a valuable new ‘all-inclusive’ framework for providing relevant insights into innovation, hidden innovation or potential innovation in the domain of the third stream. Examples of what this might look like in practice are provided.

The critical review below of research and policy, and subsequent conclusions offering a new approach are focused on the UK, but are expected to resonate with other national contexts and thereby contribute to developing on-going better understanding and hence research, policy, and practice for all of us involved in this important area.

Issues in UK knowledge transfer policy

An all-inclusive agenda?

Whilst the university knowledge transfer agenda arguably originated as commercialisation of Science, Technology, Engineering and Maths (STEM) areas, UK policy statements some 10 years ago showed an ambition to provide a ‘framework for innovation’ (DIUS 2008) for all types of Higher Education Institution (HEI), and all types of knowledge: research and non-research intensive, and ‘the full range of subjects’ (HEFCE 2008, p.31). Evident in more recent policy papers is an assumption of the universal relevance of such business-university collaborations with recommendations that ‘all domains must attain excellence’ (Wilson 2012). Conclusions of the latest Higher Education Business and Community Interaction Survey (HE-BCI), which noted the need for example to capture more insight into ‘no or low income driven outcomes and impact’ (HEFCE 2017) shows that UK policy continues to regard this agenda as broadly relevant for all. The positive ideology of the third stream and the role of policy has persisted in subsequent White Papers and policies (e.g. Witty 2013; Dowling, 2015; Industrial Strategy, 2017).

Some would argue this broadening, all-inclusive but ‘wide variation’ of the agenda represents a ‘Changing University Paradigm’ (Gibb et al 2009), an evolution of the original third mission university-industry innovation concept (Nelles and Vorley 2010), or even in fact a return to academia’s roots of having a social/community role. Some embrace the breadth whilst others regard the ‘wide-ranging moniker’ (Urwin 2003) as problematic. Whilst UK policy contextualises the review conducted here, the debate about the aims and achievements of the third mission are observable across the global academic sector (Gibb et al 2009; Krucken et al 2007; Nelles and Vorley 2010; Lockett et al 2012). The current all-encompassing nature of the third stream with pressures for academics increasingly to perform across multiple agendas

(first, second and third stream) leads arguably to ‘strategic overload’ for academia (Sanchez-Barrioluengo and Benneworth 2019).

Issues of engagement and impact

In spite of all the positive ideology and rhetoric about university knowledge transfer, problems identified 10 years ago of ‘inconsistent stakeholder engagement’ in the third stream, of ‘hidden innovation’ and of the need for ‘better insight’ (DIUS 2008), signalled issues which various policy initiatives appear to continue to seek to address today. Inconsistent engagement by academic and industry stakeholders ‘supply and demand-side’ (HEFCE 2008), and no clear pattern of engagement by discipline or type of HEI (Pilbeam 2006), led to suggestions that policy was not all-inclusive but biased towards STEM subjects, alienating (Humanities, Arts and Social Science (HASS) disciplines (Smith and Taylor 2009). Policy-makers acknowledged the need to embrace innovation in ‘newer areas’ such as charities (PACEC 2010). In order to ‘understand better’, the UK has thus introduced data gathering and benchmarking mechanisms like the annual HE Business Community Interaction survey (HE-BCI) and Knowledge Exchange Framework (KEF), alongside established knowledge transfer funding mechanisms such as the Higher Education Innovation Fund (HEIF) and Knowledge Transfer Partnerships (KTPs). Most recent data from some of these suggests overall enhanced improvement in ‘performance’ in the third stream (HEFCE 2017). However, within top line good news it may be noted that engagement by stakeholders continues to be inconsistent with: ‘institutional differences’ (Fuller et al 2017; Salomaa 2019); lower levels of achievement from certain types of third stream activity such as consultancy and low income activities (HEFCE 2017); and regional and sectoral disparities (Barcaluengo and Benneworth, 2019; PACEC 2017). Recognition that funding criteria and performance measures which are ‘formulaic’ and ‘monetised’ may be ‘imperfect’ and not capturing and facilitating all types of innovation

(HEFCE 2011; Rossi and Rosili 2015) continues to seem relevant. Investigation of barriers to engagement is not just a UK issue - see for example Nielsen and Cappelen (2014) research in Denmark and Norway.

Some have argued not so much that policy is biased but rather that policy discourse is ambiguous (Smith and Taylor 2009; Michels, 2010). Whitchurch (2010) and Wersun (2010) point to problems of policy 'lost in translation' and 'triple translation' due to the ambiguity regarding the 'more publicly-orientated strands' or 'service-orientated approach' of knowledge transfer versus more 'privately-orientated strands' or 'commercially-orientated approach'. Difference between 'normative policy discourse' and HEI implementation has been noted. Apparent aims to be all-inclusive seems problematic.

Knowledge transfer policy in the UK has previously presented itself as a framework for innovation (DIUS, 2008). Validity of this stance could be challenged by the issues of engagement cited above and these apparently persist - as shown by the recommendations from the later Wilson review that 'all domains must attain excellence' (Wilson 2012). Even in the context of the most recent HE BCI survey policy makers have continued to note the need for better understanding, and the role of academic research for informing or impacting policy is increasingly under scrutiny. However current research as reviewed below is not offering an all-inclusive, fit-for-purpose approach for better understanding.

Current understandings about the nature of university knowledge transfer

The review presented here questions the ability of current research into university knowledge transfer to inform policy aimed at supporting innovation through knowledge transfer. Research into the nature of knowledge, university knowledge transfer and how to manage it is mature but highly dispersed across disciplines spanning STEM and HASS disciplines, including

management, enterprise, education, learning, policy, geography, and technology. The cross-disciplinary nature of this body of research is appropriate but also illustrative of heterogeneity and hence potential for diverse interpretations.

Heterogeneous domain of definitions and activities

The recognition of wide-ranging, complex features, opportunities and barriers to achieving a fully-fledged university third stream focuses some attention on the nature of the ‘ecosystem’ for this important agenda, including the wide range of definitions, narratives, approaches, partners, strategies, policies, impacts, overall trends, enablers and blockers. The ecosystem or environment for the third stream continues to be regarded as important: HEFCE as recently as 2017 commissioned a report into ‘The state of the English University knowledge exchange landscape’ (PACEC 2017) which looked into the ranges of approaches and features within the UK context. Heterogeneity has been observed as defining the global as much as the UK third stream environment (Krucken et al 2007; Nelles and Vorley 2010; Lockett et al 2012). The ‘tremendous variation across the HE sector’ (Nelles and Vorley 2010, p.345) is specifically for some the result of diversification of the third stream over time, and illustrated by the range of definitions and activities, diversity of scope and impact.

An overview of the types of activity that have been the subject of research in this area since the turn of the century reveals that university knowledge transfer might include: patented research, university spin-outs, consultancy, corporate education, student placements, advisory board membership etc. Individual studies demonstrate the continuum: Pilbeam (2006) adopts an economic definition looking at research income from government, charity and business, whilst Streir and Shechter (2016) look at community engagement.

Even the focus of individual research studies makes their findings difficult to contextualise. Single studies include a range of activities both explicitly (e.g. Krucken et al 2007; Nelles and Vorley 2010; Wersun 2010; Whitchurch 2010; Ramos-Vielba and Fernandez-Esquinas, 2012), and apparently inadvertently (e.g. Ozga and Jones 2006; Sharifi et al 2014). Several studies draw conclusions based on multiple types of third stream work, for example: Ozga and Jones (2006) look at different non-comparable types of activity within various Scottish HEIs and Sharifi et al (2014) interview people involved in very diverse third stream activities.

Overall, the body of existing research provides little insight into relative importance or predominance of the different definitions but only shows diversity of interpretations of what university knowledge transfer might be about. How one measures success and the level or type of innovation achieved is at best defined as probably ‘different’, and identifying links to innovation is confounded by such diversity (Perkmann and Walsh 2007).

Heterogeneity of implications and conclusions

An overview of findings from this body of research provides a long list and range of policy implications and recommendations, including amongst others the importance of:

- language and communication;
- relationships/familiarity (including institutional);
- degree of formality;
- trust; time for relationship-building;
- number of interactions/cross-boundary networks/networking;
- cross/beyond-boundary perspective/attitude;
- motivation/incentive/reward (intrinsic/extrinsic);
- individual expectations/aims;
- strategic (institutional/sector) objectives/valorisation/clarity;

- the individual's skill, motivation;
- effort/negotiation/politics;
- skills (such as project management);
- restrictive contracts/ownership issues/bureaucracy;
- space;
- difficulty in finding partners/accessibility;
- flexibility;
- leadership, management;
- planning and reflexivity.

Although summarised here as a list, there is no clear hierarchy of importance identified. Further, although some issues may be inter-related in some way (for example 'trust' with 'time for relationship-building', and 'motivation' with 'expectations' and 'reward mechanisms'), it is not identified how these are related or how dealing with all of these should be translated into national or institutional strategy. Some of the findings provide implications for policy-makers in terms of engagement, measurement or resource allocation. For example findings about the length of time required for relationship-building leads to suggestions of the importance of (developing) soft (interpersonal) skills, and longer-term, non-commercial measures of for example the number of cross-boundary interactions. Findings urging 'flexibility' (e.g. Sharifi et al 2014) or respecting academic identity (e.g. Boyd and Smith 2016) offer no tangible, overarching policy strategy for addressing heterogeneity of types of activity.

Heterogeneity of typologies and frameworks

Attempts to address heterogeneity of the knowledge transfer domain have resulted in various analytical frameworks or typologies mapping different types of knowledge and processes. Arguably founded on Biglan's (1973) typology of academic knowledge and associated activity

as hard/soft/pure/applied, later typologies recognised knowledge creation as open-sourced and problem-orientated leading to bi-polar categorisations mode 1/mode 2 knowledge (Gibbons et al 1994) and explicit/tacit. Postmodern and social constructivist contexts saw greater fragmentation such as in organisational literature five types of knowledge as embedded, encultured, embrained, encoded, embodied (Blackler 1995), and in education Godemann's (2008) four types of trans-disciplinary knowledge involving a journey of integration, problem-orientation, re-organisation and universal vantage point.

Some suggest the third mission as a continuum of activity: 'formal-informal' (Perkmann and Walsh 2007; Amara et al 2013); from 'outcome to outreach' (e.g. Wersun 2010); paid and unpaid activities (Amara et al 2013); open versus closed process (Sharifi et al 2014); encompassing three 'functions of the third mission' (Laredo, 2007); four categories of 'community-based' 'commercialisation', 'problem-solving' and 'public space/people-based' (PACEC 2009). Perkmann and Walsh's (2007) identify sixteen categories of knowledge transfer. All these typologies represent attempts to provide a framework for heterogeneous understandings of knowledge, but do not identify any hierarchy for policy.

Distinctions between the nature of knowledge and the process of knowledge working (Ozga and Jones 2006) is also evident. Blackler (1995) charts a shift of emphasis in contemporary capitalism from understanding 'knowledge' as a product to focus on processes of 'knowing' and 'doing'. Some typologies focus on contexts/boundaries to explain different knowledge processes: Carlile's (2004) three-part continuum envisaged increasingly complex boundaries of syntactic, semantic and pragmatic knowledge collaboration. Krucken et al's (2007) typology comparing Germany and the U.S. focuses on differing levels of knowledge integration. Laredo's typology (2007) articulates 'education products' of transfer: mass; professional; doctoral. The 5 C's Model of Good Practice Knowledge Transfer developed by the UK's

Council for Industry and Higher Education (CIHE, 2012) sees a staged journey and iterative action-learning process. A review of this heterogeneous domain (Michels 2010) led to suggestions for an overarching conceptual framework based on popular metaphors such as transfer, exchange, partnership etc. The Metaphor Framework highlighted different discursive domains as explaining different conceptions of valid knowledge and knowledge transfer (and associated policy issues), surfacing the significance of a non-homogeneous view of knowledge ‘as portrayed by the knower’(s). Each metaphor represented conceptions held by some stakeholders but therefore might exclude, even alienate the perspectives of others and hence possibly explain issues of policy (dis-) engagement and inflection. However that framework did not pursue the nature of the inter-relationships between metaphors nor policy implications.

Current research provides a range of typologies but in spite or because of these provides an unwieldy body of understanding, offering no over-arching insight for policy-makers about innovation through knowledge transfer or how best to measure and support it.

Implications for better understanding

The different understandings about what is regarded as valid knowledge, how it is created and to what end, arguably reflect different stakeholder interpretation, possibly evolving understandings about knowledge, and the context about and for academia generally: from concern with national competitiveness and the link to innovation and university knowledge, and subsequently a broadening (or re-emerging) concern with a social agenda and the associated role of (academic) knowledge. Gibb et al’s (2009) ‘Changing University Paradigm’ acknowledged the increasingly complex, uncertain university task environment which persists (Lockett et al 2012).

Providing a coherent inclusive framework is thus complex. The need continues for more fine-grained policy (Lockett et al 2012) and hence research agenda/approach. Identifying, understanding and defining the interpretations of different contexts and stakeholders is important for those informing, designing, implementing and participating in university knowledge transfer. This arguably underpins different approaches adopted to-date to investigate this domain and reviewed below.

Current approaches to understanding issues in university knowledge transfer

Third stream research has understood context and stakeholder interpretations to be valuable (Benneworth and Jongbloed 2010; Streir 2011; Sharifi et al 2014) and particularly for insights into issues of policy (dis)-engagement, inflection and hidden innovation. Whilst knowledge may be regarded as valuable capital, what is valuable seems contested (typified by the so-called great divide of the sciences vs humanities). There may be no absolute truth: what counts as ‘within the true’ is subject to different discursive domains and ‘participants’ interpretations of an experience are ‘a form of knowledge’ (Fowler and Lee 2007). Calls for more insight lead to suggestions for investigation into different interpretive domains: individual; discipline; department; organisation; sector; region; policy instrument (Urwin 2003; Pilbeam 2006; Geuna and Muscio 2009; Arzenšek et al 2014; Boyd and Smith 2016).

A review of approaches adopted to-date identifies research falling largely into three broad categories:

- The individual and disciplinary-based approaches
- Organisation-based approaches
- Case study approaches

However implications drawn from this research were already critiqued earlier in this chapter for lack of over-arching action framework for supporting innovation. Ramos-Vielba and Esquinas-Fernandez (2012) identified ‘methodological difficulties’ with heterogeneous knowledge transfer. The review here indeed challenges the extent to which current approaches provide a meaningful, coherent view of heterogeneous knowledge transfer and associated issues.

The individual and disciplinary-based approaches

Individual identity as key for understanding varying participation in knowledge transfer has been suggested (Gibb et al 2009) and pursued (e.g. Sharifi et al 2014). Academics’ identity in knowledge transfer may be a complex mix of factors including discipline (Boyd and Smith 2016). A focus on the individual and their identity assumes linkages between knowledge owned and valued by the academic and their engagement in knowledge transfer.

The merits of disciplinary-based approaches to understanding and capturing hidden innovation and issues of policy effectiveness are not clear. The seminal work of Biglan (1973) laid foundations for subsequent assumptions about the significance of disciplinary difference, leading to epistemic approaches to understanding the heterogeneous nature of academic behaviour in first and second academic activities: the different approaches to research and teaching suggested as related to discipline, as for example didactic/interactive and positivist/phenomenologically-inflected (e.g. Fowler and Lee 2007). Disciplinary-based approaches to understanding the third activity of knowledge transfer have been pursued overtly and indirectly.

Links between discipline and approach to knowledge transfer have been noted. Firstly as evidenced by discontented voices from the HASS community (Fowler and Lee 2007; Smith and Taylor 2009) responding to a perceived mismatch of third stream policy for their discipline, and their inflection of policy (valuing softer, intangible skills and knowledge). Recent

acknowledgement of the need for measurement of ‘no or low income driven outcomes or impact’ suggests this sort of issue may still exist (HEFCE 2017). A disciplinary perspective exists also in the ‘hard’ disciplines. HEFCE’s (2011) call for research in newer areas (namely non technological), also assumes merits of disciplinary-based approaches. Studies which investigate knowledge transfer activities within a specific discipline or sector (e.g. Benneworth and Jongbloed 2010; Amara et al 2013; Boyd and Smith 2016; Thatcher et al, 2016) by implication suggest there is significance in relation to discipline. But their conclusions then remain only discipline-relevant.

Further, investigations into the significance of discipline for varying engagement in the third stream have been inconclusive. Pilbeam’s (2006) quantitative study found no correlation between academic discipline and varying degrees of engagement in third stream activity. Perkmann and Walsh’s review (2007) is inconclusive regarding disciplinary linkages. Hefce’s research likewise suggests little difference in disciplinary engagement (PACEC 2009).

Understanding heterogeneity in knowledge transfer framed by disciplinary conceptions seems questionable. Disciplinary differences may be one element in a more complex situated context. Whitchurch (2010) identifying academics as ‘blended professionals’ implies disciplinary distinctions as less relevant. Categorising stakeholders as ‘academic’, ‘not academic’ or ‘hybrid academics’ in itself provided no meaningful framework for policy-makers trying to support the cross-boundary innovation work of this non-homogenous group.

Organisation-based approaches

The organisation or institution as meaningful unit of analysis is strong in policy and research. Two key UK policy mechanisms - the Higher Education Innovation Fund and the Knowledge Transfer Partnership scheme - are based on *institutional* resource allocation: high performing

HEIs and certain types/sizes of business. The assumption is that meaningful knowledge transfer and policy focuses on the organisation. Lockett et al (2012) identify the HEI rather than individual academic as their ‘micro’ level of analysis.

An organisational focus underpins the seminal work of Clark (1998) linking the third stream to notions of ‘the entrepreneurial university’. Nelles and Vorley (2010) specifically valorise the HEI/institution with assertions about the importance of developing HEI-tailored missions. Gibb et al (2009), Sharifi et al (2014) and Lockett et al (2012) focus on organisational structure and leadership in the higher education sector as significant. Typologies of UK pre/post 1992 universities or research/non-research intensive HEIs (Van Vught, 2009; Gibb et al 2009) assume institutional difference to be significant.

However such studies are not instructive for action. Indicative of this is the work of Nelles and Vorley urging HEIs to develop institutional third stream missions - anyone working on such a mission will testify that this is complicated largely because of the diverse multi-disciplinary domains within most HEIs. Suggestions for flexibility in mechanisms supporting institutional knowledge transfer (e.g. Whitchurch 2010; Sharifi et al, 2014) does not define what such institutional policy looks like in practice.

In spite of HEI-funding structures and assertions of the role of HEIs in third stream success (Van Vught, 2009; Nelles and Vorley 2010), and of SMEs in national innovation (e.g. Wynn 2008), organisational factors are not unequivocally significant. Pilbeam’s (2006) quantitative study found no correlation between type of institution and engagement in knowledge transfer. Gibb et al (2009) suggest that physical and administrative structures are not as significant as other factors. Usefulness of institution/organisation-based research is debatable.

Further, Agrawal (2011) exposed tendency for research to focus on one organisational party: firm/ university, recipient/creator. An acknowledged policy focus on ‘supply side’ of ‘academia’, specifically HEIs (HEFCE 2008) exposed the need for more insight ‘demand-side’. Research into industry perspectives does exist (e.g. Wynn 2008), however even the latest HEFCE review of the state of the UK Knowledge exchange landscape (PACEC 2017) focused entirely on HEI’s and other supply side rather than demand side stakeholders. The most recent HE BCI survey (HEFCE 2017) acknowledging need for more insight into ‘collaborators’ exposes lack of real understanding of demand-side (industry) focus. Problematically, conclusions about one stakeholder category may not apply to another. ‘Firm-firm interactions’ are not necessarily relevant for ‘university-firm’ interactions (Agrawal 2011). Insights from industry may not help support academia and vice versa.

Some research incorporates all organisational parties in the knowledge equation, but fail to conclude meaningfully for all. Whitchurch (2010) and Wersun (2010) interested in ‘publically-orientated’ and ‘community-based’ academics engaged in ‘triple translation’ of policy, focus conclusions on academic ‘institutional management’ but not managers in the ‘public/private space’ (community/industry) – potentially missing ‘quadruple’ translation (hidden innovation?).

Studies drawing conclusions that focus empirically and conceptually on one organisational stakeholder are less helpful for policy needing to accommodate the heterogeneity of issues stemming from the other/all parties involved. Research is necessarily bounded, but the question is what is meaningful for the heterogeneous area of knowledge transfer. Case studies have appeared to offer an approach to gain meaningful insight of multiple viewpoints inherently involved.

Case study approaches

Case studies arguably take a cross-stakeholder and/or cross-case perspective and thereby opportunities for overarching insights and frameworks for analysis and action. Using data from academic, associates, managers and industry partners in single or multiple projects could provide insight into all/multiple different perspectives in a knowledge case. Case studies have become popular (e.g. Edwards 2006; Wynn et al 2008; Smith and Taylor 2009; Benneworth and Jongbloed 2010; Wersun 2010). UK policy-makers use case studies to illustrate impact of funding and best practice (e.g. CIHE 2012).

Inter-related, individual, departmental, institutional and regional factors may be significant in knowledge transfer (Urwin 2003; Ozga and Jones 2006; Pilbeam 2006; Fowler and Lee 2007; Geuna and Muscio 2009), and arguably justify case methodology. Case studies can focus on situated dimensions. Situation-specific factors arguably explain regional and cluster-based research (HEFCE 2017) and policy such as UK funding of Knowledge Transfer Networks (ktn-uk.co.uk) and EU funding regional innovation hubs (Gibb et al 2009).

Data from all parties in single or multiple knowledge transfer projects arguably encompasses all perspectives of a knowledge partnership group. However whether conclusions integrate all heterogeneity is questionable. Wynn (2008) focuses findings and recommendations only on the issues for the SMEs (excluding those for the academic). Nelles and Vorley (2010) incorporate ‘students on placement’ in their ‘inclusive’ concept of HEI third stream missions, but ignore other stakeholders (e.g. the companies employing these placement students).

Some studies interview academic and industry partners (e.g. Edwards 2006; CIHE 2012), but take an overly integrative approach, failing to capture the heterogeneity within and across stakeholders. Here, methodology, analysis, presentation of findings and conclusions avoid

looking at differences between parties and variation in the partnership group. Rather themes of commonality are presented. Perhaps heterogeneity problematizes attempts at synthesis and thus difference is ignored/considered not valuable - but thereby hidden innovation may not be captured. Assuming or focusing only on shared, integrated and common perspectives of knowledge partners does not help develop policy that needs to accommodate heterogeneity.

Some case study research does capture diversity, commenting on common perspectives and ‘contradictions’ or ‘tensions’ between university and company partners (Streier and Shechter 2016). Wynn et al (2008) acknowledge issues of mismatching expectations between knowledge transfer partners and highlight issues of communication requiring management. But frameworks and conclusions presented underplay the problems by failing to explore deeply the different conceptions of stakeholders which may be valuable and meaningful.

No overarching framework of understanding or action for those trying to support innovation through knowledge transfer has yet resulted from case study research. Research at levels of the individual, discipline, organisation or case-study offer a range of insights into different issues and implications for different stakeholders but no over-arching conclusions. Whilst heterogeneity has been confirmed, what is missing is an overarching action framework for those supporting innovation that incorporates heterogeneity in a coherent way.

From a missing approach to a new approach

Beyond heterogeneity

Many critics of third stream policy decry the one-size-fits-all approach - this arguably explains the adoption of disciplinary, organisation or case study-based methodologies. There is need in policy and in research for an overarching approach that incorporates heterogeneity:

accommodating newer areas involved in innovation without excluding older ones; supporting innovating SMEs but also corporates; catering for innovation imperatives of the new economy and of 'society'. In activities supported by policy, different stakeholders have to operate under the same framework. This in spite of or more importantly in theory incorporating differences between parties.

Discomfort with one-size-fits-all policy approaches resonates with those arguing for consideration of complexity in knowledge creation. Blackler (1995) noted the multidimensional nature of knowing, and argued for a more multi-layered approach. Spender (2008) suggested developing typologies based on 'action opportunities open to us' and managers' 'morally burdened' experiences. This might validate approaches investigating the lived experience at the level of the individual, organisation and case. However Spender argued further for recognition of knowledge as 'held inter-subjectively' by groups of people and hence acknowledging the inter-relatedness of knowledge(s).

Some frameworks attempt to incorporate the realities of a complex interpretive landscape: Laredo (2007) suggested that each HEI may hold a 'unique mix' of his 'three functions'; Krucken et al's (2007) suggested their 'ideal-models' were able to be held 'simultaneously'. Systematic, multi-level stakeholder analysis (Benneworth and Jongbloed 2010) suggests perceived merit in a pluralist, multi-disciplinary perspective.

However, research to date offers only understanding that there is heterogeneity in conceptualisations (regarding types of activity, implications, typologies and approaches), but does not show whether/how these may be understood as a web of connected, evolving, simultaneous or hierarchical conceptualisations - and what this means for policy. We continue to be left with questions: how to define university knowledge transfer? which issues/opportunities are most significant? where to focus resource (individuals, organisations,

clusters)? There is no over-arching holistic framework of understanding for policy or for action incorporating this variation.

Previous work (Michels 2018) noted the value for the third stream agenda of notions from the partnership concept that acknowledges both common ground and difference, consensus and dissensus between stakeholders, and integration but also non-integration of knowledge. Further, attention was drawn to the value placed in management and enterprise disciplines specifically of difference – of creative abrasion for innovation, and in partnership working the resultant innovation as inherently and positively including both collaborative diversity and conflict (Carlile 2004). Variation of perspective integrating commonality and difference in a knowledge transfer relationship are inherent but also valuable for identifying hidden innovation (Michels 2018).

A new approach: variation as inherent

Many studies into knowledge transfer have mirrored Godemann's (2008) conceptual assumption and focus on common, shared and integrated perspectives of knowledge partners and dismissed the equal value of interpretive differences of the working group for insights into innovation. Edwards (2006) identifies the political nature of knowledge partnership working and partnership working as by necessity a single unit of analysis: 'knowledge-sharing is expected to be achieved through a strategy that is based on mutual dependence where participants are effectively held hostage in a set of relations that rely on close co-operation' (p.70). Rejecting 'an essentialist view of partnership' Streir (2011) recognises 'multiple tensions'. But neither offers an all-inclusive framework for such 'politically aware' practice or management.

Policy-makers want to ‘understand better’ hidden innovation, provide a framework for innovation and need to strike a meaningful balance between something inclusive but easy-to-implement, accommodating heterogeneity of stakeholders. Research has yet to adopt fully or to address the issue of variation and leverage the web of commonality and difference as providing valuable insights for innovation, hidden innovation or potential innovation in multi-party, cross-boundary university knowledge transfer. Research could better inform when framed conceptually by variation.

The approach needed here conceptualises participants as a collective group, with variation as assumed and inherent, and knowledge partners understood as likely to hold different and similar views – indeed irrespective of their identity/role as ‘industry’ or ‘academic’ or from a certain ‘sector’ or ‘discipline’ or size of ‘organisation’ or type of ‘institution’. An academic partner engaged in knowledge transfer may but may not share an appreciation of the value of commercial ‘outputs’ as well as social or academic ones; an industry partner may but may not consider academic publications or social benefits as indicators of success as much as ‘commercialisation’. Diversity can exist within one stakeholder group: for example institutional leaders, HEI tech transfer managers, or young research scientists may interpret the agenda of knowledge transfer differently from their peers holding shared but also distinct conceptions (Sharifi et al 2014; Arzenšek et al 2014). Such variation is inherent in knowledge transfer – understanding and integrating this into research and policy is important.

The non-dualist approach suggested here allows for conceptualisation of more than simply two sides involved in the knowledge activity. A research approach which investigates how knowledge is understood differently (and similarly) by knowledge transfer participants – analysing the variation of all these knowledge parties as a group, a single unit of analysis has yet to be considered in knowledge transfer research.

Table 1 offers examples (both generic and UK-specific) to illustrate the focus of the approach suggested and to contextualise potential insights and implications. The point is that the unit of analysis is all participants in the mechanism: their collective interpretation and variation. So for example in contract research projects the unit of analysis is the collective group of industry clients, academics, research assistants (etc.) and their shared common ground and different perspectives about what is valuable and hence useful for identifying (hidden) innovation.

Table 1: All-inclusive research incorporating variation: examples from UK HEI policy context

Knowledge transfer activity	Included in ‘partnership’ unit of analysis	Focus of analysis
Industry-funded contract research	Industry client; academic; research assistant	<p>Variation of perceptions of the partnership group: commonality and difference</p> <p>Leading to all-inclusive framework of understanding and action</p>
Bespoke executive education/CPD	Commissioning industry client; academic delivery team; recipients/delegates	
University spin-outs	University tech transfer office; academics; spin-out team; investors; legal team	
Higher Education Innovation Fund (HEIF) SME engagement vouchers	SME owner; academic; institutional KT manager; HEIF manager	
Knowledge Transfer Partnership scheme (KTPs)	Company partner; academic partner; associate; HEI manager; KTP regional advisor	
Industry-funded student work placement scheme	Employer; student; academic supervisor; university placement scheme manager	

Conclusion and way forward: an all-inclusive approach

This review has identified ‘wide variation’ in university knowledge transfer in terms of types of activity and stakeholder that challenges the ability of policy mechanisms and associated measurements to be universally effective. Knowledge transfer brings together academics, associates and industry partners from arts through to science, from private through to not-for-profit sectors. There are by definition diverse knowledge partners who may hold both common and different conceptions, attitudes, expectations and value-judgements in relation to knowledge transfer, valid knowledge and innovation. This may lead to different interpretation, implementation, translation and inflection of policy. It points specifically towards an interpretive methodology that acknowledges variation of interpretation as appropriate.

Implications offered by current research have been critiqued for not providing an over-arching, coherent, prioritised view of implementable implications for policy. Current research approaches do not inherently incorporate heterogeneity, inter-subjectivity between partners and variation in the knowledge transfer partnership group.

Studies to date note to a greater or lesser extent commonality and difference but what has not been investigated is what value might be discovered by understanding the shared difference, the variation of perspectives of the knowledge partners involved in a knowledge transfer activity. Existing research has yet to be framed methodologically by an understanding of diverse stakeholders working in a given knowledge transfer activity, as a heterogeneous group with commonality and difference as inherent.

A potentially relevant research methodology for enhancing understanding and new theoretical and practical insights in this domain is phenomenography and embodies a ‘broad speculation

that variation of perception is likely to exist' (Cousin 2009, p.191). Limited thus far to research in education, phenomenography 'assumes variation'. Phenomenography goes beyond heterogeneity and adopts an understanding of the inherent value of non-dualism, of 'a range of experience', and that respondents 'who experience a situation in different ways may have different outcomes' (Micari et al 2007, p.461). As such it is conceptually appropriate for research aiming to be informative for those in knowledge transfer trying explicitly to understand and support heterogeneous engagement (including 'local inflection') and innovation (including 'hidden').

Phenomenography's second order perspective reports practice and identifies what is experienced and valued by participants, but further attributes values to the 'collective experience of variation in experience', with the unit of analysis being the 'group'. This directly aligns with research aiming to inform the understanding and practice of those who acknowledge the challenge of an all-inclusive policy mechanism (here knowledge transfer) aimed at a heterogeneous group (here knowledge transfer partners). The underlying assumption in phenomenography of not just a set of different meanings but 'a logically inclusive structure relating the different meanings' (Åkerlind 2005, p.323), offers possibilities for deeper understanding for those trying to engage in and support knowledge transfer through an 'all-inclusive' policy.

Understanding the variation in perspectives of knowledge partners trying to operate within a given knowledge transfer activity offers potential to understand better (dis-) engagement, innovation and hidden innovation, and hence provide important insights for research and policy. Further consideration should be given to the merits of phenomenography as a methodological framework for providing an all-inclusive approach in the heterogeneous domain of university knowledge transfer. The review of research and policy here focused on

the UK context is expected to resonate and trigger reflection and research in other national contexts and thereby contribute to developing on-going ‘better understanding’ for all of us involved in this challenging, stimulating and important area.

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