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Reconceptualising knowledge exchange and higher education institutions: broadening our understanding of motivations, channels, and stakeholders

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ABSTRACT

This Special Issue represents an effort to go beyond a narrow notion of knowledge exchange (KE) and explicitly address broader questions related to the measurement of and incentives towards KE in Higher education institutions (HEI). Specifically, we bring attention to a number of under-researched topics in the literature. These relate to: (i) The participation of a diverse set of academic actors in KE activities – in particular, academics in emerging economies and women academics – whose role in KE is insufficiently investigated in the extant literature; (ii) academics' engagement with under-explored KE stakeholders, specifically policymakers and the public sector; and (iii) the tensions and tradeoffs that are implicit, but often unacknowledged, in the relationship between HEIs' traditional teaching and research activities, and KE as a third institutional mission.

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1. Introduction

Over the past 30 years, policy makers and funding organisations have paid increasing attention to fostering knowledge exchange (KE) between academics and external stakeholders (European Commission 2007; Geuna and Muscio 2009; Molas-Gallart and Tang 2007; Jongbloed and Zomer 2012). KE has become institutionalised as a 'third mission' for higher education institutions (HEIs), and increasingly incentivised through various policies, at national, regional and university management levels (Kitagawa and Lightowler 2013; Lockett, Wright, and Wild 2014; Molas-Gallart and Casto-Martinez 2007; Rosli and Rossi 2016; Sharifi, Liu, and Ismail 2014). As a result of this growing interest, the diversity of KE in terms of the activities and actors involved has been more widely recognised. For example, various types of interactions between academic scientists and external organisations (sometimes known as 'academic engagement') have been identified (Perkmann et al. 2013, 2021). However, certain KE activities, actors and contexts remain poorly understood and KE policies tend to be skewed towards commercialisation of research and 'academic entrepreneurship', with a dominant focus on science, technology, engineering and medicine (STEM) fields (Rothaermel, Agung, and Jiang 2007).

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Recently, there has been a shift to promoting greater focus on a wider range of interactions and engagement between universities, the public and other communities (Watermeyer 2016). These include the impact of non-STEM disciplines such as humanities, arts and the social sciences (SSH) to society (Olmos-Peñuela, Benneworth, and Castro-Martinez 2014a, 2014b; De Jong and Muhonen 2020), or the increasing relevance interdisciplinary research and multi-stakeholder approaches show to provide to complex problems (Fazey 2014). There is also growing interest in understudied forms and contexts of engagement, including interactions in resource-constrained environments (De Silva 2016) and the perspectives of underrepresented groups such as female scientists. Finally, little is known about the organisational mechanisms that need to be put in place to facilitate and support a wider range of KE activities. Understanding the effectiveness of broad-based KE policies is deemed to be imperative, given the growing expectations about HEIs' contribution to innovation processes and economic development as well as to civic agendas (e.g. Goddard and Vallance 2013; Uyarra 2010).

This Special Issue represents an effort to go beyond a narrow notion of KE and explicitly address broader questions related to the measurement of and incentives towards KE. We do this by shedding light on a range of issues that are under-researched in the literature. These relate to: (i) the participation of a divere set of academic actors in KE activities – in particular, academics in emerging economies and women academics – whose role in KE is insufficiently investigated in the extant literature; (ii) academics' engagement with under-explored KE stakeholders, specifically policymakers and the public sector; and (iii) the tensions and tradeoffs that are implicit, but often unacknowledged, in the relationship between HEIs' traditional teaching and research activities, and KE as a third institutional mission.

The remainder of this editorial is organised as follows. In the next section, we briefly discuss the main themes of this Special Issue, highlighting the research gaps addressed by each of the contributing papers. Based on this discussion, we then articulate their key contributions, paying attention to the variety of international contexts, levels of analysis and methods. The contributions in the Special Issue not only enhance academic discourse, but they also aim to inform a lively international debate on how to evaluate and incentivise HEIs' KE engagement with a broader, more inclusive approach bringing attention to the tradeoffs and tensions. A deeper understanding of the diversity of KE mechanisms and actors involved, while examining individual and organisational aspects affecting these processes (i.e. motivations, incentives, metrics), should aid in the design of policies that support sustainable participation in KE. Therefore, in the concluding section, we draw some general implications for policy and HEI management.

2. An overview of under-researched themes in the KE literature

The seven papers in this Special Issue seek to broaden our understanding of KE by situating KE in a wider context that acknowledges diverse settings, audiences and impacts, critically reflecting on KE measurement and assessment, and deepening the understanding of tensions and trade-offs between KE and different university missions. This is explored at different levels of analysis, namely the individual and organisational (HEIs), and considering a variety of geographical scopes (see Table 1).

The contribution to the literature by this issue highlights three interrelated themes. The first theme addresses the diversity of academic actors involved in KE activities. Three papers discuss this theme by, firstly, focusing on academic actors working in a diverse socio-economic context, and more specifically, on the challenges found in developing and emerging economies (Athreye, Sengupta and Odetunde); and, secondly, on women academics, highlighting the nature and causes of the gender gap in KE (Lawson and Salter; Ramos-Vielva and D'Este). The second theme addresses the diversity of target users beyond industry, focusing on the nature of public sector engagement and the impact on public policy (Bozeman, Bretschnerider, Lindsay, and Didier; Thune, Reymert, Gulbrandsen and Simensen). Under the third theme, two papers investigate the

Table 1. Themes and levels of analysis.

Theme 1: Broadening the understanding of KE activities by under-researched actors: academics in emerging economies, women academics	**Unit of analysis**	**Geography of analysis**	**Methods/ Data source**
Suma Athreye, Abhijit Sengupta and Oladimeji Jamiu Odetunde	Individual	Country (Nigeria)	Survey
Cornelia Lawson and Ammon Salter	Individual	Country (UK)	Survey
Irene Ramos-Vielba and Pablo D'Este	Individual	Country (Spain)	Survey
Theme 2: Broadening the understanding of KE activities with under-researched stakeholders: policy and public sector stakeholders			
Barry Bozeman, Stuart Bretschneider, Spencer Lindsay and Nicolas Didier	Individual	International	Survey
Taran Thune, Ingvild Reymert, Magnus Gulbrandsen and Erlend Simensen	Individual	Country (Norway)	Survey
Theme 3: Effectiveness and limitations of incentives to KE in the context of multiple trade-offs			
Francesco Rentocchini and Ugo Rizzo	University	Country (UK)	Secondary data
Kwadwo Atta-Owusu and Rune Dahl Fitjar	Individual	International	Survey

Source: Authors' own elaboration.

tensions and tradeoffs that influence KE engagement, including tensions with the HEI missions of teaching and research and their associated incentive mechanisms (Rentocchini and Rizzo; Atta-Owusu and Fitjar). These papers examine the potential effects of changes in the 'mission mix' of HEIs on the variety and intensity of KE activities that academics participate in.

In the following section, we review the current debate in relation to the aforementioned three themes to highlight the research gaps that the papers in this special issue are aiming to address.

2.1. Broadening the understanding of KE activities by under-researched actors: academics in emerging economies, women academics

The vast majority of studies on KE has focused on advanced industrial economies and even here, very unevenly with a few countries being over-represented. Developing and emerging economies, usually characterised by weaker innovation ecosystems and more fragile institutional support, have received much less attention. However, as Athreye, Sengupta and Odetunde note in this issue, academic entrepreneurial activities do happen in these contexts too, and they are increasingly important for academic researchers, university managers and policy makers. In these countries research commercialisation may be hampered by weak infrastructures and institutions or by missing actors (supplier networks, private investors), requiring the university to take a more proactive institution-building role (Chatterjee et al. 2018). At the same time, academics in developing and emerging economies might be incentivised to undertake some KE activities, such as academic entrepreneurship, as a way to overcome resource constraints (De Silva 2016).

Based on a survey data of 300 academics of the University of Lagos, Athreye, Sengupta and Odetunde (this issue) investigate the motivations, intentions and perceptions of academics towards KE in Nigeria. They find that, while the entrepreneurial motivation of researchers strongly influences their intention to engage, the link between intention and actual engagement is mediated by academic perceptions of departmental orientation and support, often leading to low engagement outcomes as a result. They conclude that academics' perception of organisational support is an important factor influencing entrepreneurial outcomes, particularly in situations where entrepreneurial ecosystems and institutions are weak and unsupportive. Challenges in these countries are complex and may involve both refocusing activities around quality and quantity of research produced in local universities, as well as putting in place supporting institutions to implement KE practices effectively.

Recognising the diversity among academics involved in KE is also important, since individual characteristics play an important role in predicting academics' engagement and their decision to

engage in KE activities (Llopis et al. 2018; Perkmann et al. 2013). While researchers' past professional experience and academic quality have been investigated extensively (e.g. Giuliani, Morrison, and Pietrobelli 2010; Haeussler and Colyvas 2011), other individual factors such as gender differences are less well understood (Bozeman and Corley 2004; Bozeman and Gaughan 2011). Prior research has analysed the motivations behind the engagement gap between men and women, particularly with respect to commercialisation. Research has shown that a series of factors contribute to this perception, including different rates of participation in science, career progression, publications or grants. What has not been investigated so far, however, is whether the engagement gap between men and women persists when a broader range of KE activities and stakeholders is considered.

Lawson and Salter (this issue) investigate gender differences in KE, drawing on original survey data from 15,000 UK academics and adopting a matched sample strategy. They find that while a gender gap exists in commercial-oriented areas of engagement, a reversed gender gap can be found for KE with the third sector, as women are more likely to engage with charities regardless of their career stage and research field. The paper suggests that women engage with different actors and carry out activities currently less visible in terms of status, which in turn hinders the appreciation of their contribution to KE and of their value for society. Ramos-Vielba and D'Este (this issue) also focus on gender differences in KE activities. They use original data of 10,000 Spanish scientists to investigate the difference in participation rates between men and women in commercialisation, engagement, and informal activities; and to assess organisational and individual factors that moderate participation. They find that women's participation at senior level (professor) is significantly higher than men's in informal activities, while men show higher participation rates in the case of contractual research (engagement) during their early and intermediate career stages but not at professorial level. However, in the case of commercialisation, rank does not level gender differences, with men engaging more than women both at early career and professorial level. Also, peer effect is found for commercialisation activities only, e.g. a higher proportion of women professors active in commercialisation activities positively affects the likelihood of other women scientists engaging in commercialisation.

2.2. Broadening the understanding of KE activities with under-researched stakeholders: policy and public sector stakeholders.

The users and targets of academic knowledge are also diverse. Universities' KE with knowledge users in the public and third sectors and the relationships between these users and academic research have so far not been investigated extensively. Two papers in this volume contribute to this area by focusing on the use of academic research in policy making.

Bozeman, Bretschnerider, Lindsay, and Didier (this issue) examine the interactions between social science research and policy practitioners by focusing on the use of specific forms of research, namely, 'published research'. Drawing from a dedicated survey based around papers published in top public management journals, they analyse how different communication approaches such as public media, as well as the individual characteristics and experiences of academics, affect the use of research by policy makers. They find that a substantial percentage of research is used by policy makers and public officials (more than one third of the researchers admitted their work was used by practitioners). Factors such as communication of the research in conventional mass media, but also journal impact factors, seem to be good predictors of both policy and management use, while previous experiences of academics as practitioners, researchers' years of career, productivity or gender have no bearing on use.

Also in this issue, Thune, Reymert, Gulbrandsen and Simensen examine the perspectives of academics and policy makers on KE. Based on two large Norwegian surveys, they analyse the channels and mechanisms of KE from both academia and policymakers' perspectives. They find for instance that collaboration with government organisations is more frequent among male academics,

academics employed by universities (not colleges), and those in more senior roles. On the government side, officials holding a PhD degree or with prior work experience from research institutions are more likely to access research from academic sources frequently. Drawing on the analysis of patterns of exchange and interaction between the two spheres of research and policy, they argue that there is a space of 'co-production' between academic institutions and government organisations inhabited by small groups of individuals embedded in specific expert networks, who share certain similarities. By focusing on policy makers and practitioners as a particular type of knowledge users, these studies highlight the complex channels and multiple relationships between policy and research.

2.3. Effectiveness and limitations of incentives to KE in the context of multiple trade-offs

Universities as organisations have increased control over the transformation of academic values through a variety of incentive mechanisms including recruitment, reward and recognition, and other forms of support (e.g. local funds and infrastructures), in parallel with the growing demand for social and economic involvement at local, national and international levels (Jacobson, Butterill, and Goering 2004; Luukkonen and Thomas 2016). Miller, Cunningham, and Lehmann (2021) discuss the evolution of the universities' missions – with the emergence of the entrepreneurial university model leading to the rise of a 'third mission' (Laredo 2007; Nelles and Vorley 2010; Pinheiro, Langa, and Pausits 2015) along with teaching and research. Universities have been facing growing and conflicting demands from governments and the general public, including demands for research excellence, teaching quality and socio-economic engagement. Different universities perform these missions differently, and each mission influences the others (Fuller, Benyon, and Pickernell 2017). Studies show that there are different incentive mechanisms at play between teaching, research and socio-economic engagement for new and old universities (Sanchez-Barrioluengo 2014; Degl'Innocenti, Matousek, and Tzeremes 2019; Sánchez-Barrioluengo, Uyarra, and Kitagawa 2019) with the co-existence of activities that are 'entrepreneurial' and 'engaging' in nature (Sanchez-Barrioluengo and Benneworth 2019).

Therefore, incentivising KE activities is situated at the crossroad between different university missions. As noted above, identifying and implementing the appropriate incentives may be particularly challenging in certain institutional contexts such as those found in resource-constrained environments, for instance, in developing and emerging economies. Key questions therefore emerge in relation to: whether (financial and non-financial) incentives work at the individual and/or organisational levels; what are the key challenges and what organisational capabilities and resources are needed to implement incentives; and how incentives for KE are influenced by changes (e.g. higher education policies) affecting any of the university's missions (Leisyte, Enders, and de Boer 2009). As Atta-Owusu and Dahl Fitjar argue in this issue, while a number of studies have explored the role of incentives on academics' KE engagement, they tend to narrowly focus on formal engagement activities and the findings are largely inconsistent.

Two papers in this Special Issue contribute to this debate. Rentocchini and Rizzo investigate how changes in the 'mission mix' of UK HEIs influence the variety and intensity of their KE activities. They argue that the increase in university tuition fees in England and Wales in 2021 signalled a greater focus on teaching. Using information on research projects awarded to HEI by the UK Research Councils during the period 2006–2013, they find that, compared with Scotland and Northern Ireland (where fees did not increase), English and Welsh HEIs affected by the reform saw a decrease in the variety and intensity of KE outcomes. The authors conclude that this is a result of increased pressure on academics to prioritize teaching responsibilities. As teaching outcomes have become more relevant in terms of career progression, they argue that individual attitudes and incentives to participate and promote KE have decreased.

Atta-Owusu and Dahl Fitjar also focus on academic incentives to participate in KE and examine, using data from a sample of academics in seven European universities, the individual perceptions of direct and indirect benefits from engagement, and whether or not these perceptions influence the

likelihood of academics to actually participate in KE activities. They note that universities have introduced reward schemes to encourage KE participation, particularly in relation to formal activities such as commercialisation. They argue, however, that KE brings indirect benefits to academics that can be reputational, relational or intellectual and which can positively impact academic teaching and research roles. The paper finds that while direct university rewards tend to diminish engagement in KE activities, perceived indirect benefits have an enhancing effect. Furthermore, they find these associations to be stronger in STEM than in SSH fields.

By focusing on the role of academic incentives, these studies highlight the importance of seeking synergies across the university missions. As noted by Atta-Owusu and Dahl Fitjar, academics are more likely to engage when the various missions are perceived as mutually reinforcing, rather than separate activities competing for their time.

4. Implications for policy and areas for further research

While in the last thirty years, KE has attracted both scholarly and policy attention, the focus has tended to be on formal activities linked to academic entrepreneurship and commercialisation. Such a narrow conception of KE has underplayed the diversity of impacts of KE and their perceived value for society. The current Special Issue collects contributions to overcome these limitations and to deepen our understanding of KE, by unpacking the breadth of KE channels, highlighting underrepresented actors involved in the KE process, and exploring novel ways to assessing the impact of KE. In the following, we identify several cross-cutting implications emerging from our reading of the papers, and we propose lessons for policy and university management, as well as some directions for future research.

A first implication emerging from the articles in this Special Issue is that KE should not be treated as an isolated phenomenos, but rather as intersecting with other university activities. As universities are asked to respond to a growing range of 'missions', the tradeoffs between those missions need to be more explicitly understood and taken into consideration by policymakers. Careful consideration should be given to the relationship between incentives for KE and incentives for research or teaching, as incentivising teaching or research might have unintended consequences on KE, and vice versa. This is relevant both at the organisational (university) level and at the individual (academic) level. Changes in education and research policies appear to have strong impacts on universities' and academics' incentives to engage in KE, and on which types of KE to engage in. Indeed, the lack of policy alignment due to changes in higher education policy, can negatively impact third mission activities (Rentocchini and Rizzo, this issue). For this reason, it is particularly important that universities improve their ability to advocate the value of their KE engagement, and to identify any situations where education and research policies are likely to affect this engagement. University incentives mediate the link between intention and actual engagement of their academic staff (Athreye, Sengupta and Odetunde, this issue), something that is particularly true in countries with weak institutions where organisational support is a key factor for academics to diversify their engagement activities. Hence, another important implication for HEIs in both developing and developed countries is that one-size-fits all policies, as well as centralised incentive schemes and support structures, end up being less effective for entrepreneurial engagement than more decentralised and tailored support.

A second implication is that KE activities are socially embedded and are affected by biases and power relations like all other social processes. Universities often explicitly reward direct forms of engagement, particularly in relation to activities involving industry partners. However, academics' motivation to engage might be driven by broader benefits, such as reputational, relational, and intellectual benefits, as well as positive impacts on teaching and research (Atta-Owusu and Dahl Fitjar, this issue). It is therefore important to unpack the motivations and intentions of academics towards KE. Additionally, Lawson and Salter (this issue) provide a clear picture that gender biases exist in terms of engagement with the Third Sector, where women interact more than men at any

career stage. Ramos-Vielba and D'Este (this issue) show that women's participation in informal activities is prominent and much higher than men who instead prefer more formal engagement in commercialisation. Hence, greater awareness is needed of the social and cultural preferences as well as the economic factors that may hinder contributions to KE engagement by academic staff.

A third implication stemming from the above contributions is the importance of a broader understanding of the 'innovation ecosystem' where KE takes place, through the linkages and interdependencies with various actors ranging from firms to policy makers and civil society (Taxt et al. 2022). The innovation ecosystem also consists of a variety of intermediaries, consultants, experts and knowledge brokers (Bandora-Gill 2023). There are a multitude of actors currently involved in KE, whose role is not yet fully acknowledged. The user side of KE is populated by industry as well as the broader public sector, including education, healthcare, government bodies and Third Sector organisations including charities and cultural institutions. How academic knowledge is used (types of use), the motivations for its use, and the main factors determining the use of research, are all relevant questions to better understand the impact of KE on policy. Crucially, it is important to examine both sides (academics and policy makers) to appreciate the differences in motives, mechanisms, and effects, and to see KE as an interactive process of co-production (Thune, Reymert, Gulbrandsen and Simensen, this issue). Bozeman, Bretschnerider, Lindsay (this issue), find that a substantial percentage of research (more than one third) is used by policy makers and public officials. Both of these studies highlight the complex channels and multiple relationships between policy and research, where social scientists may play a strong role. This has important implications in terms of supporting access to academic research through broad forms of communication as well as the need to facilitate co-production spaces to facilitate the circulation and translation of academic research.

Finally, besides the growing importance of understanding the KE tradeoffs and adopting a more inclusive approach to KE actors, it is also necessary to develop better indicators to capture the scale and effectiveness of universities' KE channels and the short and long-term impact of this engagement. On the one hand, KE activities are dynamic and not static: they change over time and their effects are often indirect. Accordingly, we need more efforts to capture the impact of KE for partner organisations and individuals involved over time. Along with growing efforts to measure and evaluate KE activities, we need to acknowledge their dynamic nature and sometimes intangible impact. To capture these, different indicators are needed for different types of activities and relationships, going beyond existing instruments focused on commercial potential. On the other hand, new indicators need to allow universities to showcase a broader range of activities and impacts that go beyond research commercialisation and capture KE that occurs through e.g. student involvement, social entrepreneurship, and informal interactions. Likewise, it is necessary to capture impacts on regional economies and local communities. As universities are place-based institutions and key actors in local innovation ecosystems, it is relevant to acknowledge their institutional context, which comprises a complex landscapes of actors and collaborative activities co-existing in the same environment. Another implication of the papers on gender is that adopting a broader perspective on what constitutes KE can help us realise that academics that may appear to be less engaged following traditional metrics, are actually quite active when we adopt a broader perspective. Indicators for KE also need to move beyond hard metrics to include softer indicators including the quality of relationships established and the value of the impacts generated.

We believe that the papers in this Special Issue open up many interesting avenues for future research. Table 2 below summarises some of the themes and related research questions that the papers have alerted us to, but there could be, of course, many more.

In summary, KE requires motivation and ability involving not only academic researchers but also external partners to manage relationships and societal impacts. Therefore, focussing solely on university policy is insufficient and broader consideration should be given to other policies affecting KE. We need to increase awareness of the social, cultural, and economic factors that may hinder

Table 2. Future research directions.

Theme	Some possible research questions
Motivations and intentions of academics towards KE	• What are the indirect benefits that drive academics to engage in KE? • Are these different in developed and developing economies contexts?
The social, cultural and economic factors that may hinder academics' contribution to KE engagement	• What is the role of academics' socioeconomic class, immigrant status and so on in hindering (or in some ways supporting) KE engagement? • Do different social, cultural, economic profiles of academics correlate with preferential engagement in different types of KE?
Differences in motives, mechanisms, and effects between academics and other stakeholders (industry, charities, government etc.)	• How do the differences between partners impact the nature and quality of KE? • How can we facilitate co-production spaces to support the circulation and translation of academic research? • How does the broader innovation ecosystem – including industry as well as public sector, charities and cultural institutions – support engagement in KE and the achievement of successful KE?
Better indicators to capture the scale and effectiveness of universities' KE channels and the short- and long-term impact of KE	• How can we best capture the long-term impacts of KE? • How can we best capture the effectiveness of a broader range of KE channels? • How can we best capture engagement with a broader range of stakeholders such as students, charities, government? • How can we capture the quality of engagement in an interdisciplinary context? • What are the long-term impacts of KE on the local/regional context where universities are located?

Source: Authors' own elaboration.

KE engagement on the part of academics, particularly those who appear less engaged in more visible and formalised types of KE activities. The studies proposed in this Special Issue signal that we need to expand the engagement agenda to include other characteristics of academics that may hinder or support KE engagement – for example better understanding the role of academics' socioeconomic class, immigrant status and so on. Ultimately, there is a lot of untapped potential that may not be yet realised, whenever lack of institutional support, resource constraints, biases, power dynamics, or adverse explicit or implicit incentives, prevent academics from engaging in KE to the extent that they could or would like to.

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