University of Southampton

Faculty of Social Sciences

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A multi-layered perspective on inclusive academic entrepreneurship, diversity, and social inclusion: Towards social change

by

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Abstract

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A MULTI-LAYERED PERSPECTIVE ON INCLUSIVE ACADEMIC ENTREPRENEURSHIP, DIVERSITY AND SOCIAL INCLUSION: TOWARDS SOCIAL CHANGE

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The aim of this doctoral study is to provide a multi-layered perspective on academic entrepreneurship (AE) and social inclusion by investigating the AE process drawing on entrepreneurship, diversity management domains within business and management studies, and social inclusion domains within social policy and sociology disciplines. It problematizes the AE process in STEM (Science, Technology, Engineering and Maths) departments in research-oriented UK universities by taking diversity strands such as gender, ethnicity, and age/career stage into consideration, in order to demonstrate the institutional enablers and constraints for AE. It also focuses on institutional orders and institutional logics that characterise academic entrepreneurship (AE) ecosystems, which lead to gender-based differentiated responses by academics. This research also provides policy insights that are tailored to Higher Education in the UK, based on a thorough understanding of academic entrepreneurs' experiences and views, in order to achieve meaningful social change.

Drawing on an explorative qualitative study of 64 interviews with STEM department academics and Technology Transfer Officers of research-based UK universities, I adopted

an interpretivist approach in examining the AE process and social inclusion. This in-depth qualitative research design to generate valuable insights into the emerging field of academic entrepreneurial ecosystems, which so far mainly relies on quantitative data. Moreover, policy documents and reports on AE, social inclusion and diversity were included into this research, to present a wider understanding of the key activities and strategies developed in the policy context and ecosystem. While the findings support most of the debates on institutional policies on institutional change, this research puts more emphasis on the significant stances for pressures that academic researchers experience and the importance of creating impact for not only economical but societal change.

This research makes multiple contributions to knowledge, policy and practice: First, I offer theoretical contribution by revealing the importance of multiple institutional influences/logics in the process of AE through the multi-level analysis. I advance the theory of logics by demonstrating how the interplay of logics creates different kinds of salient points and pressures for academics and university management teams. In addition, this research demonstrates the link between the institutional dynamics and agentic responses of key actors in the AE ecosystem, underpinning the transitory role of institutional forces. Second, this research contributes to the social inclusion and diversity literature by exploring increasing importance and relevance. Finally, this study provides a number of research and policy implications for academics and policy makers and managerial insights, including university managers. I argue that more tailored policies should be introduced and adopted based on a deeper understanding of the experiences and views of academic entrepreneurs to support change for equality and inclusiveness of the AE process.

Dedication

This thesis is dedicated to my parents, Renan and Cemal Tunalıoğlu, for all the values and principles that they taught to me. I am proud to be your daughter.

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Research Thesis: Declaration of Authorship

Print name: MELIKE NUR TUNALIOĞLU

Title of thesis: A multi-layered perspective on inclusive academic entrepreneurship, diversity, and social inclusion: Towards social change

I declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have consulted the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
5. I have acknowledged all main sources of help;
6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
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Conference Papers:

Tunalıoğlu, M. N., Karataş-Özkan, M., Costanzo, L. and Baruch, Y (Paper accepted for June 2021) *Gendered nature of academic entrepreneurship in STEM departments: Institutional orders and logics*, Gender, Work and Organization Conference, Kent University, UK.

Tunalıoğlu, M. N., Karataş-Özkan, M., and Costanzo, L. (Paper accepted for December 2020) Gendered nature of academic entrepreneurship: *Institutional orders and logics, European Academy of Management* (EURAM) Annual Conference, Dublin, Ireland.

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Tunalıoğlu, M. N., Karataş-Özkan, M., Costanzo, L. and Baruch, Y. (September 2019) *Understanding academic entrepreneurship and diversity through the lens of institutional logics,* British Academy of Management (BAM) Annual Conference, Aston University, UK.

Tunalıoğlu, M. N., Karataş-Özkan, M. and Costanzo, L. (August 2019) *Interacting institutional logics that shape academic entrepreneurship and diversity in the UK*, Academy of Management (AoM) Annual Conference, Boston, USA.

Tunalıoğlu, M. N., Karataş-Özkan, M., Costanzo, L. and Baruch, Y. (June 2019) *Understanding the dyadic relationship between academic entrepreneurship and diversity strands: Interacting institutional logics*, European Academy of Management (EURAM) Annual Conference, Lisbon, Portugal.

Tunalıoğlu, M. N., Karataş-Özkan, M., Costanzo, L. and Baruch, Y. (June 2019) *Academic entrepreneurship and diversity strands: towards social inclusion*, Research Seminar, Brunel University London, London, UK.

Tunalıoğlu, M. N., Karataş-Özkan, M., Costanzo, L. and Baruch, Y. (September 2018) *Gendered nature of academic entrepreneurship ecosystems: Insights from STEMM departments of UK research universities*. Gender Issues in Business, Newcastle, UK.

Tunalıoğlu, M. N., Karataş-Özkan, M., Costanzo, L. and Baruch, Y. (June 2018) *Academic entrepreneurship and diversity through the lens of institutional logics.* European Academy of Management (EURAM), Reykjavik, Iceland.

Tunalıoğlu, M. N., Karataş-Özkan, M., Costanzo, L. and Baruch, Y. (April 2018) *Academic entrepreneurship and diversity through the lens of institutional logics: Research universities in the UK.* SILOS, Southampton, UK.

Research papers-in-progress:

Tunalıoğlu, M. N., Karataş-Özkan, M., Costanzo, L. and Baruch, Y. Extending the boundaries of academic entrepreneurship: demonstrating the instrumentality of new logics for addressing social inclusion, *Technological Forecasting and Social Change* (To be resubmitted in 2021)

Tunalıoğlu, M. N., Karataş-Özkan, M., Costanzo, L. and Baruch, Y. Actions speak louder than words: How do gendered dynamics of academic entrepreneurship influence women academics' response strategies? *Gender, Work and Organization* (To be submitted in 2021)

Tunalıoğlu, M. N., Karataş-Özkan, M., Costanzo, L. and Baruch, Y. Accounting for equality and inclusiveness: Neoliberal policies that are shaping academic entrepreneurship *Small Business Economics (*To be submitted in 2021)

Signature: …….. Date: ……..

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Abbreviations

AE	Academic Entrepreneurship
EPSRC	The Engineering and Physical Sciences Research Council
OECD	Organization for Economic Cooperation and Development
PGR	Postgraduate Research
STEM	Science, Technology, Engineering and Mathematics

Chapter 1 Introduction

The purpose of this chapter is to present an overview of the research and an introduction to the conceptual, methodological, theoretical, practical, and political contributions of this thesis. This chapter begins with the research overview, thesis aims, objectives and research questions. This is followed by a summary of the three constituting papers and an introduction to the theoretical framework and methodological underpinnings of the study. The chapter concludes with the research contributions and the structure of the thesis.

1.1 Background and the scope of the research

My doctoral research focuses on academic entrepreneurship (AE) and social inclusion informed by a transdisciplinary approach drawing on entrepreneurship, diversity management domains within business and management studies, and social inclusion domains within sociology and social policy disciplines. In other words, it seeks to problematize the process of AE in STEM (Science, Technology, Engineering and Maths) departments by considering the diversity strands such as gender, ethnicity, and age/career stage and demonstrate the institutional enablers and barriers for AE.

AE has gained increasing attention in scholarly literature and policy documents, with the emphasis on the impact of applied research for broader society and economy (Patzelt and Shepherd, 2009; Abreu, Demirel, Grinevich and Karataş-Özkan, 2016; Meek and Wood, 2016; Halilem, Amara, Olmos-Penuela, and Mohiuddin, 2017). Academic researchers are highly encouraged to get involved in AE in research-based universities. As some institutions have direct impact on the entrepreneurship process (Gohmann, 2012), for some academic institutions, commercialization of their research findings into innovative ideas is a requirement (Ambos, Makela, Birkinshaw, and D'Este, 2008). In addition to such institutional requirements, individual motivations such as increasing personal income, accessing resources and learning play an essential role for academics to engage in commercialisation (D'Este and Perkmann, 2010).

Inclusion refers to, "the ability to contribute fully and effectively to an organization with a sense of belonging, respect and being valued" (Bell, Özbilgin, Beauregard and Sürgevil, 2011, p. 135) and inclusivity of entrepreneurial ecosystems has been a significant theme in the extant literature (such as Thompson, Purdy and Ventresca, 2017; Brush, Edelman, Manolova and Welter, 2018; McAdam, Harrison and Leitch, 2019). This thesis also aligns well with a recent call by scholars (ibid) for further research on gender and entrepreneurial ecosystems. Acker (2016) defines inequality in organizations as

> "Systemic disparities between participants in power and control over goals, resources and outcomes; workplace decision such as how to organize work; opportunities for promotion and interesting work; security in employment and benefits; pay and other monetary rewards; respect; and pleasures in work and work relations" (p. 443).

Importance of the topic has been further reinforced with an emphasis placed on diversity agenda such as social inclusion of disadvantaged groups for a more inclusive and social society (All Party Parliamentary Group Diversity and Inclusion in STEM, 2018; Nesta, 2019). Acknowledging the complexity and multi-layered nature of the topic and adding emphasis on the importance of diversity and inclusiveness, it is imperative to look deeper into the characteristics of AE process, its types, and the role of university structures and socio-economic impacts of the process for wider diversity implications. Coping with multiple inequality grounds provides an extensive and beneficial ground for social inclusion and diversity in the context of the AE process that has the ultimate objective of making an impact on the economy and society.

Theoretical underpinnings of my research are mainly rooted in institutional logics perspective. In order to investigate the context of academic entrepreneurship at macro, meso and micro levels, institutional logics perspective was utilized to analyse the empirical data in Paper 1 and 2. It is applied to comprehend institutional structures and mechanisms in order to develop a framework for unpacking the relationship between AE and diversity. Institutional orders, associated logics and response strategies of academics and other key actors involved in the process are part of the investigation (Bruton, Ahlstrom and Li, 2010; Dalpiaz, Rindova, and Ravasi, 2016; Purdy, Ansari and Gray, 2017).

In Paper 3, this framework improved by Bourdieu's concept of field (Bourdieu, 1984, 1987; Bourdieu and Wacquant, 1992), which provides an approach to analyse how agents operate in a social and professional context; and Foucault's concept of governmentality (1979, 1982, 2007), that provides an important tool to investigate the way in which people are instructed to govern themselves.

Social inclusion and academic entrepreneurship are emerging subject domains within the entrepreneurship discipline, as highlighted by many scholars in the field (i.e. Halilem *et al*., 2017; Brush et al., 2019; McAdam et *al.* 2019). However, the connection between the two is not well-established. Whereas some studies attempt to focus on only one of the diversity categories (i.e. gender, age, ethnicity, race, class, sexual orientation, disability), this research focuses on multiple diversity categories to demonstrate the complexity and contradictory processes, factoring "interpenetration realities" (Acker, 2006, p. 442) of gender, age and ethnicity. As a result, this thesis aims to problematize the process of AE in STEM departments a transdisciplinary approach drawing on entrepreneurship, diversity management domains and social and demonstrate the institutional enablers and barriers for AE.

The overall aim of this research is to have a better understanding of the role of diversity strands (gender, ethnicity and age/career stage) while investigating AE process in research-intensive UK universities by providing insights from the STEM disciplines. Three qualitative papers are produced to contribute towards this aim (See Chapters 3,4, and 5). The next section explains the research questions and aims that formed these three papers.

1.2 Motivations of the research

This research project started with a scholarly interest in a broad area of entrepreneurship and social inclusion. I was interested to understand what kind of problems faced by entrepreneurs from disadvantaged groups (i.e. disability, gender, ethnicity etc.), how they cope with these challenges in order to be successful, and what factors could cause failure in their businesses. Having an interdisciplinary academic background on political science and sociology, I was particularly intrigued by the possible political and social implications

of such research. I thought it would be significant to make an interdisciplinary connection between entrepreneurship and social inclusion. The lack of research on these subjects triggered my curiosity and during the first three months of my PhD training, and I focused on reviewing the extant literature to this end.

I started to work as a Research Fellow on an EPSRC (The Engineering and Physical Sciences Research Council) funded project, during the first year of my study. I was responsible for designing the empirical study, collecting, analysing qualitative data as well as contributing to writing the project report on academic entrepreneurship in the STEM research base (at University of Southampton) focusing on issues of career development, diversity and inclusivity. Since the research project was conducted at the University of Southampton, I conducted interviews with academic staff from the STEM departments (of the University of Southampton), who are involved in different forms and stages of commercialisation of research including licensing, patenting, spin-offs and consultancy work. I have also interviewed participants who are not interested in commercialising their research in order to understand their motivations for not engaging. In addition to the questions regarding the process of academic entrepreneurship, enablers and barriers, we asked the participants questions related to diversity and inclusion. The questions for the research project were focused on participants' experience of commercializing their own work and the motivation behind their decision-making process. Moreover, I asked them about their opinions on university policies on academic entrepreneurship and whether they receive internal and external support, such as training and mentoring opportunities. In addition, I questioned their perspective and experience on under-represented groups' engagement in academic entrepreneurship.

Consequently, this research project also became a pilot phase of the empirical part of my doctoral study. I have gained more knowledge and experience on undertaking qualitative fieldwork. Being part of this research project reshaped my doctoral project in many ways and it enhanced my knowledge in the field which helped me to identify the relevant research gap. Recruiting participants, conducting the interviews, and analysing data helped me develop a better understanding of academic as well as practical issues involved in a doctoral study. As a result, my supervisory team and I decided to apply a similar approach to my thesis by extending the research and consider this project as a

pilot study for my work. We planned to build a research project that produces three interrelated papers to study social inclusion and academic entrepreneurship in the UK.

As a result, the focus of my research inquiry had narrowed down from a broad area of entrepreneurship and social inclusion to academic entrepreneurship and exploring the role of diversity strands in order to provide socially inclusive work environments. I continued conducting interviews with STEM department staff at University of Southampton. Even though I am not a STEM scientist or an academic entrepreneur; I am woman who lives in a foreign country, in the early stage of her academic career. I believe my socio-cultural background has influenced both my choice of thesis topic and my interpretation of the qualitative data. This view also supports to interpretivist underpinning s of this doctoral study.

> "Multiple knowledges can coexist when equally competent interpreters disagree, and/or depending on social, political, cultural, economic, ethnic and gender factors that differentiate the interpreters" (Guba and Lincoln, 1994, p.113).

In the end of my first year I passed my first progression review by submitting a first draft of the first paper of my thesis which focuses on exploring the relationship between different diversity dimensions such as gender, ethnicity, and age, within the context of entrepreneurship, particularly academic entrepreneurship drawing on synthesis of the literature. This interdisciplinary study puts importance on the intersectionality of these diversity categories to explain and explore different kinds of commercialization processes at university level such as patents, spinouts, licenses and consultancy work. Various business journals were scanned in order to have an inclusive understanding of academic entrepreneurship and intersectionality of diversity elements in order to identify relevant research gaps. (see Table 1-1).

Table 1-1 Progression Reviews (based on PGR progression reviews guideline)

Progression Reviews	**Criteria for Submission**	**Examination Dates**
First Progression Review	• Developing an adequately detailed plan of work to enable the research degree to be completed within the allowable registration period • Defining the preliminary objectives and scope of the research project adequately • Making an appropriate survey of the relevant literature and demonstrated an ability to make critical evaluation of published work • Proving an appropriate knowledge and understanding of applicable research methods • Discussing the ethical implications of their research with their supervisory team and can articulate how these are incorporated into their research plans.	27/06/2017
Confirmation of Doctoral Candidate	• Becoming proficient in the special field of research involved • Achieving success at PhD level given adequate motivation and perseverance.	14/06/2018

	• Submitting an overview of the research problem and rationale for the project, a substantial literature review and well-developed plans for fieldwork and data analysis	
Third Progression Review	• Developing an adequately detailed plan of work and is on track to enable the research degree to be completed within the allowable period of candidature. • Submitting a first draft of thesis that outlines the thesis structure, summarises work that has been carried out to date, summarises work still to be done, outlines a plan for submission of the thesis	17/06/2019

During my second year, I have extended my research to five more research-oriented universities in the UK (based on the University League Tables 2018 [1]), including University of Oxford, University of Bristol, University College London, University of Cambridge and Imperial College London to my research project. Primary analysis indicated, collecting data from the other actors of the AE ecosystem, therefore apart from STEM department academics, I decided to interview technology transfer officers and use policy briefs as secondary data. Before submitting a draft of an early version of this research to the Confirmation Committee, I had conducted 64 interviews (55 academics, 9 technology transfer officers). The aim and objectives of the research had become more refined and

[1] https://www.thecompleteuniversityguide.co.uk/league-tables/rankings?

the wording had significantly changed when I passed my confirmation of doctoral candidate at the end of my second year (see Table 1-1).

I have presented early versions of the first paper in the SILOS conference at University of Southampton and, European Academy of Management 2018 Conference. I have received feedback concerning the level of analysis, the importance of the interplay at different levels, and relational emphasis on AE and social inclusion which guided me in reformulating the research objectives. As a developed full paper, I have presented the first paper in the Academy of Management, European Academy of Management and British Academy of Management Conferences in 2019. On the other hand, I have presented the second paper from my thesis in workshops that are organized in Newcastle University (GIBS) and Brunel University. The salient issues emerging out of the discussions at these workshops were taken up by the, European Academy of Management Doctoral Colloquium in 2019, which provided for the furtherance of the discussion. Therefore, it is important to stress that the research aims, and questions have been shaped (see 1.3) in dialogic exchanges mainly through supervisory meetings and through discussions with other scholars at seminars, workshops, and academic conferences I have attended throughout my PhD studies. Finally, at the end of my third year, I submitted an early version of this thesis to my supervisors and passed my third progression review (see Table 1-1).

1.3 Thesis aims and research questions

This study aims to unpack the process of academic entrepreneurship from a diversity and social inclusion perspective. In order to address this broad aim, three sub-aims have been developed and are addressed in the three papers that formed this thesis. First aim of the first paper is to investigate the role of institutional logics that are instrumental for socially inclusive AE environments and whether STEM cultures and AE processes are conducive to diversity and inclusiveness lie at the heart of this inquiry. Building on this, the second paper's research aim focuses on gender. The aim is to explore the gendered dynamics of institutional orders and logics that condition women academics' engagement in AE. Lastly, the third paper of this study seeks to explain the influence of macro- institutional

forces and mechanisms that reshaped the AE field. Table 1-2 illustrates these aims, the research questions of the papers and the targeted journals for submitting the articles.

Table 1-2 Thesis aims, paper titles and research questions

Paper Title	Aims	Research Questions	Chapter	Journal Submission
Extending the boundaries of academic entrepreneurship: Demonstrating the instrumentality of new logics for addressing social inclusion	1. To investigate the role of institutional logics that are instrumental for socially inclusive academic entrepreneurship environments.	1. What logics do shape and characterize the process of AE as engaged by academics with diverse profiles? 2. How does the interplay of logics shape actions in creating and sustaining socially inclusive environments for AE?	3 (Paper 1)	Technological Forecasting and Social Change (In the process of submission)

Actions speak louder than words: How do gendered dynamics of academic entrepreneurship influence women academics' response strategies?	2. To investigate the gendered dynamics of institutional orders and logics that condition women academics' engagement in academic entrepreneurship	1. What are the key institutional orders in an AE ecosystem, which presents differentiated logics for women scientists? (Meso-level) 2. How do women scientists/academics respond to these logics in navigating through the ecosystem, tackling issues of inequality? (Micro-level)	4 (Paper 2)	Gender Work and Organization (In the process of submission)
Accounting for equality and inclusiveness: Neoliberal policies that are shaping academic entrepreneurship	3. To understand the role of neoliberal policies reshaping macro-institutional processes to create an inclusive academic entrepreneurship environment	1. How neo-liberal policies implemented by macro-institutional forces transformed academic entrepreneurship in the UK? 2. What are the policy insights that can create an inclusive academic	5 (Paper 3)	Small Business Economics (In the process of submission)

		entrepreneurial culture?		

1.4 The three papers

Building on institutional logics theoretical lens, which is part of the development of institutional theory (Scott, 2012; Thornton and Ocasio, 2008), the substantive three papers that form this PhD thesis, present a multi-level analysis on AE, social inclusion and diversity. In order to present a wider and more comprehensive understanding of the entrepreneurial process, this thesis examines entrepreneurial ecosystem and entrepreneurs in a broader context (Karataş-Özkan, 2011, Shepherd, 2011).

First paper takes a macro-level analysis that sets the tone of this research project by examining social inclusivity of the AE environment in STEM departments and offers effective policies and regulations that would lead to a socially inclusive AE work environment. Second paper focuses on the role of gender on the AE ecosystem by taking perceptions and experiences of STEM academics' and technology transfer officers' who are part of the AE ecosystem into consideration, hence taking a meso-micro level of analysis. The complex relationships between multiplicity of actors and institutions investigated further in this paper by using institutional orders, logics and exploring the response strategies academics in the AE ecosystem. This takes the logics debate presented in the first paper as step further by delineating gender-specific dimensions of these strategies and actions of STEM scientists. Impact logic has a dual nature (financial and societal impact) as it was presented in both the first and the second paper, the third paper discusses the impact of neoliberal policies on the AE environment. By utilizing Foucault's governmentality and Bourdieu's fields, this paper aims to explain multilevel interactions and interplay between macro-institutional forces and micro-individual agency. Overall, these three related but separated papers contribute to a multi-layered

understanding of academic entrepreneurship and social inclusion phenomena. Following sessions provide the rationale for the three papers and highlights their contribution to the AE and social inclusion literature.

1.4.1 First paper

The first paper of this research project is currently in the process of submission to *Technological Forecasting and Social Change* Journal, providing a general understanding of the characteristics of AE process and social inclusion through the lens of institutional logics theory.

This paper defines AE broadly as the commercialization of the university research process by generating a wider economical and societal impact and argues that the institutional environment has a direct impact on the process of AE. Building on contemporary discourse on AE, it focuses on translating research base to impactful research outcomes (Siegel and Wright, 2015). Since AE impacted by disciplines, this research project focuses on the AE process of STEM departments due to these departments' high-level involvement in commercialization as a result of university-industry cooperation (Haeussler and Colyvas, 2011; Karataş-Özkan and Chell, 2015). In the recent scholarly literature and policy documents (i.e. NESTA 2018, NSTC 2018) inclusion of underrepresented groups is highlighted in order to create a more inclusive and socially sustainable society. Even though, various diversity strands have been investigated in the expanded entrepreneurship literature (Koning and Verner, 2009; Karataş-Özkan, 2017; Guzman and Kacperczyk, 2019), there is a dearth of research on multiple diversity categories in the context of AE.

Institutional logics theory is applied in order to comprehend the complex structure of the academic entrepreneurship and intersectionality of diversity. Therefore, this paper aims to present the logics that shape the process of AE as engaged by academics from different diversity groups, demonstrate the role of logics and action on creating socially inclusive AE environments, and introducing effective policy insight for university management teams and other stakeholders. For this end, the first paper identifies the core institutional logics (Upton and Warshaw, 2017), introduces new forms of institutional logics and

demonstrates the value of institutional pluralism in achieving the intended objectives of academic entrepreneurship.

Apart from expanding empirical and theoretical literature, the findings provide essential policies such as raising awareness to impact outcomes of AE, supporting socially inclusive entrepreneurial mindsets, addressing the structural and functional tensions that promote socially inclusive work environments and improving resource access for AE by funding new platforms and facilitating innovative learning methods.

1.4.2 Second paper

The second paper of this research project is currently in the process of submission to *Gender Work and Organization* Journal, demonstrates institutional orders and institutional logics that shape AE ecosystems, which lead to gender based differentiated responses by academics.

As the gendered nature of entrepreneurial ecosystems is an underdeveloped topic, this paper focuses on the factors that condition women academics' engagement in AE in STEM fields of research-oriented universities in the UK. Developing effective entrepreneurial ecosystems for AE is highly instrumental for the outcome of commercialisation activity with socio-economic and political implications (Malecki, 2018). We underline the significance of institutional orders and the logics that emerged from the institutional context of AE. As AE is a complex process that harbour interplay of multiple co-existing and conflicting institutional logics from which academics, as key actors of the ecosystem, develop different strategies (See 1.4.1). Focusing the gendered nature of the entrepreneurial ecosystems, we have addressed the following questions in this paper to present a multilevel analysis. At meso level we asked "What are the key institutional orders in an AE ecosystem, which presents differentiated logics for women scientists?" and at a micro level we questioned "How do women scientists/academics respond to these logics in navigating through the ecosystem, tackling issues of inequality?".

This paper argues that the key institutional orders include university, industry, family and educational establishment. Associated logics are identified as societal impact logic, diversity logic, profession logic, science logic and market logic. Drawing on a qualitative

study of 64 interviews with STEM department academics and Technology Transfer Officers of research-based UK universities, our findings reveals that, women scientists cope with varied institutional logics that institutional orders present by developing responses (micro level strategies) such as reinforcing their position as academics rather than academic entrepreneurs; shifting the focus towards academic reputation and impact; legitimising AE at the intersection between science and market logics; challenging societal impositions of domestic roles and affecting change in schools/educational establishments as role models.

This paper offers empirical and theoretical contribution to the gendered nature of AE ecosystem literature by explaining the underpinning institutional forces and demonstrating the link between these institutional dynamics and agentic responses of the key actors (see Gehman, Lounsbury, Greenwood, 2016; Ocasio, Loewenstein, and Nigam, 2015). Identified key institutional orders and associated logics influences women academics' responses in an AE ecosystem. Women have agency in these circumstances, and they develop agentic strategic responses (McAdam et al., 2019). However, these micro strategies have limited effect within the ecosystem, without a supportive institutional environment. In addition, our multi-level analysis clearly shows that further collaboration between meso and micro forces within the AE ecosystem is required to cope with women's underrepresentation in STEM. Apart from theoretical and empirical contributions, this research paper offers policy interventions for organizations and recommended career strategies for women.

1.4.3 Third paper

The last research paper of this PhD thesis is designed to present an overview on how AE is affected by macro-institutional forces (i.e. governments and funding bodies). By exploring the influence of neo-liberal policies in the UK higher education system, this paper aims to provide implications for policy makers and recommendation to academic entrepreneurs in order to create an inclusive AE work environment. This paper is in the process of submission to *Small Business Economics*.

In this paper we demonstrate the multi-layered nature of inclusive AE by showing how the discourse of AE and its practise have emerged. Taking the neoliberal policies that affected this field into consideration and the dispositions of the actors (academic entrepreneurs), we argue that equality of opportunity and equality of outcome are the two premised principles in the field (Shane, 2000). The question of who has access to or gain experience from entrepreneurial opportunities is still relevant and create inequality of opportunity (Shane and Venkataraman, 2000; Baker and Powell, 2016). Foucault's governmentality allows us to critique neo-liberal policies and, put these debates in the context of historical institutional forces that have not only activated neo-liberal policies but also encouraged some of the actors to change the rules of the game (Foucault, 1982; Lemke, 2002).

Building on the idea of broadening and conceptualizing the concept of entrepreneurial opportunity (Baker and Powell, 2016), we propose reconceptualizing the AE culture. In order to empower academic entrepreneurs from disadvantaged groups, we can apply the idea of carrying entrepreneurial motivation beyond financial gain and building a system that supports the community of people, not just the individuals (Powell and Baker, 2017). At this juncture Bourdieu's notion of field provides a systemic approach to identify the specific forms of capital that operate within a field (Bourdieu, 1987). Capitals exist to individual agents who are governed by the logic of the field as organizations draw the boundaries of individual agency (Tatli, Özbilgin and Karataş-Özkan, 2015).

Through carefully identified and presented policy insights, we advocate for inclusive AE through this research. Our findings suggest, in order to achieve inclusivity in the AE ecosystem, institutional support that enables diverse and international collaborations, improving research evaluation process and redesigning impact agenda is essential. By cultivating a community that includes under presented groups such as early stage careers, women and ethnic minorities, a more egalitarian and inclusive AE environment can be formed. In addition, generating stronger and effective communication with potential partners and other stakeholders will ensure noticeable change within the AE ecosystem.

1.5 Theoretical frameworks

1.5.1 Institutional orders, logics, and response strategies

Theoretical development is essential in order to improve the scholarly field of entrepreneurship (Zahra, 2007). The application of institution theory is accepted to be useful in entrepreneurial research (i.e. Shane and Foo, 1999; Ahlstrom and Bruton 2002), because of the complex nature of the process of entrepreneurship and its relational dimensions. Since institutional theory perspective is highly useful to explore the entrepreneurial process, it is expected to implement a deeper understanding into the characteristics of the academic entrepreneurship process, its types, and the role of university structures, socio-economic impacts of the process and to expose its relationship on the importance of diversity and inclusiveness.

Therefore, this three-paper thesis followed the institutional logics perspective of the institutional theory (Friedland and Alford, 1991; Thornton and Ocasio, 1999; Thornton, Ocasio and Lounsbury, 2012) to address the motivations, enabling factors and challenges that STEM academics from different diversity groups overcome in the AE ecosystem. In this research, institutional logics are accepted as a theory and method of analysis that allows researchers to examine the influence of culture on the behavior of social actors at a societal level (DiMaggio, 1988; Thornton and Ocasio, 2008). Friedland and Alford defines institutional logics as "material practices and symbolic systems through which individuals and organizations produce and reproduce their material subsistence and provide meanings to their space and time experiences" (1991, p.243). Thornton and Ocasio extend and define this definition of institutional theory as:

> "Socially constructed, historical pattern of material practices, assumptions, values, beliefs and rules by which individuals produce and reproduce their material subsistence, organize time and space, and provide meaning to their social reality" (Thornton and Ocasio, 1999, p.804).

Plurality of logics is an established topic in scholarly research (e.g Greenwood, Raynard, Kodeih, Micelotta, and Lounsbury, 2011; Martin, Currie, Weaver, Finn and McDonald, 2017), with many academics researching multiplicity of institutional logics (Zellweger,

Richards, Sieger and Patel, 2016). However, logics are not always compatible, and when different logics interact with each other they can promote conflicting values and goals (Pache and Santos, 2010; Jaskiewicz, Heinrichs, Rau and Reay, 2016) and competing logics could co-exist if the development of a collaborative relationship is maintained (Reay and Hinings, 2009).

In order to unpack this definition and delineate the underlying assumptions of institutional logics, it is essential to investigate the root construct, which is *institution*. Institutions generate a logic that provides meaning to the practices organisations and individuals engage in, forming the" laws of motion" of order (Mutch, 2018, p. 244). These orders are conceptualised as institutional orders in institutional theory, which represent institutional domains possessing distinctive logics (Thornton *et al.,* 2012). Therefore, by forming the starting point for logics, they stem from these institutional orders. Hence, institutional orders define sources of legitimacy and agency underpinned by value systems and meanings; and, therefore, conditioning logics that shape the form and nature of strategies and actions individuals take (Ertuna, Karataş-Özkan and Yamak, 2019).

The role of institutions in shaping collective action is highlighted by new institutional theorists (see DiMaggio and Powell, 1983; Scott and Meyer, 1983). Institutions are viewed as shaping the" preconscious understandings that organisational actors share" (DiMaggio, 1988, p.3), thereby concealing possibilities outside those understandings (Cardinale, 2018). However, role of agency is also important in understanding individual action within institutions. This debate on actors' embeddedness with their ability to change or maintain institutions has been at the heart of institutional theory and associated scholarship (Seo and Creed, 2002). Smets and Jarzabkowski (2013) argue that intersecting logics are reconstructed by individuals who perform their work in the institutional complexity. Neglected situatedness of agency and actors in the workplace can be explained by understanding reconstruction of institutional logics and individuals' contradictory institutional practices (Delmestri, 2006; Smets and Jarzabkowski 2013), which connects "the micro-level activities and macro-level effects" of people's actions (Smets and Jarzabkowski, 2013, p.1304)

As a result, in this research institutional logics theory has been applied to comprehend complexities of the subject and develop a framework for unpacking the relationship between academic entrepreneurship and diversity. Institutional orders, associated logics and response strategies of academics and other key actors involved in the process as part of the investigation. In mobilizing the institutional logics lens, this thesis seeks to understand how different kinds of institutional influences create enablers or barriers for AE, as experienced by diverse groups of academics. The salience of one logic over others or their interactive capacity is instrumental in shaping the process of AE.

1.5.2 Bourdieu's concept of field

French sociologist Pierre Bourdieu aimed to develop an understanding for reflexive sociology (Bourdieu, 1987; Bourdieu and Wacquant, 1992) in order to examine the practical logic of social action and analyse relations of power by linking micro to macro level foundations (Power, 1999). Bourdieu offers several effective framework tools to explore his arguments, among which, field and capital (Ozbilgin and Tatli, 2005), will be discussed in this section, to understand political decision-making process and managerial interpretation of institutional complexity.

Capital could be described as knowledge people gain that can provide an advantage in a specific field and a wide variety of power resources (Bourdieu, 1984, 1987, 1998; Bourdieu and Wacquant, 1992; Tatli et al., 2015). According to Bourdieu, the main types of capital are economic, social, cultural and symbolic capital. Whereas, economic capital as the most straightforward and transmittable capital could take forms as money, investment and property; social capital refers to the social network of an agent and it could be resources that are available to an agent through their social network, in other words serve as informal professional relations. Cultural capital could be explained as agents' cultural knowledge that is accumulated during their life. It has three distinctive stages (embodied, objectified, and institutionalised). In addition, symbolic capital refers to reputation and could be utilized to gain advantages and prestige in different settings (Bourdieu, 1984, 1987,1998; Swartz, 1997; Power, 1999).

In the AE context, apart from earning livelihood, economic capital could be funding opportunities for researchers. Social capital, on the other hand, can be accepted as networking and creating connections, especially for early-stage careers in the AE ecosystem, which is an essential tool. Among the three distinctive stages of cultural capital institutionalised cultural capital is a useful concept to explain the value of academic entrepreneurship, as it refers to specific qualifications of an agent. In the AE environment, the specialized knowledge on commercialization communicates in a way to generate objective values for academic entrepreneurs. Symbolic capital could help academics get promotion, gain academic reputation or receive funding to carry on research; and help them to commercialize their research outputs due to their specialization in a particular subject.

However, "A capital does not exist and function except in relation to a field" (Bourdieu and Wacquant, 1992, p.101). Field can be understood as the social and professional context in which agents operate, positioned and affected by the interaction between institutions and practices (Tatli et al., 2015). Even though each field has different logic of practice, all fields are hierarchical and competitive (Ayling, 2019). Individuals obliged to compete with the relative power they have within the field, through which their positions established (Bourdieu, 1998). The positions of agents in a field is structured according to the different types of economic, social, cultural and symbolic capitals they hold. Different forms of capital are valued differently in different fields and fields are structured by their relations to other fields (Bourdieu and Wacquant, 1992). For example, national budgets for research funding are determined in the political field. Following this logic, the field of politics possesses power that influences the value of capital within a field.

Field is a useful concept while studying AE and analyses the linkages between institutions and agents. Both agents and institutions continuously struggle due the regulations and rules of the field (Bourdieu and Wacquant, 1992). As field construct can be used not only to explain the influence of the policies of institutional macro forces, but also to understand the effect of organisations at meso level and to examine the micro level strategies of the agents within the AE ecosystem. With the rise of neo-liberal policies in the UK, changes in the policy field of higher education caused alterations in internal

management structures at universities. Expectations from academics are redefined, hence the changes in academic profession culture influenced the AE environment.

1.5.3 Foucault's concept of governmentality

Michel Foucault's theories on power and knowledge has been accepted as an important part of political and social life, as it has altered multiple disciplines such as sociology, history, philosophy and political science. In his book *Security, Territory and Population*, based on the lecture series he delivered between 1977-1978, he explained the relations of power among the state and its people as the art of power (Foucault, 2007). Similarly, in the *Subject and Power* (Foucault, 1982), he argued we need to start analysing social life by looking at power dynamics. He argues that everybody is subjected to power and nobody can be completely free in a society. Normalised power motives us to follow a certain set of rules, it constructs our view of the word and, shapes our beliefs, values and decisions. However, knowing that we are subject to power, we can be more autonomous. That is why power knowledge is important (Foucault, 1982; Sokhi-Bulley, 2014).

Power could be a difficult concept to grasp (Foucault, 2007). Foucault identified three distinguished forms of power: sovereign power, disciplinary power and governmentality (1982, 1991, 2007). The concept of governmentality is developed, by the French philosopher, to explain the fundamentals of power relations that state exercise to control the population. He argues that we live in an era of governmentality since the 18th century (in the West), as the state started to transform itself by new techniques of governing for survival (Foucault, 1979; Joseph, 2010). Governmentality, as "conduct of conducts" (2007, p.88), focuses on the problem of state and population and questions how the government performs the art of governing (Foucault, 1979).

Governmentality combines the terms of government and rationality. It encompasses the rationality to manage the activities of agents, therefore the combination of the practice of governing and rationality of government makes governing possible. In other words, the art of governance practices rationality as a way of governing, as it structures the possible field of action of people beyond leading but mainly directing. While Foucault's approach pushes the limits of traditional power, it argues that in the liberal societies' states

produce more subtle ways of exerting power (Foucault, 1982, 1991; Joseph, 2010). This approach raises the question of how institutions and practices operate in the way they do? (Rose, O'Malley and Valverde, 2006). The Foucauldian aspect refers to how people are instructed to govern themselves by shifting power from the centre and distributing it to the population. In other words, the state orchestrates the way people think and act. It focuses on the efficiency of a population and how to manage it by creating norms and standards that encourage self-governance. This concept of creating self-governed people and suggesting that is the natural thing for the people to do, aligns with neo-liberal policies (Foucault, 1979). Ultimately, minimizing the agent's reliance on state resources serves as a form of neoliberal subjectification (Foucault, 1982).

Consequently, in liberal settings, states implement new methods to practice power through the network of institutions, practices and procedures (Lemke, 2002; Joseph, 2010). Foucauldian aspect argues that under neo-liberal reforms, market logic was presented as a natural operation as a result of moving away from centralized government activities that limited state's interference. With neoliberal governmentality, values and norms of the market such as being competitive, resilient, flexible, risk taker, and innovative extends to other areas of social life, reflecting on individual characteristics. Agents are expected to adopt above-mentioned entrepreneurial traits in a society (Leander and Van Munster, 2007).

This section focused on governmentality as this concept is useful to explain the influence of neo-liberal policies in higher education, which affected the AE environment in the UK. Relevancy of governmentally lies within its substantial capacity to problematize and improve neoliberal policies (Rose et al., 2006). A contextualised understanding of the neo-liberal policies underpinning the governance could be instrumental in creating an inclusive AE environment.

1.6 Methodology

This three-paper thesis follows an exploratory qualitative research design informed by interpretivist stance (Neuman, 2000; Myers, 2019). Qualitative researchers use philosophical assumptions that are embedded in interpretive frameworks (Creswell,

2013) and these ever-expanding philosophical assumptions (ontology, epistemology, axiology, and methodology) are accepted substantially in qualitative research (Denzin and Lincoln, 2011). The selection of this paradigm is informed by the underlying philosophical assumptions as interpretive projects often used to represent marginalized or underrepresented groups such as gender, race, class, religion and sexuality (Ladson-Billings and Donnor, 2008).

Two main criteria have been instrumental in framing the sample and participants: a) STEM department members and technology transfer officers from a research-oriented university in the UK and b) academics from different gender, ethnicity and age groups. I have interviewed academics who are both involved and not involved commercialization process at the university in order to question their motivations and decision-making process. For this project only gender, age and ethnicity were taken into consideration as diversity elements, due to the difficulties to reach out to academics from other underrepresented groups, such as sexual orientation or disability. Purposeful sampling technique (applying the above-mentioned criteria) was employed while selecting interviewees (Miles and Huberman, 1994). Participants were reached out via e-mail and interviews were conducted either face to face or over the phone.

Overall, sixty-four semi-structured interviews have been conducted with fifty-five STEM department academics from highly ranked, research-oriented universities in the UK (based on University League Tables 2018)[2] and nine Technology Transfer Officers (TTO) from these respective universities. Among the top ten research universities, six universities are included in this research: University of Oxford, University of Southampton, University of Bristol, University College London, University of Cambridge and Imperial College London.

A qualitative interview protocol that questions the process of academic entrepreneurship and the role of diversity in the STEM workforce, was developed for this purpose. In addition, ethical procedures of the research governance process were followed and

[2] https://www.thecompleteuniversityguide.co.uk/league-tables/rankings?

before each interview participant information sheets were given, consent forms were collected. In the end of each interview debriefing documents were provided to explain the objective of the research. In order to maintain research integrity, all files containing any personal details of the participants are used anonymously and all responses were kept confidential in order to maintain research integrity (Flick, 2009). The collected data is processed to reveal knowledge, based on the ontological and epistemological assumptions by addressing the research questions and research methodology (Myers, 2019).

1.7 Research contributions

This research project makes several contributions to the knowledge at both paper and thesis level. At the paper level, the first paper extends the boundaries of AE by demonstrating the instrumentality of new instructional logics for addressing social inclusion. The paper offers an empirical and theoretical contribution to the existing literature. First, it investigates the role of coexisting fundamental institutional logics (Nicolini, Delmestri, Goodrick, Reay, Lindberg and Adolfsson, 2016; Upton and Warshaw, 2017), such as profession, science and market logics and explain how these dominant logics enable academics to make sense of what they are doing in practicing AE, and also in reflecting on their motivations, enablers or constraints in the process. Second, it introduces two new institutional logics, diversity and impact logics, that are essential in capturing value through AE for addressing social inclusion. This paper argue that the intersection of multiple logics may facilitate AE process in universities, as it promotes the demands of different stakeholders such as policy makers and research councils (Mair, Mayer and Lutz, 2015), by offering a conceptual framework that contributes to the theory on institutional logics from a pluralism perspective and establish a ground for the need for policy changes on these issues. The second paper focuses on the gendered nature of the AE ecosystem (see Brush *et al.,* 2019; McAdam *et al.,* 2019) by examining institutional orders and institutional logics. It identifies the key institutional orders (university, industry, family and educational establishment) and the institutional logics (profession, science, market, diversity and impact) that shapes gender based differentiated agentic responses by academics in STEM departments. These institutional forces and associated

strategies could play a significant role in creating an inclusive entrepreneurial ecosystem (Stangler and Bell-Masterson, 2015), in AE. Lastly the third paper of this research project focuses on policy implications for change for equal and inclusive environment in academic entrepreneurship. It identifies the AE processes that reshapes the institutions and institutional changes.

At the level of advancing academic research, contributions of my doctoral research include academic, practical and policy implications. At the policy and practice level, if universities want to attract more talent and generate academic entrepreneurs, new ways of promoting the outcomes of entrepreneurship within the university could be useful. Considering the importance of the unique and diverse environment of the academic population, universities should provide support, and invest in people when needed. Such support mechanisms should be underpinned by the requirements and associated practices of several institutional logics, such as profession, science and market logics, which collectively affect the process. Senior management of universities should be more responsive to societal impact and improving diversity agendas, which cater for the needs for such diverse groups of academics, and design institutional support structures that recognize the interplay between logics.

Calling upon these multiple theoretical, practical and policy contributions, I argue that the AE process is still a neutral territory for disadvantaged groups. Coexistence of established logics and two new logics that emerged from my research demonstrate the importance of institutional dynamics governing the relationship between such inequality and AE. Moreover, the findings of this research reveal that there is a need for developing an effective and more inclusive AE ecosystem for academic entrepreneurs as an important framework to unpack the diversity dimension for AE. Impact logic at the societal level can support change for equality and inclusiveness of the AE process, which could improve the level of engagement of academics from different diversity groups.

Building on these contributions, AE is presented to be influenced by multilevel interactions (micro-individual, meso-relational and macro-field forces of academic entrepreneurship) through these three papers. The first paper shows the influence of macro level perspective of AE process and social inclusion and sets the scene of the

prevailing instrumental institutional orders. The second paper focused on the agentic responses of academics on micro-level and the gendered nature of AE ecosystem as social processes on meso-level. The third paper shows the interplay between macro and micro levels, in shaping the process of AE and demonstrating the influence of impact logic.

1.8 Structure of the thesis

This thesis follows the three-paper PhD route and it consist of six chapters. The order and the details of each chapter is presented in Table 1-3 below.

Table 1-3 Thesis Structure

Chapter No	Chapter Title	Chapter Description
Chapter 1	Introduction	This chapter provides an overview of the thesis, provides the research aims and research questions, explains the rationale for the three papers, provides the theoretical framework, philosophical and methodological approaches of the thesis and presents overall structure of the thesis
Chapter 2	Methodology	It outlines the research setting of this doctoral study and provides detailed information on selected philosophical paradigms, data sources, data collections and data analysis procedures. It also presents the trustworthiness of the qualitative work and ethical considerations.

Chapter 3	Paper 1 Extending the boundaries of academic entrepreneurship: Demonstrating the instrumentality of new logics for addressing social inclusion	These three substantive papers containing distinct research contributions represent the core of the thesis. Even though they are self-contained academic papers, they are related and produced through one overall project; this PhD thesis. Each chapter presents one paper that includes its own introduction, literature review, methodology, finding, discussion, and conclusion sections. (See 1.3)
Chapter 4	Paper 2 Actions speak louder than words: How do gendered dynamics of academic entrepreneurship influence women academics' response strategies?	
Chapter 5	Paper 3 Accounting for equality and inclusiveness: Neoliberal policies that are shaping academic entrepreneurship	
Chapter 6	Conclusion	This last chapter provides conclusions for the overall thesis. By revising the

		research questions, by the light of findings of the three core papers of the thesis, it also includes a summary of this PhD work, assess the contributions, limitations and provide suggestions for future research.

1.9 Chapter summary

This chapter offered an introduction to the research, research aims and approach of this thesis. This doctoral study seeks a better understanding of the relationship between AE, social inclusion and diversity. First, the research gaps to be addressed were identified and research aims, and research questions were introduced. Second, a summary of the three interrelated papers that forms this thesis presented. This was followed by a section that provides the theoretical framework and after that an overview of methodology of this research was presented. The chapter concluded with a discussion of key academic, practical and policy implications of this PhD thesis as a whole and an outline of the thesis structure. The ensuing chapter explains the research methodology underpinning the current study, with paradigmatic assumptions leading to the research approach, research design, data collection and data analysis.

Chapter 2 Methodology

2.1 Introduction

The aim of this chapter is to provide an account of the research methodology of this doctoral study. Each paper in this thesis has its own methodology section, which explains the processes of data collection and analysis for that particular paper, with an underpinning research approach. However, this chapter gives a more detailed account of methodological matters underpinning this research. In essence, this is an explorative qualitative study, informed by interpretivist paradigmatic stance as a research philosophy. The focus of the thesis is on academic entrepreneurship and social inclusion by problematizing the academic entrepreneurship process in STEM departments, taking major diversity strands such as gender, ethnicity, and age/career stage into consideration from an institutional theory perspective. While there are some qualitative studies on social inclusion in this subject domain (i.e. Ezzedeen and Zikic, 2012; Parsons and Priola, 2013; Sattari and Sandefur, 2019; Dennissen, Benschop and Van der Brink, 2019), "the lack of more nuanced understanding of how, how much and why academics engage in AE activities and how their environment influences the extent of AE they undertake" (Davey and Galan-Muros, 2020, p.2), has encouraged me to apply qualitative methodology to investigate this phenomenon at institutional, organisational and individual levels. Building on Gartner and Birley's (2002) argument on how qualitative research on entrepreneurship can generate insights on public policies that promote and regulate entrepreneurial activities, this qualitative approach and the nature of research problem have entailed interviews and thematic qualitative data analysis as data production processes and methods. Writing up the papers and the thesis was an integral part of the process, which led to reporting findings in three papers (see Chapter 3, 4 and 5).

This chapter is structured in the following way: It begins with outlining the main philosophical paradigm, with its key assumptions. After explaining the rationale for choosing the interpretivist approach for three papers, qualitative research design is introduced. Then, sampling technique and actual sample are outlined. This is followed by presenting the methods of data collection and analysis with details of the procedures

involved. The chapter then discusses the ethical considerations made and precautions applied in this research. The final section of the chapter evaluates the trustworthiness of the current study, using quality criteria for qualitative research.

2.2 Research philosophy

2.2.1 Relevance of philosophical paradigm

The design of a research begins with the selection of a topic and determining the philosophical paradigm. The quality of management research is situated by the researcher's ability to process the philosophical assumptions from start to finish of the research inquiry (Easterby-Smith, Thorpe and Jackson, 2012), thus, it is important to establish the philosophical paradigm of the research so that the underlying assumptions and methodological matters can be understood. A paradigm can be described as the complex relationship embedded in the multiple concepts within the data (Corbin and Strauss, 2008), and sometimes termed as research philosophy (Denzin and Lincoln, 2011). There is a historical debate regarding the nature of social world in social sciences. Scholars from different schools of thought argue that these philosophical perspectives and underpinning assumptions can sometimes overlap or contradict with each other (Patton, 2015). In order to understand such debates and explain the rationale for the selected paradigm for this research, alternative inquiry paradigms and philosophical assumptions should be grasped by qualitative researchers.

Every research is based on some philosophical assumptions about what social reality is and how knowledge could be obtained to understand such reality. These assumptions, mainly ontology, epistemology and axiology form the core of different research paradigms and approaches. In brief, ontology is our assumptions about the nature of being/reality; deals with nature of their existence (Duberley, Johnson and Cassel, 2012) and examines various ways of conducting reality (Denzin and Lincoln, 2011). There are different meaning and assumptions in ontological positioning. Epistemology is the "study of the criteria by which we can know what does and does not constitute scientific knowledge" (Duberley *et al*.,2012, p.16). In other words, epistemology is our assumptions about the nature of knowledge and knowing; it refers to how we know and focuses on

analysing the nature of the knowledge and in which way knowledge is evaluated (Maxwell, 2011). Epistemology could be a significant tool to formulate appropriate question and could help the researcher to find reasonable answers from different forms of reality (Soini et al.,2011). Axiology is about the values of the researcher and how these values are implicated in their approach of researcher's engagement with the research participants and process. Its importance lies in how our values affect the way in which we conduct our research findings (Lee and Lings, 2008). Consequently, these assumptions help the researcher to build a research paradigm, which leads to methodology (as methodology includes research approach/design, data collection and analysis methods as well).

The process of methodological engagement constituted by philosophical underpinnings is crucial for explicating data collection and analysis methods in any qualitative study. Therefore, methodology of a research encapsulates both our philosophical assumptions and methods (Duberley *et al*.,2012), and becomes our consequent approach to problem solving and inquiry strategy. These paradigmatic assumptions have a significant effect on the way we conduct our research, what we see and interpret as data and how I write up the research thesis (Cunliffe, 2010; Cope, 2011).

Three common paradigms in our disciplines (mainly organization and business/management studies) are usually acknowledged as conventional (positivist) paradigm, critical (emancipatory) paradigm and interpretivist (social constructivist as its sub-paradigm) paradigm (Neuman, 2000; Lincoln and Lynham, 2011). Each paradigm involves different ontological, epistemological and axiological assumptions and thus, deals with a different nature of a social reality, by applying different epistemological approach. In other words, the nature of the knowledge is shaped by the researcher's assumptions, set of beliefs, frame of reference. The alternative inquiry paradigms and philosophical assumptions (extracted from Guba and Lincoln, 1994; Saunders, Lewis and Thornhill, 2009; Lincoln and Lynham, 2011) are presented in Table 2-1.

Table 2-1 Alternative inquiry paradigms and philosophical assumptions

	Conventional (positivist)	**Critical (emancipatory)**	**Interpretive (social constructivist)**
Ontology	Realism: Reality is assumed to exists but to be imperfectly apprehendable because of the flawed human nature.	Critical or historical realism: Realities are socially constructed entities that are under internal influence. Operates in a contextualized historical, social and cultural world.	Relativism: Realities are comprehendible in the form of multiple, intangible mental constructions. Constructions are alterable as are their associated realities (Guba and Lincoln, 1994).
Epistemology	Dualist and/or objectivist: The investigator and the investigated object are assumed to be independent entities; investigator studied the object without influencing it.	Subjectivist: Mediated by values, driven by the study of socio-historical structures, freedom, oppression, power and control.	Transactional and subjectivist: The investigator and the object of investigation are assumed to be interactively linked. As a result, findings are created by the investigation process.
Axiology	The disinterested scientist: Value-free way; the researcher is independent from the data and	Engaged participant: Researchers seek to change existing social and other conditions, policies and practice	Passionate participant: Value bound or value laden; the researcher is the part of what is being researched, cannot be

	maintains an objective stance	(Lincoln and Lynham, 2011).	separated and so will be subjective (Saunders *et al.,* 2009; Lincoln and Lynham, 2011).
Methodology	Experimental, manipulative: Verification of hypothesis, quantitative methods	Dialogic, dialectic, transformative: Involved a search for participatory research, which empowers social transformation	Hermeneutical, dialectical: individual constructions are elicited to transform action, policy and practice. qualitative, in dept investigations, small samples.

Table 2-1 explicates the three major paradigms of inquiry. Conventional paradigms as positivism and post-positivism are driven by immutable and natural law by taking a dualist objectivist epistemological stance. On a methodological level, they aim to prove or disprove hypothesises; by using natural science philosophically approach they value objectivism in the collected data. Use of numerical data and statistics is important to visually interpret the data. Positivist researchers separate themselves from what they research and do not regard themselves as importable variables in their research (Guba and Lincoln, 1994; Lincoln and Lynham, 2011). In this regard, positivist paradigms can be seen as a direct opposition to interpretive/social constructivist paradigm. This doctoral research aims to answer "how" questions (i.e. *How does the interplay of logics shape actions in creating and sustaining socially inclusive environments for AE?*) which are related to AE and social inclusion process. On account of this, conventional paradigms were not adequate for the purpose of this research.

On the other hand, critical theory stance focuses on the reality that is shaped wider social, political, cultural, ethnic and gender influences, even though the nature of the reality is similar to post-positive perspective. Epistemologically critical paradigm mediated

by values; therefore, it is subjectivist and driven by the socio-historical structures, which aim to produce knowledge to challenge oppressive structures (Lincoln and Lynham, 2011). In principle this paradigm aligns with some of the interpretivist assumptions of my research (i.e. researching on social conditions, policies and practice), however taking a solely critical inquiry stance was not ideal for this research. Whist critical theories (i.e. critical, race, feminist, queer and disabilities) focuses on issues on social inclusion as well (Creswell, 2013); my doctoral research seeks to problematize the process of academic entrepreneurship within business and management studies, by considering the diversity strands (such as gender, ethnicity, and age/career stage) within sociology and social policy disciplines from an institutional logics perspective. In addition, due to this versatile approach, I consider myself as a passionate participant rather than an engaged participant (Guba and Lincoln, 1994).

Being aware of the different philosophical stances that underpin qualitative research is the responsibility of a good qualitative researcher (Myers, 2019). This situated perspective enables the researcher to develop a rigorous approach to qualitative research, aligning all steps of the process and clarifying them to the reader. These steps include formulating research questions, deciding and justifying data collection and data analysis methods and procedures, and presenting the findings of the research (Easterby-Smith *et al.,* 2012). Within the scope of this doctoral study, interpretivist paradigm is deemed as the most appropriate approach for this research given the nature of the research focus, unpacking the process of academic entrepreneurship from a diversity and social inclusion perspective. In the following sections the rationale of the chosen philosophical paradigm and the way the three papers were designed (data collection and analysis; presenting the findings) will be explained.

2.2.2 Rationale for choosing interpretive approach

In this research, philosophical assumptions that are presented above were considered in relation to the nature of the research aims and questions. This study aims to understand and unpack the process of academic entrepreneurship from a diversity and social

inclusion perspective using an institutional theory lens. The interpretivist paradigm was accepted as the most relevant approach that could enable to examine academic entrepreneurial process and its ecosystem. The important actors of the AE ecosystem (i.e. academics and technology transfer officers) were included in the study as research participants as their experiences are essential to understand and interpret the AE process from a social inclusion perspective.

Interpretivist research paradigm accepts reality as a human construct and argue that people make their own sense of socially constructed realities. Max Weber, the nineteenth-century sociologist, pioneered this approach. *Verstehen* (meaningful understanding) perspective refers to "understanding the meaning of action from the actor's point of view" (Patton, 2015, p.56). Weber (1949) highlights the context-specified knowledge and explains the process of interpretivist examination of social phenomena which is constructed through interactions between people. In this research, the interpretivist paradigm is used interchangeably with social constructivism (Denzin and Lincoln, 2011; Guba and Lincoln, 1994), although once could argue that social constructionism is one of the interpretivist paradigms with a particular emphasis on social interactions and dynamics underpinning social phenomena under study. Interpretivist perspective is concerned with narrative explanation and deep understanding of social phenomenon (Guba and Lincoln, 1994). This deep and widely accessible understanding provides the ability to achieve social and emotional experience, which leads the research to influence positive change (Lincoln and Lynham, 2011). This argument concurs with the overarching aim of this thesis and hence forms the core of the methodological and disciplinary matters underpinning the three papers included in this study.

Prasad (2015, p.13) argues that "all interpretive traditions emerge from a scholarly position that takes human interpretation as the starting point for developing knowledge about the social world". While studying individuals and their experience, interpretivist researchers intend to study and focus multiple realities (Creswell, 2013). These realities can coexist by the researcher's characteristics and socio-cultural backgrounds (Guba and Lincoln, 1994). In other words, these realities and researchers' view of and approach to it are informed by the researcher's worldview. In the interpretivist paradigm, the choice of the method is determined by heuristic questions (Lincoln and Guba, 1985). Interpretive

researchers use qualitative research methodologies to explore, interpret and describe social realities. Interviews, focus group, observation and analysis of texts are common approaches to this inquiry as emergent ideas can be obtained (Creswell, 2013); and rich data with great deal of dept are produced accordingly (Bryman, 2012).

2.2.3 Interpretive paradigm in the three papers

Academic entrepreneurship scholars face a "story deficit" (Gartner, 2007, p. 624). Even though there is a large body of literature on entrepreneurship, the lack of recognition and discussion on academic entrepreneurship from a social inclusion and diversity perspective is palpable (Romero and Valdez, 2016; Gartner, 2007; McAdam et *al.*, 2019; See Chapter 3). Research related to diversity issues in social sciences is often treated in constructivist ways (Maxwell, 2011). Therefore, this study aims to present multitude of insights on academic entrepreneurship and social inclusion from interpretivist paradigm perspective.

The connection between the paradigmatic position and the nature of the research problems should be illustrated clearly (Karataş-Özkan et al., 2014). Therefore, all three papers that are presented in this thesis accept the subjective multiple realities and interpret the meanings of the social actors' experiences and views. Berger and Luckman (1966) claim that society and its institutions are built by individual meanings and perceptions. In the line with this perspective, I acknowledge the importance of meanings that participant's attribute to the AE process and their experiences from a diversity standpoint. This research considers both the influence of the actors' actions and the role of the institutions, as they are embedded in the overall AE ecosystem. This is also highly related to multi-level nature of the research problematisation, bridging the gap between individual-level matters (mainly response strategies) at the micro-level and meso-relational and macro-institutional/contextual dynamics.

Therefore, the first paper investigates multiple diversity categories in the context of AE in STEM disciplines and cultures, demonstrating an understanding the AE process and its underpinning logics with emphasis on diversity strands. Applying qualitative research

approach has provided a unique understanding to explore a complex phenomenon and enabled me to generate insights drawing on extensive fieldwork with a range of participants (academics with different diversity strands and different level of engagement with AE; and technology transfer officers).who are situated in their institutional context. This view fits with the aim of the first paper as we took an interpretive approach in order to gather a deeper look into the characteristics of institutional dynamics in the AE process and social inclusion.

The interpretive stance was taken for the second and the third paper as well. The focus of the second is on gendered dynamics of institutional orders and logics that plays a role in women academic's engagement in AE, by focusing on women's response to differentiated logics to demonstrate their strategies to cope the inequalities within the AE ecosystem. The third paper, on the other hand, focuses on the effects of neoliberal policies on the academic entrepreneurial culture by examining the discourses of macro-institutional forces. It demonstrates the multilayer nature of inclusive AE, by showing how the discourse AE emerged. It also focuses on how the changes in the policy field of higher education transformed internal management structures, systems practices, and the professional academic culture of the universities. Interpreting the narratives of academics who engage with AE, as well as the ones, who decide not to engage, has enabled us to construct the reality of entrepreneurial action at UK universities. In addition, the role of the other actors of the AE ecosystem such as technology transfer officers was taken into consideration for the second and the third papers. The need for creating a new research and policy agenda to have an inclusive AE environment has emerged from the interpretation of the data that underpinned all three papers.

2.3 Qualitative research design in the context of the three papers

Research design is the plan for an entire qualitative research study. This road map involves deciding on the philosophical assumptions, research method, data collection techniques, data analysis procedures, writing up approach, and when it is suitable, how to publish findings of the research (Myers, 2019). These procedures are informed by the worldview of the researcher and translated approach into practice. Bourdieu argued that through "epistemic reflexivity", social researchers could develop richer insights of the

social world as their engagement is embedded in academic and social fields. Researchers' presupposition could bring their social capital into the research setting alongside with the research participants experience (Bourdieu and Wacquant, 1992; Bourdieu, 1984; Tatli et al., 2015). While designing the research, qualitative researchers should anticipate and plan for potential ethnical issues that may arise during the research process; and reflect on the quality considerations of the research (Creswell, 2013). The next part elaborates the research approach and design of this doctoral study (Figure 2-1).

Figure 2-1 Model of qualitative research project, adapted from Myers, 2019.

2.3.1 Research approach

There are key differences between qualitative and quantitate research. Quantitative researchers aim to produce a set of cumulative generalizations based on data calculation. Dependence on quantitative methods may neglect the social and cultural constructions" that quantitative researchers seek to associate (Silverman, 2011, p.13). As the primary motivation for conducting qualitative research is understanding participants' views and

experiences on particular social phenomena embedded within a particular historical and temporal context, including the institutional forces, qualitative research was chosen for this research project.

According to Denzin and Lincoln (2011, p.3), "qualitative research is a situated activity that locates the observer in the world. Qualitative research consists of a set of interpretive, material practices that make the world visible". In other words, qualitative data tell a story by capturing people's experience of the word and describe it (Patton, 2015) and emphasize discovering novel findings due to its fluid and flexible nature. (Bryman, 2012). Qualitative research may be conducted in many ways. The well-established and traditional approaches (such as grounded theory, case study, ethnography etc.) and more progressive frameworks in ever-changing nature of qualitative research proves the evolving definition of qualitative research (Saldaña, 2015; Creswell, 2013). The methodological position of the research is based on the Bryman's (2012) argument on qualitative research being inherently exploratory, thus the research approach of this doctoral study is broadly defined as qualitative exploratory research (Patton, 2015; Jelonek and Urbaniec, 2019; Appe and Oreg, 2020; Urbaniec and Żur, 2020).

Qualitative researcher aims to present their work as an alternative modus operandi (Scriven, 1974) for the conduct of social research (Bryman, 2012). This approach resonates with the aims of the research and the worldview of the researcher. As the researcher is the instrument and the data are the participant's words and experiences (Sinuff, Cook and Giacomini, 2007), the qualitative researchers become more aware and reflexive and therefore be able to an integral part of the research process (Bourdieu and Wacquant, 2014). Table 2-2 presented below briefly explains the purpose, focus of the research, desired results and level of generalization, key assumptions and publication mode of my research.

Table 2-2 Typology of the research based on Patton (2015)

Type of Research	Formative evaluation	Applications in this research
Purpose	Improve an intervention: a program, policy, organization, or product	The purpose to present better understanding of the role of diversity strands (gender, ethnicity and age/career stage) while investigating AE process in research-intensive UK universities by providing insights from the STEM disciplines.
Focus of Research	Strengths and weaknesses of the specific program, policy, product or personnel being studied	Enablers and barriers of AE environment were identified and discussed by gathering information from STEM scientists with diverse backgrounds.
Desired Results	Recommendations for improvements	Research contribution offers theoretical, practical and political implications; recommendations for academic entrepreneurs.
Desired level of generalization	Limited to specific setting studied	This research focuses on the AE process and AE ecosystem of the selected entrepreneurial UK universities, tackling issues related to social inclusion.

Key assumptions	People can and will use information to improve what they're doing	The aim is to provide helpful information (both for individuals and institutions) on how to improve AE ecosystem to create a more inclusive environment that supports scientists.
Publication mode	Oral briefings; conferences, internal report; other evaluators	This research project is presented in the form of a three paper PhD thesis, the researcher also presented the research in international conferences.

In addition, this approach is compatible with the eight criteria for excellent qualitative research as defined by Tracy (2010). Quality of a qualitative methodological research is capsules worthy topic, rich rigor, sincerity, credibility, resonance, significant contribution, ethical considerations and meaningful coherence (Tracy, 2010). This doctoral research has a relevant, timely and significant topic that uses rich data and pertinent theory and offers significant contribution that interconnects literature, research findings with interpretation from an interpretivist approach. These issues of establishing the quality/trustworthiness of research will be explained in section 1.5 of this chapter.

2.3.2 Sample and sampling techniques

One of the most important distinction between qualitative and quantitative research is the difference in their sampling approaches. Qualitative research focuses on a smaller sample in order to generate in depth insights about the study, whereas quantitative methods mostly depends on randomly selected, much larger samples (Patton, 2015). Miles, Huberman and Saldaña (2014) argue that qualitative samples tend to be purposive.

For that, the researcher needs to define the boundaries and create a conceptional frame that constructs the research study. Purposeful sampling allows the researcher to "illuminate" the inquiry questions (Patton, 2015) and make their own informed decision on which cases are more important to include in the sample in order to generate valuable data with the ultimate objective of addressing the research aims and objectives (Saunders *et al.,* 2009).

Patton (2015) presents 40 sampling options divided in eight categories. These strategies for purposeful sampling are not mutually exclusive. In other words, depending on researcher's decision and the research rationale, more than one strategy can be employed to collect the information-rich data to answer the research questions. Among the identified sampling options (snowball or chain sampling, responded-driven sampling, emergent phenomenon or emergent subgroup sampling, opportunity sampling and saturation or redundancy sampling), sequential sampling strategies were applied in this research. In short, while "engaging in sampling as purposeful and strategic thinking" (Patton. 2015, p. 264), the sample of this study was built mainly during fieldwork. For instance, at first, I was aiming to interview only academic entrepreneurs. However, after the pilot study, it become clear to me how significant to include technology transfer officers to the sample, in order to present more comprehensive results. Similarly, in the beginning of the sample process, I was keen on including sexual orientation and disability as diversity elements into my research. However, it was very difficult to recruit (and identify) academics who eager to discuss their sexual orientation and/or their disabilities. Table 2-3 illustrated the sampling techniques employed in this research.

Table 2-3 Sampling techniques (adapted from Patton, 2015)

Purposeful sampling strategy	**Explanation**	**Examples in my research**
Snowball or chain sampling	Start from one information-rich interviewee and then ask for additional relevant contacts. Create a chain of interviewees based on people who know people who would be a good source given the focus of inquiry. Researcher does the recruiting.	The initial contact was made with my supervisors, by selecting a few relevant and information-rich participants. After creating a chain of interviewees based on people we interacted, I continued to recruit more academic entrepreneurs from various STEM departments, who works in interdisciplinary research projects and interested in commercializing their work using snowball (chain) sampling. Apart from that I also sent over two-hundred emails to invite people to contribute to my research by targeting possible participants from the university's website.
Responded-driven sampling	A network-based strategy, initial participants are asked to recruit new contacts in their network, used-to find hard-access research participants.	Some of the participants from the early phase of data collection were selected from academic entrepreneurs who are part of *Future Worlds*, the on-campus start-up accelerator at the University of Southampton. Similar non-profit

	Initial interviewees do the recruitment.	organizations from different universities were used for sampling purposes (i.e. SET Squared at University of Bristol and University of Southampton).
Emergent phenomenon or emergent subgroup sampling	Selecting sample after the study is under way when important subgroups or critical issues arise that affect the targeted sample.	Before extending the study to recruiting academics from other universities, we decided to include another major actor to our sample: technology transfer officers. Many of the interviewees mentioned the role of TTOs and criticized their contribution. This decision was made after the initial analysis of the first twenty interview, in order to gain a better understanding of the AE ecosystem.
Opportunity sampling	During fieldwork, the opportunity arises to interview someone, without planning in advance.	In many occasions, during fieldwork I had the opportunity to recruit unplanned participants. As I interviewed participants from six universities from five different cities, I had to travel multiple times during the data collection. While I was in London, Bristol, Oxford and Cambridge; due to my time limitations I used to book multiple interviews in the same day, which often lead me to more people (i.e. academics who works in the same

		lab as research fellows). In my experience recruiting interviewee on site has both advantages and disadvantages.
Saturation or redundancy sampling	Analysing patterns as fieldwork proceeds and continuing to add to the sample until nothing new being learned.	I believe my data reached its saturation during the last few interviews I have conducted. I was initially planning to recruit more academics from Imperial College, however I realized similar things said by the academics and decided not to add new cases. The time limitation also played a role in this decision.

Specific criteria have been used in framing the sample and participants. To provide a holistic account of the phenomena, the sample has included different actors from AE ecosystem such as academic entrepreneurs from different STEM departments, academics with different level of experience and engagement in AE, STEM academics who are not engaged with AE and technology transfer officers. In addition to unpack the diversity dimensions, both women and men academics were involved, as well as academics from different ethnical backgrounds and various age groups/career stages. Recruiting women was a challenging task due the underrepresentation of women scientists in STEM departments (except from Medicine and Chemistry departments). As a result, after the first recruitment stage (first 23 interviews at University of Southampton), I tried to include more women to the sample. Data was collected from UK context, participants were selected from six highly ranked, research-oriented universities in the UK. Based on their overall research intensity, among the top ten research universities University League

Tables (2018) identified, six universities are included to this research: University of Cambridge, Imperial College London, University of Bristol, University College London, University of Southampton and University of Oxford (See Table 2-4).

Table 2-4 University League Table list (2018)

	Overall Research Intensity	University	Medicine by Research Intensity	Chemistry by Research Intensity	UK Rank	Overall Score
1	0.95	Cambridge	0.77	1	1	1000
2	0.95	Queen's, Belfast	0.91	1	36	768
3	0.92	Imperial College London	0.88	1	5	925
4	0.91	Bristol	0.88	0.98	17	834
5	0.91	University College London	0.96	1	7	909
6	0.9	Southampton	0.85	1	26	792
7	0.87	Oxford	0.74	0.98	2	998
8	0.84	Glasgow	0.78	0.91	27	791
9	0.83	Warwick	0.61	0.94	8	896
10	0.83	Edinburgh	0.85	0.96	23	805
11	0.82	St Andrews	0.57	1	3	962
12	0.82	Leicester	0.74	0.93	30	786
13	0.81	Birmingham	0.7	1	16	836
14	0.8	King's College London	0.77	0.8	21	811
15	0.8	Newcastle	0.84	0.86	23	805
16	0.79	Nottingham	0.73	0.98	18	825
17	0.78	Manchester	0.66	0.87	22	808
18	0.77	Lancaster	0.99	0.92	9	889
19	0.75	East Anglia (UEA)	0.68	0.75	12	853
20	0.75	Leeds	0.68	0.76	14	850
21	0.74	Sheffield	0.77	0.83	32	782
22	0.74	Queen Mary, University of London	0.71	0.88	34	776
23	0.73	Sussex	0.61	0.93	19	818
24	0.73	Aberdeen	0.52	0.88	40	747
25	0.7	Liverpool	0.68	0.83	41	741
26	0.62	Cardiff	0.63	0.58	37	765
27	0.59	Keele	0.92	0.96	48	713

It is also important to underline that the size of the sampling is limited by the time researchers' have, to collect data and the geographical limitation on the sample (Kvale 1996; Seidman 2006; Baker and Edwards, 2012). In other words, depending on the nature and purpose of the research, uniqueness or complexity of the analysis and practical issues such as time scale and geographic limitations, each qualitative study could need different number of participants (Baker and Edwards, 2012). As a PhD student, I had limited time and resources to collect the research data. I started the initial interviews at University of Southampton in early 2017 (as part of an EPSRC funded project) and ended

data collection in 2018. Moreover, the chosen sample required me to travel, and it was challenging to visit four other cities to conduct the interviews. As I conducted most of the interviews face-to-face, during my fieldwork I had to travel to London multiple times, Oxford twice, Bristol and Cambridge once.

As a result, overall, 64 interviews were conducted in this research; with fifty-five STEM academics and nine technology transfer officers. During the fieldwork, I realized that TTOs were configured differently in each university, even though their function is similar. As a result, in some universities more than one interview was conducted with TTOs, in order to gather better understanding of their role in the AE process. While the first paper focuses on the AE process and presents data merely from 55 academics, second and the third paper examine the wider AE ecosystem, thus included TTO perspective as well, drawing on the additional 9 interviews conducted with the TTO officers. The following table presents the profile of the participants.

Table 2-5: Profile of the participants

Overall Interview No	University	Position	School/Department	Gender	Nationality	Age
1	University of Southampton	Prof	Engineering	M	British	50+
2	University of Southampton	Prof	Engineering	M	British	25-39
3	University of Southampton	Post-doc	Engineering	M	Chinese	25-39
4	University of Southampton	Research Fellow	Engineering	M	Chinese	25-39
5	University of Southampton	Prof	Chemistry	M	British	50+
6	University of Southampton	Prof	Chemistry	M	British-Persian	40-49
7	University of Southampton	Research Fellow	Engineering	M	Spanish	25-39

8	University of Southampton	Research Fellow	Engineering	M	British	25-39
9	University of Southampton	Research Fellow	Engineering	M	British-Indian	40-49
10	University of Southampton	Prof	Mathematics	M	British-Chinese	50+
11	University of Southampton	Prof	Chemistry	F	American	50+
12	University of Southampton	Post-doc	Engineering	M	British	25-39
13	University of Southampton	Post-doc	Chemistry	M	German	25-39
14	University of Southampton	Prof	Medicine	F	British-Chinese	40-49
15	University of Southampton	Associate Prof	Mathematics	M	Vietnamese	25-39
16	University of Southampton	Prof	Chemistry	F	British-Scottish	50+
17	University of Southampton	Prof	Chemistry	M	British-French	50+
18	University of Southampton	Post-doc	Chemistry	F	British	40-49
19	University of Southampton	Prof	Chemistry	M	British	40-49
20	University of Southampton	Associate Prof	Medicine	F	British	50+
21	University of Southampton	Prof	Engineering	M	British	40-49
22	University of Southampton	Research Fellow	Physics	F	Czech	25-39
23	University of Southampton	Prof	Medicine	F	British-Romanian	40-49
24	University College London	TTO		M	British	25-39
25	University College London	Reader	Medicine	F	British	50+
26	University College London	Senior Lecturer	Chemistry	M	British	50+

27	University College London	Prof	Chemistry	M	British	50+
28	University College London	TTO		F	Dutch	25-39
29	University of Oxford	Prof	Chemistry	F	British-Australian	40-49
30	University of Oxford	Prof	Chemistry	F	British	40-49
31	University of Oxford	Post-doc	Chemistry	F	British	25-39
32	University of Oxford	Post-doc	Chemistry	M	Thai	25-39
33	University of Oxford	Prof	Medicine	M	British	40-49
34	University of Southampton	Prof	Medicine	M	British	50+
35	University of Southampton	TTO		F	British	40-49
36	University College London	Post-doc	Chemistry	M	British	25-39
37	University of Southampton	Prof	Medicine	F	British	50+
38	University of Oxford	Associate Prof	Medicine	F	British	25-39
39	University of Oxford	Post-doc	Medicine	F	Dutch	25-39
40	University of Oxford	Prof	Chemistry	F	British	50+
41	University of Oxford	Post-doc	Chemistry	F	Danish	25-39
42	University of Oxford	Post-doc	Chemistry	F	British	40-49
43	University of Oxford	Post-doc	Chemistry	F	British	25-39
44	University of Oxford	Post-doc	Chemistry	M	French	25-39
45	University College London	Prof	Chemistry	F	British	40-49

46	Imperial College London	TTO		F	Indian	25-39
47	Imperial College London	TTO		M	British-Italian	25-39
48	University of Oxford	TTO		M	British	25-39
49	University of Bristol	Prof	Medicine	M	British	50+
50	University of Bristol	TTO		F	South African	40-49
51	University of Bristol	TTO		M	British	25-39
52	University of Bristol	Post-doc	Chemistry	F	Italian	25-39
53	University of Bristol	Post-doc	Chemistry	M	British	25-39
54	University of Bristol	Post-doc	Chemistry	F	British	50+
55	University of Bristol	Post-doc	Chemistry	M	British-American	25-39
56	Imperial College London	Post-doc	Chemistry	F	German	25-39
57	University of Cambridge	TTO		F	Indian	25-39
58	University of Cambridge	Associate Prof	Chemistry	F	Croatian	40-49
59	University of Cambridge	PhD	Biology/Medicine	F	British	25-39
60	University of Cambridge	Post-doc	Biology/Medicine	F	German	25-39
61	University of Cambridge	Research Fellow	Chemistry	F	British- Israeli	25-39
62	University of Cambridge	Business Mentor	Biology/Medicine	F	British	50+
63	University of Cambridge	PhD Student	Biology/Medicine	F	Latvian	25-39
64	University of Southampton	Associate Prof	Medicine	F	British	25-39

2.3.3 Data collection methods

It is significant to make informed decisions about suitable data collection methods in order to address research questions set and hence achieve a successful outcome of any research project. The data collection methods should provide all the necessary information that the researcher is ought to answer through the research. Primary data collection of this study is semi-structured interviews. Myers (2019, p. 120) argues that primary data "add richness and credibility to quantitative manuscripts" because primary sources are gathered directly from the people or organizations by the researcher, which are unique to one's own project. On the other hand, field notes and secondary data (i.e. policy reports and documents) were used additionally to support the primary data (Myers, 2019).

2.3.3.1 Interviews

Qualitative inquiry contributes to the knowledge by studying how things work, understanding why it matters and capturing stories to understanding people's perspective and experiences (Patton,2015). Interviews allows the researcher to examine what people do in real life, therefore they are often used in qualitative research (Silverman, 2011). However, as "the quality of the information obtained during an interview is largely depended on the interviewer" (Patton, 2015, p.427), significant interview principles should be adopted throughout the interviewing process, such as asking open ended, clear and focused questions; attentive listening; asking follow up questions when necessary and being empathic and neutral as possible (Creswell, 2013; Patton, 2015). Applying these principles, semi-structured interviews were used as the primary data collection method in this doctoral study.

Even though there are various types of interviews, including structured, semi-structured and open-ended (unstructured) interviews; they require different skills and they are conducted for different purposes and research problems (Silverman, 2011). Semi-structured interviewing was chosen in this research for their flexibility and ability to

provide contextual and holistic data (Creswell; 2013; Singh, Sung, Cooper, West and Mont; 2019). Additionality, doing semi-structured interviews was the better fit in this research, as this method best used when the researcher will not get more than one chance to interview someone (Bernard, 1988). Considering the fieldwork involved travelling and academics who have busy schedules, semi-structured interviewing was the ideal way of collecting data.

For this reason, before going to the field with the direction of the research questions, an interview protocol that employs a blend of close-ended questions and open-ended questions was designed (Patton, 2015). While open-ended questions are ideal to start interesting conversation with the participants, structured questions are useful to make sure the interview covers the specific issues. In addition, using this approach created room for the possibility for asking probe questions during the interviews, which provided the researcher flexibility. Probes and follow up questions helped increased the richness and depth of the responses (Patton, 2015). For example, after couple of interviews, I realised that, due to their delicate nature, questions related to social inclusion and diversity were received much better and answered in detail by the participants, when I developed appropriate probe questions to support them.

Interview protocol had two major sections: questions related to the AE process and questions about the diversity dimensions of AE ecosystem (See Appendix A). Contextualizing the questing makes a difference in qualitative inquiry as the way the research introduces a question have a significant impact on participant's responses (Patton, 2015). By asking *what*, *wh*y and *how* questions on the process of academic entrepreneurship and the role of diversity in STEM workforce, I was able to gather information on the experience (what a person does or has done to elicit behaviours) and opinion (what they think about the experiences) of the interviewees. However, some questions in the interview protocol were irrelevant when interviewing TTOs, thus interview questions were refined in some cases, even though main questions that are significant for the research remained. Accepting the first round of the interviews I conducted at University of Southampton as my pilot study (as part of the EPSRC funded project), I have revisited my interview questions and improved them with the knowledge and experience I gained during the fieldwork. Before including more academic researchers, I have decided

to rewrite some of the social inclusion related questions to present a forethoughtful and advanced version of the qualitative interview protocol. Moreover, after deciding to extend my sample by adding technology transfer officers into my research, I have developed new questions for technology transfer officers.

As it was briefly explained above, participants were contacted through personal connections and networking channels, via e-mail or phone. A formal introductory e-mail that explains the aims and the objectives of the research projects was sent to each possible participant. The e-mail also provided information on me, the researcher, and my supervisory team. (See Appendix B). After the initial agreement the ethical procedures of the research governance process were followed, and related documents were sent to the consenting interviewees before each interview. Participation information sheets were provided via e-mail or in person (See Appendix C) and signed consent forms were collected before the interviews (See Appendix D). In the end of each interview debriefing documents were provided to explain the objective of the research (See Appendix E). In order to maintain research integrity, all files containing any personal details of the participants is used anonymously and all responses were kept confidential in order to maintain the research integrity (Flick, 2009). A sample interview transcript is presented in the Appendix F.

Interviews were conducted in Southampton, Oxford, London, Cambridge and Bristol. The meeting point was left to the interviewee's convenience. As a result, most of the time interviews took place in the academic's offices or labs, common areas at the university buildings or coffee shops. All the interviews were recorded digitally and saved in two different platforms as a backup strategy. The interviews were lasted between 30 minutes and 2 hours, and all of them were transcribed. The collected data is processed to reveal knowledge, based on the ontological and epistemological assumptions by addressing the research questions and research methodology (Myers, 2019).

2.3.3.2 Field notes

Taking field notes is not optional, as it may be crucial for the data interpretation. Therefore, field notes were taken carefully, written descriptively (Patton, 2015), even though all the interviews were recorded and transcribed. Information such as the venue and the date of the interview, the physical setting, the nature of the social interactions during the interview were noted and used when necessary for data analysis.

As the interviewer, I realized by taking notes during and after the interview, I was able to formulate new questions as the interview progresses. In addition, when I had to conduct back to back interviews when I visit a University, the field notes often provided me with important insights to pursue specific topics that were emerged from previous interviews. Taking notes also helped me during the data analysis process because they filled out some of the missing points and highlighted specific arguments emerged from the interview transcripts (Patton, 2015). As transcribing interviews can take time, in order to avoid delays in sense-making of the important data, I also kept a brief summary of most of the interviews (Myers, 2019).

2.3.3.3 Secondary data

In addition to the interviews, secondary data were collected to gather a comprehensive understanding of the research (Myers, 2019). University websites and the researcher's profile pages were used to gather initial information on selected STEM scientists and their role in the AE ecosystem. Additionally, information on the role and practice of TTOs were collected from their websites. This process has helped me to inform myself before meeting an interviewee, and tailor the interview questions as and when necessary.

Moreover, policy documents and reports on AE, social inclusion and diversity were investigated to get a wider understanding of the key activities and strategies developed by the decision-makers. For that purpose, policy related documents and reports were

utilized for this research, collected from UK parliament bicameral bodies (i.e. POST - The Parliamentary Office for Science and Technology), non-departmental public bodies and independent organizations (i.e. UKRI - UK Research and Innovation), think-tanks and innovation foundations (i.e. Nesta), higher education charters (i.e. Athena Swan Charter and Equality Charter) and intergovernmental organizations (i.e. OECD - Organization for Economic Cooperation and Development). As a result, I had the opportunity to familiarize myself with the broader policy context and ecosystem related to actions on inclusivity in the specific context of AE.

2.3.4 Data analysis procedures

Analysing unstructured qualitative data is one of the most challenging part of qualitative research (Miles and Huberman, 1994; Myers, 2019; Gioia, Corley and Hamilton, 2013). As sixty-four interviews were conducted for this project, there was a large amount of qualitative data to be analysed. Applying the following principle, “Purpose drives analysis through purposeful sampling. Design reflects purpose and therefore frames analysis” (Patton, 2015, p.527), I aimed to address the research aims by developing institutional logics perspective in the AE context and evaluating the decision-making process of institutions and policy makers on social inclusion and diversity issues. During the multiple stages of analysis, I adopted an iterative approach which included, making connection between the theory and data, revising research questions and reviewing literature (Gibbs, 2007; Miles et al., 2014).

Qualitative data analysis is hard work and involves creativity, intellectual discipline and analytical rigour. Reducing the raw information by constructing a framework of the emerged data is the first part of data analysis (Patton, 2015). For this reason, the three papers were informed by a thematic analysis approach. Thematic analysis is an encoding process that is used in many qualitative research methods. It provides a systemic structure to the qualitative data analysis. By using thematic analysis, the researcher can link different concepts and opinions using interpretation (Boyatzis, 1998; Myers, 2019),

conducted in rigours and methodologic manner (Nowell, Norris, White and Moules, 2017).

Inductive analysis involves discovering patterns, themes and categories in the research data. The ability to see pattens in what seems to be random information, involves competency of "patterns recognition" (Boyatzis, 1998). Qualitative analysis could be both inductive and deductive and led the researcher to develop *open coding* from recognizing patterns to transform them into themes and categories (Strauss and Corbin, 1998). Qualitative research applies complex reasoning through inductive and deductive approach (Creswell, 2013). Building on Peirce's (1997) argument on abductive reasoning, Shani, Coghlan and Alexander states that "abductive reasoning produces exploratory hypothesis" (2020, p.64). They explain that deduction provides explanation (often asking *what* questions), induction evaluates understanding and reflects on insights, whereas abduction gives possible explanation (Shani et al., 2020).After establishing the patterns, themes and/or categories thought inductive analysis, aforementioned approaches were applied for the confirmation of the data (Patton, 2015).

A strong motivation for qualitative research is to create insightful and meaningful findings. By taking a holistic approach, I endeavoured to analyse the research data as a whole, including my observations during fieldwork and interviewees' social environment to the data analysis (Patton, 2015). In order to make sense of the collected data, I begin by reading field notes, interview transcripts and secondary data repeatedly. I took notes on the documents, wrote down my comments and started to illustrate recurring terms. This process helped to develop the coding categories, which employed a classification system.

According to Saldaña (2015), qualitative analysis software does not analyse the data, rather they assist the process of data analysis. Accepting that as a useful tool, NVivo was used during the initial part of the data analysis. However, I did not find that process entirely useful and after getting familiar with the data, I found coding manually more helpful for data analysis (Patton, 2015).

In order to regulate the data analysis process, I examined the results from various interviews by using codes. Coding helps to organize the data while reduce the size of it.

Ryan and Bernard's (2000) steps associated to coding suggest that after sampling the text (interview transcripts) to analyse, deriving themes from the text itself in order to build an organized list of codes will allow the researcher to construct models to understand how the themes, concepts, beliefs and behaviours are linked to each other. In detail, I followed qualitative analysis procedures that are explained by Strauss and Corbin's (1998) and Gioia et al., (2012).

During the first order of analysis, multiple codes emerged (the first 23 interviews from University of Southampton). Even though the amount of first order codes/concepts (or open codes) were overwhelming, I made very little attempt to eliminate them (Gioia, 2004). While some common first order codes are related to AE process some codes were pertinent on the social inclusion and diversity (See Table 2-6)

Table 2-6 Selected first order codes

First order codes on AE process	Characteristic of academic entrepreneurs Enablers and constraints of AE process Conflicting roles of academics Pressure of financial impact The role external and internal support Industry-university relationship The role of TTOs
First order codes on social inclusion and diversity	Gendered nature of STEM Domestic constraints Importance of mentoring and networking Connectivity Responsibilities of early stage career academics Cultural barriers Creating social impact rather than focusing on economic impact.

Eventually, I started to reduce the germane categories, considering myself as a knowledgeable agent (Gioia et al., 2013). These categories (second order themes or axial codes), are accepted as theoretical level of themes which helped me to structure the aggregated dimensions. For example, in order to create the data structure that is demonstrated in the first paper, Gioia methodology (Gioia *et al.*, 2013) was adopted. After the initial coding was performed and first order terms were developed, second order themes were organized. These second order themes are theory-oriented themes (in my case institutional logics) which helped me to assemble terms to identify the aggregate dimensions of the data.

Even though writing is seen as the last phase of the project, it is wise to organize writing period simultaneously to data collection and data analysing since writing-up requires planning and is highly time-consuming (Myers, 2019). Since I started analysing data and writing up the first paper while data collection continues, I used different coding structures for this research (i.e. using Gioia data structure in Paper 1). Nonetheless, methodology sections of each paper present a more customised discussion on how data analysis was conducted and presented in the papers (See Chapter 3, 4 and 5).

2.4 Ethical considerations

As most universities and research institutes, University of Southampton places importance on research ethics. We are required to obtain permission from the Faculty Ethics Committee in order to conduct a research project that involves people as participants. Getting ethics approval from the university committee was a requirement for my research. Therefore, I submitted a research project for the ethical approval from ERGO platform (Ethics and Research Governance Online), that was approved by the Faculty Research Ethics Committee. Apart from the ethics application form, I had to fill and submit participant information sheet, consent form, debriefing form and qualitative interview protocol for the committee's revision. I consider the process of applying and obtaining ethics approval was an opportunity to explain my research to others and

receive feedback before going into the field. Therefore, ethical issues and challenges in qualitative research were taken into consideration in this study (Patton, 2015).

Myers (2019, p. 49) claims that "the golden rule [of ethnical principal] states that you should do unto others as you would have them do unto you". It means that while carrying out a scientific research that involves people, one should follow fundamental ethical principles such as being clear and honest about the purpose of the inquiry, honouring the interviewer's time, requesting informed consent of the participants and asking for permission to publish the outcomes of the research (Patton, 2015). Similarly, McNabb (2019) emphasize that, all researchers should follow four ethical principles of truthfulness, thoroughness, objectivity, and relevance to set an ethical guideline to their research. In the light of the information mentioned above, all the potential significant ethical issues and considerations are relevant to my research and they are addressed. I ensured that I informed the participants about what to expect from our meeting. Because I was interviewing academics who are familiar with PhD process, I often received many questions on my research topic and approach. Before the meeting I took time to answer all the questions they have, shared my story if they were interested. During the interviews I was very careful to create a safe and open environment for the participants to feel comfortable while answering the questions. For instance, I was aware that some of the questions I asked about social inclusion and diversity issues could be considered as sensitive information. Therefore, I was conscious on not putting pressure to the participants, if I sense the participant was reluctant to answer.

It is possible to say, not all the interviews I conducted revealed same quality of data. However, even with uncooperative interviewees and difficult situations, I have tried my best to be understanding and constructive. As Bourdieu (1984) argues out and I agree, the value of reflexivity is high and as an intellectual concept, qualitative researcher should be willing to reflect to learn how to engage with people with respect at any stage (Bourdieu and Wacquant, 1992; Brummans, 2015; Tatli, Özbilgin and Karataş-Özkan, 2015).

Lastly, ethical issues were carefully considered during data analysis and writing up process as well. I was very careful about protecting the data and the participant's confidentiality. Moreover, as the participants were aware, I was collecting data for my

PhD research. I informed them, that, apart from writing my thesis, the collected data will be used for publications. Most of the participants, particularly women in my sample, were very interested in the possible contributions of my research. When asked, I agreed to send the written reports after publishing the journal articles. This interaction created a rapport between me, and the interviewees, which in turn effected the quality of the data and insights generated.

2.5 Trustworthiness in qualitative studies

It is the researcher's responsibility to establish the trustworthiness of qualitative studies. Thus, this section provides a guidance for the trustworthiness of this research project by explaining the important considerations with illustrated examples that determine whether the method, findings, and interpretation was conducted in a trustworthy manner. Lincoln and Guba (1985) established four constructivist criteria in preference to traditional positivist research criteria. Replacing *internal validity* with **credibility**, *external validity* with **transferability***, reliability* with **dependability** and *objectivity* with **confirmability**, they reconstructed the criteria four trustworthiness of qualitative studies.

Credibility of a research is established if the research findings represent sensible information of the data collected from the participants and interpreted their original views correctly (Lincoln and Guba, 1985). The trustworthiness of analysis depends on the rich, appropriate and well-saturated data. Different credibility strategies involve prolonged engagement, persistent observation, triangulation and member check, all of which are addressed in this study. Prolonged engagement requires investing enough time to become familiar with the research setting and context and building trust to gather reliable data. During the interviews I asked distinct questions regarding the issue under study and created an environment that encouraged participants to express themselves freely. The participants often supported their statements with examples, when I asked follow-up questions (Korstjens and Moser, 2018). Moreover, collecting data from different substantive areas such as AE process in STEM departments, gender dynamics of STEM at universities and response strategies of women helped me to map the bigger

picture. Through persistent observation, the researcher identifies the elements that are most relevant to the problem and decides on what to focus in detail. In order to examine the characteristic of the research data, I developed codes by rereading the data during the analysis process. Initial codes were developed and recoded after careful revising. As triangulation requires using multiple methodologies to enhance the qualitative research process, methodological triangulation was applied in this study. Various data collection methods such as semi-structured interviews, field notes and policy documents were collected. Member check technique was also applied when the collected data and the research findings were examined and tested by the participants. As most of the participants of this study were academics who are familiar with theoretical and methodological applications of a research study.

Transferability focuses on to what degree the findings can be transferred into context and setting (Lincoln and Guba, 1985). Qualitative researchers facilitate transferability through thick description, which requires not only describing behaviours and experiences of the participant, but also explaining the context so that the data can be meaningful for others. In this research, I presented a rich account of descriptive data on AE, social inclusion, and diversity elements. Details of the context, research approach and research details were explained in the previous sections of the methodology chapter based on the iterative research process.

Dependability refers to the stability and consistency of the findings over time. It embraces participant's evaluation and recommendation of the research study. Confirmability, on the other hand, is concerned with neutrality and establishing the genuineness of the interpreted research data as the findings should be confirmed with other researchers. The researchers cannot base their own preferences during interpretation. On the contrary, interpretation of the date should be grounded in the data. To this end, audit trail strategy is needed to ensure dependability and stability in a study, by keeping record of the chosen research path. In short, the researcher is responsible for being transparent when describing the research steps, from the start of a project and reporting the findings in the end. (Lincoln and Guba, 1985; Korstjens and Moser, 2018). In the study, the research methods, design and procedures have been described clearly to reflect the integrity of this study. By protecting the inter-subjectivity of the research data, the

justification of the research methods and how it was collected explained earlier. Peer and supervisory examinations were helpful to that biased were eliminated from the research.

In order to ensure the transparency and quality of qualitative research, reflexivity should be taken into consideration as well (Bourdieu and Wacquant, 1992; Bourdieu, 1984; Creswell, 2013). This process especially important for interpretivist studies (Easterby-Smith et al., 2012). Researchers should be clear about the personal biases, assumptions, values, preconceptions they hold as, they can influence the way in which data is analysed (Finlay, 2003). Critical self-reflexion of the researcher also includes acknowledging the relationship between the researcher and the participant, and the effect of this relationship on the collected data (Bourdieu and Wacquant, 1992). As I conducted in-depth interviews with people who have physical disabilities for my master thesis, I already had some experience on how to engage with participants in the field and carry out interviews on interdisciplinary research. As a result, I utilize these experiences during the data collection process of this doctoral study. I tried my best to capture accurate reflections of what participants told me during the interviews in line with this. However, I also recognize that my views, prejudices, and personal bias could have influenced the research findings. For example, as a PhD student and a woman who works in a foreign county; I often found myself empathizing with the challenges that were explained by the young women academics, even though I am neither a STEM scientist nor an academic entrepreneur. In some cases, while discussing the challenges of being part of multiple diversity categories and facing domestic contracts, I was intrigued personally by the conversation, maybe because I was raised by a mother who is a STEM academic and researcher.

2.6 Chapter summary

This chapter has presented the philosophical underpinnings, research design and detailed procedures of the fieldwork of this doctoral research. To summarize, first alternative inquiry paradigms and philosophical assumptions were discussed and the justification for applying interpretivist paradigm was explained. Then, qualitative research approach and design that were adopted in the three papers were introduced. Aligned with this design, sampling decisions and sample were explained. The data were collected through semi-

structured interviews with academics from various STEM departments from six research-oriented universities in the UK and TTOs. The collected data were analysed using thematic analysis approach. Following the detailed accounts of these data collection and analysis processes, ethical considerations, and strategies for establishing the trustworthiness of this qualitative research were discussed in the chapter.

Chapter 3 Paper 1

Extending the boundaries of academic entrepreneurship: demonstrating the instrumentality of new logics for addressing social inclusion

Abstract

Academic entrepreneurship (AE) has gained widespread acclaim globally for bridging the gap between academia and industry, as well as addressing the issue of socio-economic inclusion and the impact of research. In this paper, we relate to, and extend scholarly work in the domains of AE and social inclusion by investigating the process of AE from an interplay of institutional logics perspective, with an emphasis on the diversity strands to which academic entrepreneurs belong. Drawing on extensive fieldwork with 55 participants, our findings highlight the co-existence of profession, science logic and market logic, combined with the new logics that we introduce – diversity and impact logics – in capturing value through AE for addressing social inclusion. We offer theoretical and practical contribution by demonstrating the instrumentality of these logics as enablers and constraints on the process of AE. We also advance the theory on logics and AE by demonstrating how the intersection of logics creates different kinds of salient points and pressures for academics and university policy makers. Closely linked to this, we make policy contributions by putting forward policy insights that are bottom-up and tailored to the Higher Education sector, based on a thorough understanding of the experiences and views of academic entrepreneurs.

Key words: academic entrepreneurship, diversity, social inclusion, institutional logics

3.1 Introduction

Academic entrepreneurship (AE) has gained increasing attention in scholarly literature and policy domains, the emphasis being on the impact of applied research for wider society and the economy (Abreu et al., 2016; Meek and Wood, 2016). In some research-based universities, academic researchers are strongly encouraged to get involved in entrepreneurial activities. As these institutions can have a direct impact on the entrepreneurship process (Hayter, Lubynsky, and Maroulis, 2018), for some such academic institutions, commercialization of their research findings into innovative ideas is not an expectation but a requirement (Ambos et al, 2008; Muscio and Ramaciotti, 2019). Therefore, the institutional environment is evidenced as having a direct impact on the process of academic entrepreneurship. In addition to such institutional requirements, there are individual motivational factors for academics to engage in commercialization, such as increasing personal income, accessing resources and learning (D'Este and Perkmann, 2010). The significance of the topic has been further reinforced globally with an emphasis placed on diversity agenda at policy level, i.e. inclusion of disadvantaged groups for a more inclusive and socially sustainable society (All Party Parliamentary Group Diversity and Inclusion in STEM, 2018; NESTA, 2018; NSTC, 2018). Given this academic and policy context, we focus on how academic entrepreneurs with diverse profiles navigate through institutional logics that govern the process of AE in STEM disciplines, drawing on a qualitative study undertaken in research-intensive UK universities. Acknowledging the complexity and multi-layered nature of the topic, and with added emphasis on the importance of diversity and inclusiveness, it is imperative to look deeper into the characteristics of the AE process, the role of institutional dynamics (mainly logics) as enablers and barriers, and wider implications for diversity and inclusiveness. To this end, we aim to address the following research questions:

1) What logics do shape and characterize the process of AE as engaged by academics with diverse profiles?

2) How does the interplay of logics shape actions in creating and sustaining socially inclusive environments for AE?

Although different strands of diversity (i.e. gender, ethnicity, disability, age/seniority, sexual orientation) have been considered when investigating entrepreneurship in general (Koning and Verner, 2009; Karataş-Özkan, 2017; Guzman and Kacperczyk, 2019), there is a dearth of research on AE in particular. Female AEs tend to commercialize their work less frequently than their male counterparts (Abreu and Grinevich, 2014). However, other diversity elements, such as ethnicity and age have emerged from the AE literature as under-studied areas should therefore be taken into consideration (Stephan and El-Ganainy, 2007; Romero and Valdez, 2016). This has inspired us to investigate multiple diversity categories in the context of AE in STEM disciplines and cultures.

STEM disciplines are particularly important for AE. Methods of commercialization such as patents, spinouts, licenses and consultancy work are more common in STEM compared with the arts and humanities (Abreu and Grinevich, 2014). Therefore, university STEM departments and their staff are more likely to get involved in the AE process by commercializing their research results. The lack of emphasis on diversity in AE calls for more critical approach to expands our understanding of the role of institutional forces in shaping diverse groups of academics' experiences in engaging in AE. We have undertaken this investigation by applying institutional logics perspective to demonstrate dynamics of multiple co-existing and sometimes competing logics on the process of AE. Institutional logics are often described as sets of material and non-material (symbolic) constructions, which form guiding principles for collective organizational action (Friedland and Alford, 1991; Thornton et al., 2012). Logics are often conceptualized as negotiable strategic resources that actors can deploy to influence and justify decisions, practices and organizational change (Bruton et al., 2010; Purdy et al., 2017). Translating these ideas into AE involves a closer look at the interplay between different logics, such as profession logic, science logic and market logic (Su et al., 2017) and their collective power on the diverse group of academics engaged as professionals within the commercialization process.

We make multiple contributions to knowledge and managerial practice: First, we offer theoretical contribution by revealing the importance of multiple institutional influences/logics as enablers and barriers for the process of AE and show how they generate strategic resources that have a dual nature in the context of AE. We identify the co-existence of several institutional logics, such as profession, market and science logics, and introduce two new logics: diversity logics and societal impact logics, collectively influencing the process of AE with an emphasis on social inclusion. More specifically, we advance the theory of logics by demonstrating how interplay of logics creates different kinds of salient points and pressures for academics and university management teams. Second, we contribute to the diversity literature by exploring how the different institutional logics apply to various populations. Diversity at STEM is of increasing importance and relevance (Greider et al., 2019), and it is critical to study it beyond the gender effect (Sattari and Sandefur, 2019). Finally, our practitioner contributions go beyond academia. We put forward managerial implications that are bottom-up and tailored, based on thorough understanding of experiences and views of academic entrepreneurs.

3.2 Theory and extant literature

3.2.1 Institutional logics

The institutional logics perspective has been increasingly used in management studies (Lee and Lounsbury, 2015), looking at the interaction between innovation, entrepreneurship and policy in particular (Su et al., 2017; Upton and Warshaw, 2017; Berggren and Karabag, 2019). Institutional logics are defined as the "socially constructed, historical pattern of material practices, assumptions, values, beliefs and rules by which individuals produce and reproduce their material subsistence, organize time and space, and provide meaning to their social reality" (Thornton and Ocasio, 1999, p.804). Logics can be applied as negotiable strategic resources in order to influence and justify decisions, practices and organizational change (Dalpiaz et al., 2016; Purdy et al., 2017); and as legitimate means to achieve a certain goal (Bjerregaard and Jonasson, 2014).

Logics may be viewed as tools of change (Greenwood et al., 2011; Fincham and Forbes, 2015).

The idea of a multiplicity of logics has become important in recent scholarly work (e.g. Dalpiaz et al., 2016; Vickers et al., 2017; Berggren and Karabag, 2019). Scholars have paid attention to existing institutional logics that align or compete with each other (e.g. Vickers et al., 2017). Further, they have researched how new logics have emerged, become dominant and changed institutional fields (e.g. Kodeih and Greenwood, 2014). We believe that it is critical to understand the plurality of logics and their capacity to transform, resist, stabilize, regenerate or emerge in institutional fields and contexts. Academics are social actors operating with several logics in the institutional environments of universities. The key logics at work in the process of AE include profession, science and market logics. For instance, profession logic is based on academic practices and values (Lundholm, Rennstam and Alvesson, 2012), while market logic may be geared towards competitiveness and commercial outcomes (Thornton et al., 2012). Science logic, on the other hand, focuses on the value of science and knowledge built through research (Dunn and Jones, 2010). Logics are not always compatible, and when different logics interact with each other, they can give rise to conflicting values, goals and practices (Pache and Santos, 2010; Jaskiewicz et al., 2016). Different logics can co-exist and yet their interplay might still produce contradictions and lead to change (Vickers et al., 2017). For instance, profession logic may coexist with market logic and science logic when academics are encouraged to commercialize their research or build stronger university-business collaboration; however, their interplay might generate different outcomes for different groups.

It is unclear how the different kinds of institutional logics create enablers or barriers for AE as experienced by diverse groups of academics. The dual nature of logics (i.e. enabling or constraining), and their interplay, as well as the salience of one logic over others is instrumental in shaping the process of AE. As some logics can coexist and compete for extended periods of time (Berggren and Karabag, 2019), it is also important to develop an

understanding on how competing logics can co-exist, as long as the development of a collaborative relationship is maintained (Reay and Hinings, 2009).

3.2.2 AE and diversity strands

We broadly define AE as the commercializing of the academic research base, generating wider impact for the economy and society. AE has attracted increasing attention in both scholarly and practitioner domains in the last few years (e.g. Balven et al., 2018; Belitski et al., 2019). Klofsten and Jones-Evans (2000) stated that all commercialization activities, outside of the basic university responsibilities such as teaching and research, are considered as AE. In order to receive marketable products and services from university research, some universities have started to make significant investments to enhance university/industry collaboration. Even though the commercialization of academic research is valuable in order to generate revenue, many universities emphasize creating social impact and economic development as another intended outcome of AE (Meek and Wood, 2016). More contemporary discourse on AE focuses on impactful research and the translation of the research base and findings into tangible outcomes for the economy and society (Wright, 2012; Siegel and Wright, 2015).

The challenges of commercialization in universities have also been explored in the extant literature (e.g. Rasmussen et al., 2006; Gümüsay and Bohné, 2018). The nature of the academic profession is such that it is permeated with multiple demands and expectations. Some scholars argue that the traditional roles of teaching and research might conflict with AE, resulting in less commercialized activities at university level (Ambos et al., 2008). In addition, it is essential to consider the characteristics of academic entrepreneurs with regard to their research subject areas, seniority, experience, external and internal support and their ethical views on entrepreneurship (Abreu and Grinevich, 2017).

AE relates to the discipline. STEM subjects tend to display a high degree of cooperation and collaboration with industry, mostly due to the availability of funding and industry interests in STEM projects and outputs (Haeussler and Colyvas, 2011; Karataş-Özkan and Chell, 2015). Therefore, we have chosen to focus on STEM departments where there is more evidence of AE, and where a diverse set of academics are involved in the process.

Regarding diversity and the commercial application of academic research, the literature is typically limited to gender impact (Goel, Goktepe-Hulten and Ram, 2015; Abreu and Grinevich, 2017). Females were found to be less successful in commercializing their academic research outputs and acquire venture capital or other types of funds to support the AE process (Smith, Henry, Etzkowitz, Meschitti and Poulovassilis, 2015). This may be due to individual motives or situational factors (Goel et al*.,* 2015). Their self-selected research areas might not be commercially valuable. Also, some of them are merely interested in scholarly endeavor, even though their work could be commercialized (Karataş-Özkan and Chell, 2015). Time limitation is another underlying reason for such lack of engagement in AE. While all academics tend to emphasize how busy they are, women, especially, indicate that they have already full schedules, and complain about time management being an issue (Karataş-Özkan and Chell, 2015).

Ethnicity is an under-researched diversity strand in the context of AE. Saxenian (2002) argues that foreign-born scientists have a higher tendency to become entrepreneurs, because they may recognize opportunities that do not exist in their home countries. Supporting this argument, Krabel, Siegel and Slavtchev (2012) note that foreign-born scientists may have experience of different research methods due to their diverse academic backgrounds and cultural environments, which enhance their social capabilities. Yet, there are barriers as well, such as lack of proficiency in English (or the language of the host country), which in turn affects their involvement in AE (Romero and Valdez, 2016).

There is even less research on other strands of diversity and AE. With regard to age or seniority, the discussion mostly relates to how senior academics have a stronger network and more experience in enterprise activities (Klofsten and Jones-Evans, 2000), commercialization and advanced networks (Stephan and El-Ganainy, 2007; Karataş-Özkan and Chell, 2015). Nevertheless, this is not to imply that younger academics are not interested in commercialization; as novice researchers and entrepreneurs (Wiklund and Shepherd, 2008), they tend to generate many novel or original scientific and technological outputs and projects. In terms of career development (Baruch and Vardi, 2016), AE is imbued with opportunities and constraints for many under-represented groups.

We relate and extend the work in these domains by investigating the respective process of AE from an interplay of institutional logics perspective, with a focal emphasis on diversity strands that profile the academics involved in the process. The importance of this study lies in its focus on the relationship between AE and diversity elements, particularly addressing the contextual landscape, as called for by Welter (2011). This contextual landscape refers to the institutional influences, norms, values and practices, namely institutional logics, associated with the multi-dimensionality of the academic profession in general, and academic entrepreneurship in particular. These considerations led us to focus our empirical investigation on the following research questions:

(i) What logics do shape the process of AE as experienced by academics with diverse profiles?

(ii) How is the interplay of logics and actions instrumental in creating and sustaining socially inclusive environments for AE?

3.3 Data and methodology

This is exploratory qualitative research (Patton, 2015; Myers, 2019), adopting an interpretivist approach (Patton, 2015), to explore the multiple views and experiences of the academics. They are situated in their institutional context, mainly universities and the wider world of technology transfer.

3.3.1 Data sources and production of empirical material

The researcher conducted 55 semi-structured interviews with academic members of staff in the STEM departments of six UK universities, considered high research intensity ranking according to The Complete University Guide (2018). The characteristics of the participants are presented in Table 3-1.

Participants were selected through purposive and snowballing sampling technique (Patton, 2015) in order to obtain different views from a diverse group of academics in STEM departments with various levels of experience in the AE process. We also investigated the relationship between the diversity of the workforce within STEM (i.e.

gender, ethnicity and age) and the enablers or impediments to AE which influenced this relationship. Interviewees were approached by e-mail and via Heads/Deans of Schools/Faculties in the selected universities. Participation was voluntary and confidential. Twenty-nine participants were female and 26 were male, selected from different age groups and/or career stages (post-doc to professors), and from various ethnic groups. All the interviews were conducted face-to-face, audio-recorded (Miles and Huberman, 1994) and lasted between 30 minutes to 120 minutes (Chapter 2, Section 2.3.2 and 2.3.4).

Table 3-1 Profile of the participants

Interview No	Position	School/Department	Gender	Nationality	Age
P1	Prof	Engineering	M	British	50+
P2	Prof	Engineering	M	British	25-39
P3	Post-doc	Engineering	M	Chinese	25-39
P4	Research Fellow	Engineering	M	Chinese	25-39
P5	Prof	Chemistry	M	British	50+
P6	Prof	Chemistry	M	British-Persian	40-49
P7	Research Fellow	Engineering	M	Spanish	25-39
P8	Research Fellow	Engineering	M	British	25-39
P9	Research Fellow	Engineering	M	British-Indian	40-49
P10	Prof	Mathematics	M	British-Chinese	50+
P11	Prof	Chemistry	F	American	50+
P12	Post-doc	Engineering	M	British	25-39
P13	Post-doc	Chemistry	M	German	25-39
P14	Prof	Medicine	F	British-Chinese	40-49
P15	Associate Prof	Mathematics	M	Vietnamese	25-39
P16	Prof	Chemistry	F	British-Scottish	50+
P17	Prof	Chemistry	M	British-French	50+
P18	Post-doc	Chemistry	F	British	40-49
P19	Prof	Chemistry	M	British	40-49
P20	Associate Prof	Medicine	F	British	50+
P21	Prof	Engineering	M	British	40-49
P22	Research Fellow	Physics	F	Czech	25-39
P23	Prof	Medicine	F	British-Romanian	40-49

P24	Reader	Medicine	F	British	50+
P25	Associate Prof	Chemistry	M	British	50+
P26	Prof	Chemistry	M	British	50+
P27	Prof	Chemistry	F	British-Australian	40-49
P28	Prof	Chemistry	F	British	40-49
P29	Post-doc	Chemistry	F	British	25-39
P30	Post-doc	Chemistry	M	Thai	25-39
P31	Prof	Medicine	M	British	40-49
P32	Prof	Medicine	M	British	50+
P33	Post-doc	Chemistry	M	British	25-39
P34	Prof	Medicine	F	British	50+
P35	Associate Prof	Medicine	F	British	25-39
P36	Post-doc	Medicine	F	Dutch	25-39
P37	Prof	Chemistry	F	British	50+
P38	Post-doc	Chemistry	F	Danish	25-39
P39	Post-doc	Chemistry	F	British	40-49
P40	Post-doc	Chemistry	F	British	25-39
P41	Post-doc	Chemistry	M	French	25-39
P42	Prof	Chemistry	F	British	40-49
P43	Prof	Medicine	M	British	50+
P44	Post-doc	Chemistry	F	Italian	25-39
P45	Post-doc	Chemistry	M	British	25-39
P46	Post-doc	Chemistry	F	British	50+
P47	Post-doc	Chemistry	M	British-American	25-39
P48	Post-doc	Chemistry	F	German	25-39
P49	Associate Prof	Chemistry	F	Croatian	40-49
P50	PhD student	Bio/Medicine	F	British	25-39
P51	Post-doc	Bio/Medicine	F	German	25-39
P52	Research Fellow	Chemistry	F	British-Israeli	25-39
P53	Business Mentor	Bio/Medicine	F	British	50+
P54	PhD student	Bio/Medicine	F	Latvian	25-39
P55	Associate Prof	Medicine	F	British	25-39

Due to the qualitative nature of this research, the following stages of thematic qualitative data analysis was applied (Miles and Huberman, 1994; Nowell et al., 2017). After analyzing and examining the interview transcripts and field notes, collected data were organized and sorted by creating codes categorized as first-order, second-order and third-order codes. This approach is consistent with the analytical approach, which includes

open/initial coding, axial coding and selective or focused coding, drawing on Corbin and Strauss (2008). First-order codes referred to open/initial codes that led us to identify analytical concepts and categories and helped us to refocus our research questions. Second-order codes explored the subject of the research by investigating the relationship between concepts and categories and the purpose of the analysis, in order to lead to the process of theoretical integration - explained as axial coding by Corbin and Strauss (2008). Third-order codes (aggregate dimensions) can be described as selective or focused orders (Gioia et al., 2013), which helped us develop our key conclusive themes in addressing the research questions. Figure 3-1 gives a representation of the final first-order, second-order and third-order codes generated from the analysis and interpretation of the interview data.

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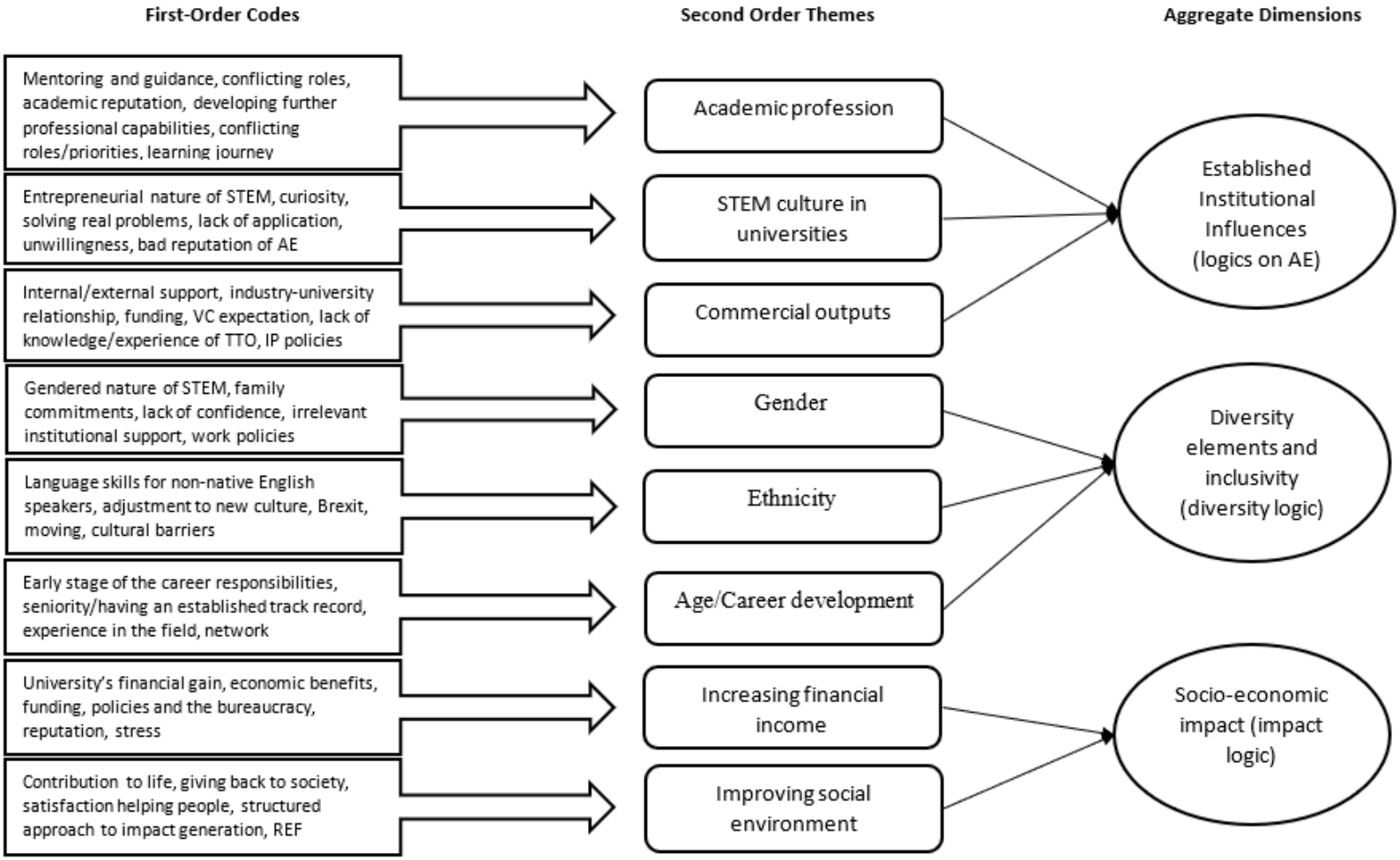

Figure 3-1 Data Structure

3.4 Findings

3.4.1 Key institutional logics shaping AE

AE is a dynamic process, mediated by a multitude of elements which are driven by a diverse set of logics (see Table 3-2). Our analysis suggests that there are key logics which co-exist in shaping the process of AE, mainly profession logic, science logic and market logic. These dominant logics enable academics to make sense of what they are doing in practicing AE, and also in reflecting on their motivations, enablers or constraints in the process. We will explain each logic in the context of AE, placing emphasis on their interplay and subsequently their capacity for generating new logics.

Table 3-2 Academic entrepreneurship and logics

	Existing Logics			**New Logics**	
	Profession Logic	***Science Logic***	***Market Logic***	***Diversity Logic***	***Impact Logic***
Enabling aspects	-Mentoring -Academic reputation and career development -Developing further professional capabilities	-Entrepreneurial nature of STEM departments	- Internal support - External support	-Inclusive work environment that appreciates the value of contributions from different groups	-Contribution to society and economy
Constraining aspects	- Conflicting roles - Gap between academic and industrial partners	- Lack of application of blue-sky science or unwillingness of the scientist - Bad reputation of commercialization	-Lack of knowledge and experience of the TTO staff -University policies on IP	-Ineffectiveness of existing diversity schemes and compliance approach to diversity	-Over-emphasis and pressure on the academics through a structured approach to impact generation

3.4.1.1 Existing logics of profession, science and market

Profession logic is highly important for academics, who are not only contractually obliged to undertake certain professional activities, but also to engage in activities that are acknowledged as legitimate and are required by their profession by simply belonging to a particular discipline and wider academia. Our findings reveal an important aspect of the profession logic, mentoring which is instrumental in AE. Mentoring is traditionally a significant part of the academic culture. Creating a relational network is one of the most important aspects of the profession logic; people connect with each other through the nature of their discipline as part of the academic profession. Its significance is not only related to developing the mentees as academic entrepreneurs by generating further contacts, creating strategic resources and sharing their experiences, but also to instilling an entrepreneurial spirit and orientation throughout the mentoring process, in order to encourage commercialization.

> *"What mentoring gives you is advice, the advice of how to actually do the thing that you want to do. It gives you the contact, because quite often the mentors have contacts that might be your customers, or they might give you law advice, or manufacturing. But it also gives you confidence." (P8)*

Mentors can be instrumental in assisting with the decision-making process when evaluating the fitness of a commercial idea - often characterized by the tension between science logic and market logic. Mentors are not only considered as 'strategic resources' who provide advice throughout the process but are also useful in generating further contacts for the development of an entrepreneurial idea.

Furthermore, academic reputation and career development have been revealed as enablers embedded in professional logic. There are cases which demonstrate that AE can contribute to career development and advancement (i.e. promotion to professorships).

> *"I took the Industry Fellowship for two years, it was definitely a contribution toward my career development. It was just before my promotion to full*

> *Professor, so understanding the needs of industry and research made an impact on my personal career." (P11)*

In addition, AE helps scholars to develop further professional capabilities. In some cases, academics also have opportunities to collaborate with colleagues from different departments, which creates a new environment in which to share and extend their knowledge. Our study reveals that engaging in entrepreneurial activities within academia improves abilities such as problem-solving in science and in business.

> *"The positive sides are the people and learning completely new things. I mean learning about scaling up and learning about chemical engineering, learning about business and about what the words mean and how you can do deals, all that sort of stuff. That is really fun!" (P37)*

This cultural outlook at the disciplinary level involves certain types of skill sets in practicing AE. These transferable skills are required for public engagement.

> *"Yes, for my personality and my own ambition, it is about inventing new things, making new things happen. It is about interacting with the people that you would never interact with." (P14)*

Profession logic can also have impeding aspects. Impeding elements could present themselves as the tensions that arise from the interplay of logics. One major issue is the conflicting roles that academics need to perform as professionals. Teaching, research and administrative duties need to be fulfilled concurrently in order to maintain their position at the university. However, these aspects of profession logics do not always reconcile. Adding AE to the equation is sometimes a difficult task.

> *"It is a competition between research, teaching, administration and entrepreneurship. And like anything else, you've got to compete with your time; prioritize your time." (P5)*

Furthermore, academic professional routines and ways of acting (such as lack of agility, time and project management, etc.) do not always align with the profession logics in industry. There is a gap between industry and academia in terms of expectations and

meeting deadlines which creates misunderstandings between the two parties. Such misunderstanding could be harmful for university/industry relations, which are important dynamics for AE.

> *"There are a lot of academics who still believe that they can do what they want, how they want, in things that they are interested in, and that's it. And you know, that will be very nice, but actually life is not that simple anymore. If you want to do that, you have to join a research institute which is totally focused, no teaching, has something as its goal which you fit into." (P17)*

Turning our attention to science logic, our research has revealed the nature of STEM disciplines as being more conducive to the development of entrepreneurial ideas in the form of commercialization, supported by the university culture and structures. In addition, close links with industry, which help bridge the gap between academic work and application in practice, are cited as important in STEM domains, particularly in engineering. The very notion of addressing real-world problems is an important motivation for academic entrepreneurs.

> *"Particularly in the Engineering Departments, because they are often a little bit closer to industry, it is perhaps not seen as a bad thing that you are doing research and it translates into commercial products." (P21*)

Science logic is not fully imbued with facilitative attributes for AE. Blue-sky research does not often lend itself to commercialization or application to industry, and some scientists show unwillingness to engage in AE in their universities.

> *"Some academics do not want to do any applied research and are only motivated to do blue sky research and the fact that they want to understand how the system works." (P55)*

In addition, some participants argued that scientists who are involved in AE develop a bad reputation due to the opportunistic image they portray; they are not seen as noble academics any more. This perception is a negative attribute of the science logic.

> *"I feel like academics have a bipolar attitude toward business. On the one hand, there is a perspective that is held by several academics that the commercialization of research and thinking about it when embarking on a research project is actually a dishonorable thing to do and you should not be doing that. It detracts from the purity of research. On the other hand, there is REF impact, you are constantly being assessed on your ability to engage with business and engage beyond the academic ecosystem, and there is a pressure on you to produce economic impacts." (P47)*

Most of the participants agreed on the importance of the external and internal support they received as academic entrepreneurs in STEM departments, which we interpret under market logic. AE is a process that not only comes from the application of a scientific idea, but also needs to be mediated by the elements of market logic. When discussing commercialization in STEM departments, it is crucial to include processes such as the finding of funding, the marketization process, developing technology into a prototype, etc. Internal influences include factors such as the existence of an incubator or accelerator environment, with implications for all elements of the process of AE varying from funding, legal services and market development.

> *"If the idea is very good, then it could also be easier to convince yourself and others to put more resources into it, I think. If it is a nice scientifically brilliant idea, and there is no market for it, then the idea is rubbish, in that sense. So we feel that in this case, it's a good idea and it's a good market potentially for it." (P13)*

The role of external funders is critical not only to fund commercialization projects, but also to drive an impact agenda in order to highlight the importance of impactful research with demonstrable evidence that it benefits the economy and society generally. Another key point is to understand whether there is a demand in the market for the product. As one of the participants pointed out, if there is no market for an idea, it will not be successful.

Furthermore, participants discussed the lack of institutional support in terms of not having a clear understanding of the entrepreneurial process and university policies on

intellectual property. They complained about the limited support from Technology Transfer Officers, mainly because, they believed, people advising them were not qualified to understand either the scientific or the business aspect of their projects. One academic who held a post-doc position mentioned that he was not able to get any useful advice from the TTO while he was spinning out, due to their lack of ability and experience. It was also suggested that academics may have a mistrust of the university, which creates tension between the two parties. This demonstrates the dual nature of market logics and perceptive differences between the parties involved.

> *"I had a bad experience with the university. I had some discussions with people that I just felt like, they were waste of time, and they did not understand the software and how to advise. A lot of people that work in the TTOs in my experience, work in TTOs because they are not actually very good in business. If they were good in business, they probably work in a business. That is my impression with the TTOs." (P47)*

3.4.2 New logics and their capacity for action and change in the field

Our research reveals two new logics which can be instrumental in shaping the AE process and related policies in the STEM departments of universities. These are diversity and societal impact logics. Diversity logic can be explained by looking into aspects of the process associated with the experiences of academics from different diversity categories and the institutional underpinnings of these diverse experiences. On the other hand, societal impact logic can be explained as engaging in research which contributes to society (and the economy) is a major motivation for research-oriented universities. Distinctiveness of societal impact logic lies in the emphasis placed upon influencing societal debates, altering behaviours and addressing societal challenges, which is different from market logic.

3.4.2.1 Diversity elements and diversity logic

Three strands of diversity appeared to be significant in shaping the experiences of academic entrepreneurs. These were gender, ethnicity and age (mostly linked to career

stage). A positive dimension of diversity logic was that having a diverse research group, with both female and male scientists indicated better outputs in the research. In other words, an inclusive work environment which appreciates the value of contributions from different groups of individuals could lead to better understanding of a market product. An inclusive work environment ensured by university policies supporting equal opportunities for people wanting to be involved in AE is significant.

> *"Ensuring that you have a diversity is not just nice to have, it actually produces better results. The very best teams that I have run have had a mix of male and female. So actually, making sure you have both women and men is you get demonstrably better outputs; you get demonstrably better product; you get demonstrably better fit to what people might want in the marketplace." (P21)*

Conversely, the ineffectiveness of existing diversity schemes and compliance approach to diversity management was often mentioned as an impeding factor in diversity logic as an institutional influence. Even though creating an inclusive work environment is highly important, forcefully implementing change in diversity and equality is not sustainable. In addition to the need to adopt effective diversity schemes, existing values, principles and practices underpinning aspects of diversity logic should be acknowledged and improved. For instance, an Italian academic who had lived in several countries argued that she encountered prejudice due to her nationality.

> *"The fact that I am Italian, it was seen where there was some prejudice. And I feel like it was stronger here in the UK. I always felt like I had to prove something, because there was some prejudice against how the Italian system works." (P44)*

Similarly, the lack of gender balance in STEM departments leads to disproportionate allocation of work. For example, in order to promote visibility and influence of women academics in expert discussions and decision-making processes, there is a requirement to have gender balance in panels, in many universities. This adds more pressure on women academics in STEM departments as they are few in numbers and they have to bear additional responsibility compared to male colleagues. As expressed by some research participants, this deters many women academics in engaging with AE.

> *"There are mundane things like appointment panels. There must be a gender balance on every appointment panel. If you have 10 women in the department, however many appointment panels in a year, they are disproportionately you are going to have to serve on them rather than the men. [In the department] there are not enough women; it means the women have to attain that balance that has to do more than men do." (P27)*

Regarding the age category, managing an academic and entrepreneurial career simultaneously is highly unlikely, because the responsibilities of an early stage academic can be very demanding.

> *"Somebody who is just developing their academic career at 30, it's a brave person who says, 'I am going to stop this, and I am going to try a Spin Out'. Because that means stopping what they are doing, working for nothing for a year; you have got a family, your husband or your wife will say 'Where is the money?' you know, and you will say 'Oh it will come in a year's time'. You have two kids and it is really hard, so you need a job." (P1)*

Another participant highlighted the importance of networking and experience in order to receive funds and grants, which are essential for involvement in entrepreneurial activities at universities. It is a challenge to convince research councils or other funding bodies that one's research is important, and it needs support, especially for early career researchers.

> *"It all comes down to money doesn't it? But I think if there was some more responsible way of levelling that playing field, then it might help. Most funding doesn't give you that much time for you to start from scratch to get something together. It's not really feasible, mostly. … I think when you're more senior, you've sat on quite a few grant reviews boards, so you kind of know what probably constitutes a decent application." (P37)*

3.4.2.2 Societal impact logic

Societal impact logic has emerged as the other compelling logic that highly influences AE. Academics consider the impact and implications of their research beyond the academic environment when managing their projects. As a result, academic entrepreneurs are guided by a societal impact logic which aims to enhance cultural enrichment and quality of life, by improving health and wellbeing, increasing public engagement with the research and influencing public policies. These constitute the more enabling aspects of societal impact logic as an institutional influence.

> *"You always want to feel that whatever you are doing has some sort of impact. The opportunity to spin out a company and take an idea forward and then realise the potential. Once that become a possibility, that motivation of doing that was intense. There is a lot of satisfaction if you are adding value to a sector, then that is impact." (P45)*

However, our research has also identified tensions *within* this logic and its capacity to influence AE. Societal impact creation through AE is sometimes imbued with a paradoxical relationship between the university management and academics whereby university policies and bureaucracy may be perceived and experienced as barriers. Even though scientists could benefit from career progression by building personal reputation, the pressure is often too strong, as impact generation is seen as a way to get promotion or be successful within the university. In addition, it was mentioned that the pressure to create impact in research is an outcome of universities' interest in financial gain, which puts the scientist in a difficult position.

> *"Universities with all the impact and the REF, they're starting to realise that they do want companies and start up and commercialization. I think this is why [as] an academic, you must have a spin out company! Sometimes it feels like they encourage by saying that we have all those, in Teams and Projects when you [learn about] commercialization. But the policies and the bureaucracy is just trying to do the opposite; that's how it feels." (P52)*

"Obviously, the university care about impact, and impact is extremely important for University finance." (P43)

3.5 Discussion and Conclusions

The commercialization of university research is highly encouraged by research-oriented universities in order to increase the importance of collaboration with industry, and hence to improve economic productivity (Siegel, Waldman and Link, 2003) and societal impact (Gunn and Mintrom, 2016). It is also directed at improved social inclusion, i.e. the inclusivity of AE in terms of integrating diverse categories of academics into the AE process. Our findings clearly demonstrate that it is worth questioning and problematizing diversity issues in the context of AE in STEM departments from an institutional logic's perspective, thereby advancing the theory of institutional logics as well as shaping AE and our practical knowledge of AE.

3.5.1 Theoretical contributions

In order to improve the scholarly field of entrepreneurship, theoretical development is essential (Zahra, 2007). Our findings reveal that the context of AE is conducive to explicating the interactive power of logics, as a highly complex and multi-dimensional phenomenon. Particularly, we reveal the co-existence of three established logics (profession, science and market) in shaping AE in addition to the emergence of two new logics, diversity and societal impact logics. The findings also support theoretical claims about the co-existence of plural logics in shaping organizational phenomena (Nicolini et al., 2016; Upton and Warshaw, 2017), as well as tension amongst multiple logics (Binder, 2007), aligning with the argument that dominant logics play a significant role in shaping organizations' perceptions and reactions towards demands and requirements (Lee and Lounsbury, 2015).

We contribute to the institutional complexity discourse by revealing the dual nature of the logics conducive to enabling and constraining mechanisms of entrepreneurship within

the specific institutional academic contexts. In doing so, we provide empirical nuances to the institutional complexity surrounding AE.

The new logics of diversity and societal impact tend to co-exist and form a compelling blend for AE as experienced by under-represented groups of academics (by gender, age and ethnicity). In addition to a strong push by governments for impact (Rasmussen and Gulbrandsen, 2012; Slaughter and Leslie, 1997), academics show an increasing acknowledgement of diversity, emphasizing how such a logic contributes to enhancing AE and STEM academic cultures in general. However, our study also reveals that addressing organizational equality and social inclusion is challenging; it is not formulaic (Dennissen et al., 2019). For instance, a management approach only focused on compliance with laws and regulations about equal opportunities may not be conducive to a diverse and inclusive environment for AE. Rather, a diversity logic is about fostering a diversity culture in science and academic community, with associated values, norms and practices. Therefore, we propose that both new logics can be highly influential in shaping AE and its links with the wider societal agenda of diversity, equality and inclusiveness.

We expand research on multiplicity of institutional logics. Echoing Mair et al. (2015), we argue that intersection of logics may facilitate AE in universities, as it serves in meeting the demands of different stakeholders (universities, policy makers and research councils). Particularly, we demonstrate that AE is often leveraged in university environments for material (i.e. funding) as well as symbolic (reputation, impact, etc.) reasons. Put it differently, professional logic, with its associated values and processes, is configured to accommodate market and science logic, and other emergent logics, i.e. diversity and societal impact logics. This represents a shift in the psychological contract that academic have with both their employers and their profession (Baruch and Rousseau, 2019).

There are important implications for the strategic allocation of resources and the institutional procedures and management processes supporting AE. Such strategic resources have a dual nature as enablers and barriers in ways that the interplay of these logics that generate the resources brings about different kinds of pressures for academics with diverse profiles (mainly gender, age and ethnicity). Linked to the wider societal impact logic embracing social inclusion, diversity logic can be instrumental as a leverage

for better and more equal utilisation of such strategic resources and for developing institutional practices accessible to under-represented groups, such as women and people with different ethnic backgrounds or different age groups.

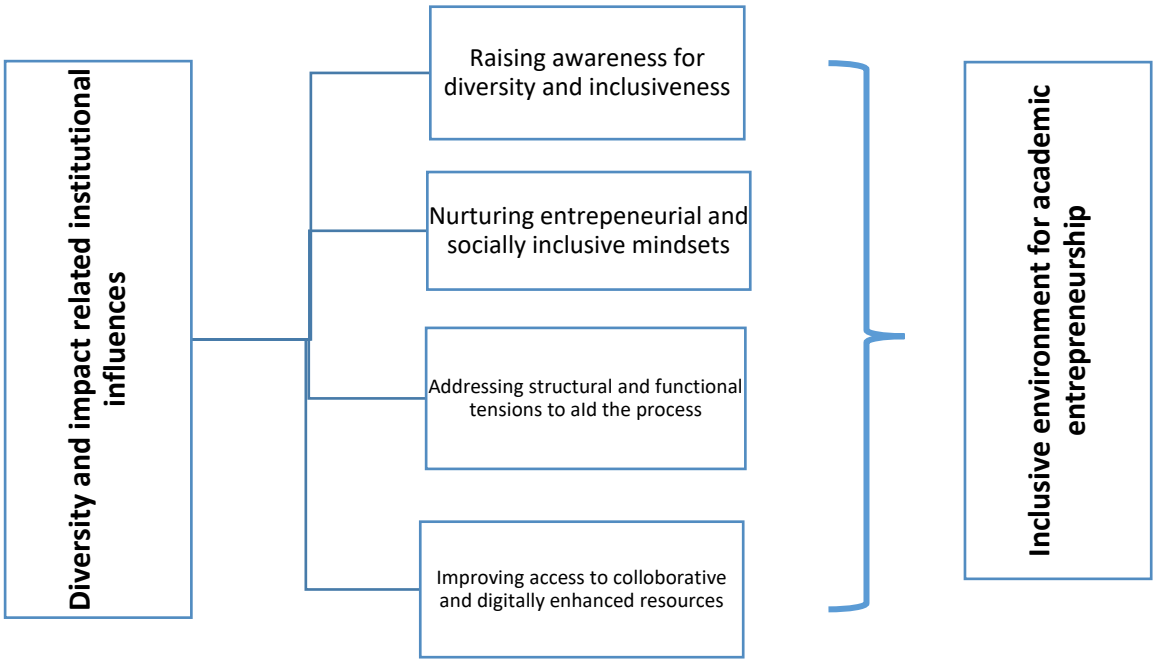

Figure 3-2 Socially inclusive work environment for academic entrepreneurship

Through our empirical application of institutional logics, we propose a conceptual framework (Figure 3-2) showing how the combined diversity and impact institutional logics can potentially contribute to developing an inclusive environment for AE, through effective managerial policies. This theoretical contribution implies also managerial implications as presented in the next section below. In summary, we propose that, in addition to the coexistence of profession, science and market logics, two emergent logics, i.e. diversity and impact, intersect in shaping the process of AE to address inequalities and achieve a more effective integration of a diverse academic workforce. This framework contributes to the theory on institutional logics from a pluralism perspective, as explained above, and precipitates the need for policy changes on these issues.

3.5.2 Managerial Implications

Our findings suggest that universities should increase the awareness of entrepreneurship by creating an inclusive environment and supportive culture, as well as developing sound institutional response strategies for realizing such potential. This would be instrumental to attract more talent and generate more academic entrepreneurs, new understandings and ways of promoting the outcomes of entrepreneurship within the university are essential. University management need to design new structures and foster a diverse and inclusive culture to eliminate the tension between traditional activities (research and teaching) and entrepreneurial activities, so that academics can be engaged in AE as a natural progression of their professional practice.

Senior management of universities should also be responsive to societal impact and diversity agendas which cater for the needs of such a diverse group of academics, and design institutional support structures that acknowledge these diversity and impact related influences. Technology transfer officers and any accelerator programs should adopt a strategic outlook and enhance skillsets in order to provide better support in guiding academics, which could prevent tensions and mistrust between the university (i.e. relevant departments such as Technology transfer officers and university management)

and academics. Such aligned engagement with university departments could help AE in creating a more sustainable and effective socio-economic impact.

To improve effective managerial policies, we suggest a need to : (i) raising a high level of awareness of AE in terms of societal impact outcomes and the potential to address diversity and inclusiveness challenges; (ii) nurturing entrepreneurial and socially inclusive mindsets, by incorporating relevant entrepreneurship and diversity training alongside business practices across the spectrum of academics in relevant disciplines; (iii) addressing structural (e.g. relationships between different units of universities and academics) and functional (e.g. funding and networking) tensions to support AE with an emphasis on socially inclusive work environments; (iv) improving access to resources for AE through collaborative and digitally-enhanced and inclusive ways/platforms, for example funding hubs, encouraging partnerships with industry through platforms, and facilitating peer-to-peer learning across the board (i.e. with academic entrepreneurs beyond the individual university boundaries).

3.5.3 Limitations and agenda for future research

Our results may be affected by specific characteristics of the universities under study. To increase the generalization of the results, future research could extend this study to different types of universities and in different countries. This would enable gaining a more holistic understanding of the phenomenon, while some of the logics could be explored in different institutional settings. For instance, contextual differences (i.e. between EU, USA and developing economies), would also shed further light on AE, as they would reveal different nuances to the diversity and impact logics as well as the most established logics (research, science and market), thus potentially pointing to the need of tailored macro-policies for AE.

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Chapter 4 Paper 2

Actions speak louder than words: How do gendered dynamics of academic entrepreneurship influence women academics' response strategies?

Abstract

In this paper, we examine institutional orders and institutional logics that characterise academic entrepreneurship (AE) ecosystems, which lead to gender based differentiated responses by academics. Gendered nature of entrepreneurial ecosystems is a relatively new topic. We focus on factors that condition women academics' engagement in AE in STEM fields of research-intensive universities. Drawing on a qualitative study of 64 interviews with STEM department academics and Technology Transfer Officers of research-based UK universities, we found that the key institutional orders that play a major role include university, industry, family and educational establishment. Women scientists cope with varied institutional logics that institutional orders present by developing responses such as reinforcing their position as academics rather than academic entrepreneurs; shifting the focus towards academic reputation and impact; legitimising AE at the intersection between science and market logics; challenging societal impositions of domestic roles and affecting change in schools/educational establishments as role models.

Key words: Gender, academic entrepreneurship, institutional logics and orders

4.1 Introduction

Academic entrepreneurship (AE) has gained increasing prominence in scholarship as well as policy domains. Developing effective entrepreneurial ecosystems for AE is highly instrumental for the outcome of such commercialisation activity (Malecki, 2018). Further, the current Higher Education agenda expects academics to generate not only research and teaching, but also 'impact' beyond academia. This impact agenda is increasingly linked to AE in universities and socio-economic and political implications of such activity. Yet, it is unclear how entrepreneurship activity can be retained and sustained in academia (e.g., Rippa and Secundo, 2019). Entrepreneurial activity in any form is shaped by interconnected institutional forces at multiple levels. One useful construct to capture this interconnectedness is entrepreneurial ecosystems. Entrepreneurial ecosystems are often characterised and measured by multiplicity of actors and institutions and relationships between them (Spigel, 2017; Spigel and Harrison, 2018). Our research underlines the centrality of institutional orders and the logics that emanate from these institutional orders in the context of AE. As such, AE is a complex process that presents interplay of multiple co-existing and sometimes conflicting institutional logics from which academics, as key actors of the ecosystem, confront varying prescriptions (Tunalıoğlu, Karataş-Özkan and Costanzo, 2019; Chapter 3).

Inclusivity of entrepreneurial ecosystems has been a recent theme in the extant literature. Our research problematization aligns well with a recent call for further research at the intersection of gender and entrepreneurial ecosystems (such as Thompson et al., 2017; Brush et al., 2019; McAdam et al., 2019). Drawing on from works of Stangler and Bell-Masterson (2015) and McAdam et al., (2019), an inclusive entrepreneurial ecosystem entails four domain conditions to become established and effective: density, which refers to the number and proportion of individuals engaged in entrepreneurial activity; fluidity, which means population flux, labour market change and firm growth; connectivity, reflected in the existence and deployment of networks; and diversity of the opportunity. Especially the last two aspects, connectivity and diversity of opportunity, pertain to our study strongly as our focus is on the gendered nature of entrepreneurial ecosystems in the context of AE from science base.

It is important to investigate diversity in entrepreneurial activities, particularly gender diversity, because of the growth in female academics in all fields, in STEM domains in particular as women STEM entrepreneurs have an essential role as role models (Poggesi, Mari, De Vita and Foss, 2020). Success in entrepreneurial activities may be a key factor for the sustainability of the sector, and the lack of females in this activity is a challenge. Thus, we aim to investigate the gendered dynamics of institutional orders and logics that condition women academics' engagement in AE in STEM departments of research-intensive universities, with an emphasis on their responses to such institutional forces stemming from the AE ecosystem. This triggers the following research questions:

1) What are the key institutional orders in an AE ecosystem, which presents differentiated logics for women scientists? (Meso-level)

2) How do women scientists/academics respond to these logics in navigating through the ecosystem, tackling issues of inequality? (Micro-level)

In order to address these questions, we have carried out 64 semi-structured interviews with both female and male academics as well as technology transfer officers as part of the entrepreneurial ecosystem. The analysis of our empirical material illustrates that while university, industry, family and educational establishment are prevailing institutional orders that generate several institutional logics, women academics develop responses to engage with these institutional logics in navigating through the associated prescriptions in order to tackle inequality. We make the following contributions to advance scholarly knowledge in three main ways: Firstly, we offer an empirical, theoretically based contribution to gendered nature of AE ecosystem literature by explicating the underpinning transitory meso-level institutional forces that influence women's participation and success in AE, and demonstrating the link between these institutional dynamics and agentic responses of key actors. Secondly, we contribute to ongoing research on institutional orders and logics by responding to calls for research bridging meso level aspects of the institutional process with the micro-elements (i.e. individual level-strategies). Lastly, our choices regarding methodology manifest the value

of in-depth qualitative research design to generate insights into a newly emerging field of entrepreneurial ecosystems, which so far predominantly relies on quantitative data.

The rest of the paper is structured as follows: we examine the AE ecosystems from a gendered perspective and present an overview of institutional orders and logics in order to problematize the relationship between AE ecosystem and gender dynamics. In the next section, we next present our methodology, followed by findings related to the institutional orders leading to logics and responses of women academic entrepreneurs. Lastly, we present the study's conclusions and discuss our findings and the limitations of this research.

4.2 Literature review

4.2.1 Entrepreneurial ecosystems from a gender perspective

Research on entrepreneurial ecosystems has excited many scholars in the field recently. Its approach to entrepreneurial contexts as a composite network of actors and institutions is useful and can be instrumental in explaining the multi-layered nature of entrepreneurial process and its embeddedness at the intersection of macro-environment and meso-relational factors. Mason and Brown (2014, p.5) defines entrepreneurial ecosystem as a “set of interconnected entrepreneurial actions, institutions, and entrepreneurial processes which formally and informally coalesce to connect, mediate, and govern the performance within the local entrepreneurial environment”. The emphasis on institutions, processes and connectivity is worth highlighting. Ecosystem-based views of entrepreneurship elevate a dynamic and socially complex aspect of interaction characterising entrepreneurial process (Brush et al., 2019). Other definitions of entrepreneurial ecosystem (e.g. Isenberg, 2010; Autio, Kenney, Mustar, Siegel and Wright, 2014; Garud, Gehman and Giuliani, 2014; Scaringella and Radziwon, 2017) support this approach with focusing on combination of stakeholders including individuals, entrepreneurial teams, supporting organisations and policymakers anchoring in interaction with each other jointly working towards economic growth.

It is important the highlight the importance of cultural and policy dimensions, Spigel (2017) defines entrepreneurial ecosystems as the union of localized cultural outlooks, social networks, investment capital, universities, and active economic policies that create environments supportive of new start-ups. Spigel explains the ecosystems from a perspective of the interplay among cultural, social and material attributes; he emphasizes the connections between these attributes for developing and reproducing entrepreneurial ecosystems. For the purpose of this research, drawing on Spigel, it is important to stress that such material attributes as entrepreneurial support organizations, government-backed funding schemes or university-support programmes for technology entrepreneurship are unlikely to succeed unless they are underpinned by supporting and aligning social and cultural attributes. This implies and leads to a host of tentative questions such as what constitutes key material, social and cultural attributes of AE ecosystems; what the associated institutions are within each domain of material, cultural and social; how they interact for generating inclusive (or non-inclusive) settings for AE.

With an objective to develop a robust understanding of university-based entrepreneurial ecosystems through a qualitative research, Theodoraki, Messeghem and Rice (2018, p.153) reinforce social capital element of ecosystems by arguing that applying the structural dimension of social capital enhances access to resources; addressing the cognitive dimension strengthens interactions between ecosystem actors; and stressing the relational dimension enhances complementarity and trust as the ecosystem evolves. Universities in general, university-based incubators, form a specific domain of institutions whereby relationships between actors and structures shape the process of AE. Complementarity between academic and non-academic actors; trust; sharing a similar vision (Theodoraki et al., 2018), and equal access to opportunities are key for developing and sustaining a healthy ecosystem for AE. Departing from this standpoint, we argue that we need to better understand the key institutions and the associated logics within an entrepreneurial ecosystem, which is the task of this paper as reflected in the first research question.

A widespread approach in the extant literature on ecosystems is needed to link ecosystem's structural components (such institutions as government, universities, incubators or accelerators etc.) to main actors (such as entrepreneurs, venture capitalists, policy makers etc.). Advocating a process perspective of entrepreneurial ecosystems, Spigel and Harrison (2018) present the following dimensions as differentiating factors of entrepreneurial ecosystems: the role of state, accessing regional resources and benefits, the role of knowledge, key actors and industry. Role of knowledge is naturally associated with the role of universities as producers of academic entrepreneurs. In terms of the emphasis on connectivity between different actors and institutions, we should consider resource flows and resource recycling (see Spigel and Harrison, 2018) as well as knowledge flows, particularly for AE. Do these knowledge and resource flows create an equal level of playing field for women and men scientists in engaging entrepreneurial activity? How do their experiences vary in accessing institutions and associated resources of an ecosystem? These questions warrant answers and we seek to delineate these in the context of AE in the current study.

On the other hand, gender inclusiveness of entrepreneurial ecosystems is a very new topic covered in the extant literature; and it is likely to receive further attention given the issues raised both in academic and policymaker circles. Drawing on the study by Stangler and Bell-Masterson (2015), in a recent work McAdam et al. (2019) note that women's activity is underrepresented in entrepreneurial ecosystems. Two key characteristics of entrepreneurial ecosystems approach (as discussed above and by Stangler and Bell-Masterson, 2015) are connectivity and diversity of opportunity. The role of networks (social dimension in Spigel's 2017 conceptualisation as presented above) is a domain condition for effective entrepreneurial ecosystems.

Diversity of opportunity is equally important due to the degree and type of access to opportunities. For example, female entrepreneurship's (lack of) legitimacy as a career choice is a function of this (lack of) diversity of opportunity (McAdam et al., 2019). Another example could be whether there is a gender disparity in securing angel financing (material dimension of the ecosystem in Spigel's conceptualisation); this is taken up by Poczter and Shapsis (2017), who found that gender disparities exist in the magnitude of investment received by women, which also varies according to industry.

In line with previous conceptualizations of entrepreneurial ecosystems stressing social capital and networks as important components (Isenberg, 2010; Stam, 2015; Spigel, 2017), it is revealed by Neumeyer, Santos, Caetano and Kalbfleisch (2019) that there is a difference in the distribution of social capital and network connectivity between male and female entrepreneurs. They have also found ethnicity-related difference, which is entrepreneurial ecosystems favouring white male and white female entrepreneurs.

It is on this basis, we identify ecosystems as a useful framework for unpacking diversity dimensions of AE, particularly gender dimension. This is a complex and multifaceted research issue. Role of gender and forming gender-based norms, values and logics can be traced back to institutional orders such as family, educational establishments etc. Recently, scholarly work has provided evidence for the importance of education in STEM subjects for entrepreneurial activity; for example, Dilli and Westerhuis (2018) argue that closing the gender gap in science education at the country level is beneficial for (female) entrepreneurial activity because it helps to create a gender-egalitarian environment by providing role models for women entrepreneurs. They also show that gender roles are highly embedded in informal institutions and persist over time. These points elevate the role of institutional forces shaping AE and agentic responses of women academic entrepreneurs. This links us to our theoretical underpinnings drawn from institutional theory.

4.2.2 Theory: Institutional orders, logics and agency

Institutional logics as a theoretical lens has gained traction in business, management and organization studies, with a focus on its explanatory power for complex symbolic and material organisational practices. According to the key theorists of institutional logics, logics are defined as “socially constructed, historical patterns of cultural symbols and material practices, including assumptions, values and beliefs, by which individuals and organizations provide meaning to their daily activity, organise time and space, and reproduce their lives and experiences” (Thornton et al., 2012, p. 2).

In order to unpack this definition and illustrate the underlying assumptions of institutional logics, it is essential to we need to understand the root construct, which is “institution”. For Friedland and Alford (1991), institutions are combinations of symbolic constructions and material practices that give meaning to the ways people engage in their social and organisational life. According to Mutch (2018), institutions generate a logic that provides meaning to the practices organisations and individuals engage in by forming the “laws of motion" of an order (p. 244). These orders are conceptualised as institutional orders in institutional theory, which represent institutional domains possessing distinctive logics (Thornton et al., 2012). They form the starting point for logic; hence, logics emanate from these institutional orders. The original list of Thornton et al. (2012) includes the following institutional orders: family, community, religion, state, market, profession and corporation. More recently, Mutch (2018) has offered a modified and a slightly expanded version of these institutional orders incorporating family, economy, medicine, religion, play, knowledge, politics, military and law. These institutional orders define sources of legitimacy and agency underpinned by value systems and meanings; and therefore, conditioning logics that shape the form and nature of strategies and actions individuals take (Ertuna et al., 2019). Thus far, this debate has contributed important insights for approaching our first research question concerning the key institutional orders of an AE ecosystem that presents differentiated logics for women scientists. In our study, major institutional orders that pertain to this question include university, industry, family, and educational establishment. Significant logics that are associated with these institutional orders are as such that university context is characterised by science, profession, market and diversity logics as explained in Paper 1 (Tunalıoğlu, Karataş-Özkan and Costanzo, 2019). Industry, as an institutional order, has two prevailing logics, societal impact logic and market logic even though diversity logic started to gain prominence. Family is dominated by family and diversity logics; whereas educational establishment generates more of profession logic and diversity logic. These are meso-level constructs, which help us unpack the guiding values and principles available to organisational actors.

As to answering the second question, it is essential to move further onto the agency. Institutions are viewed as shaping the ‘preconscious understandings that organisational actors share’ (DiMaggio, 1988, p.3), thereby concealing possibilities outside those

understandings (Cardinale, 2018). This is rather problematic because the role of agent or agency is important in understanding individual action within institutions. This debate on actors' embeddedness with their ability to change or maintain institutions has been at the heart of institutional theory and associated scholarship. Based on Giddens (1984), many institutional theorists are subscribed to the view that structure provides possibilities for action but also it actively induces actors to pursue some of those possibilities rather than others (Cardinale, 2018). This is linked to the concept of bounded agency from an interdisciplinary perspective. According to Evans, bounded agency is "socially situated agency2 (2008, p.93) and she argues that individual decision-making processes are bounded by social institutional and macrosocial conditions. One of the intersecting dimensions of bounded agency focuses on the potential of social change (Evans, 2017), which makes it particularly relevant for the current study. The notion of framing the possibilities for action and the degree of influence (Powell and Rerup, 2017) to affect social change raises important points for our second research question, namely how women academics respond to these framing logics in navigating through the AE ecosystem, tackling issues of inequality. Does this space of AE create latitude for agency of women academics? In other words, whether they can rise above the limitations of the meso institutional and organisational forces (i.e. associated orders and logics as described above) and therefore able to tackle inequality is at the centre of our inquiry.

4.3 Methodology

4.3.1 Research approach and sample

Employing an exploratory qualitative research paradigm (Myers, 2019), we conducted sixty-four semi-structured interviews with academics from STEM departments and nine technology transfer officers from at least one of the included universities (Chapter 2). This exploratory study adopted an interpretivist approach to explain the experiences of STEM academics who work in highly ranked six research-oriented universities in the UK, which

are selected on the basis of the University League Table (The Complete University Guide, 2018).

Purposeful sampling technique was applied in this research (Patton, 2015). People from different age groups/career stages and ethical backgrounds in order to achieve a diverse sample that gives us different approaches were recruited. For instance, a post doc and a professor or a British and a non-British participant's perception of similar cases presents different points of view. In addition, due to the underrepresentation of women in other STEM departments such as engineering (STEM Women, 2019), our women participants are mostly from Chemistry and Medicine. Sample size in our study is far above the norm in qualitative studies (Saunders and Townsend, 2016). This has enabled us to reach the saturation point of data, which is the primary means of verification in qualitative studies (Corbin, Strauss, and Strauss, 2014). Interviewees were approached by email and via Heads/Deans of Schools/Faculties in the selected universities. Participant details are illustrated in Table 4-1.

Table 4-1. Profile of the participants

Overall Interview No	Position	School/Department	Gender	Nationality	Age
P1	Prof	Engineering	M	British	50+
P2	Prof	Engineering	M	British	25-39
P3	Post-doc	Engineering	M	Chinese	25-39
P4	Research Fellow	Engineering	M	Chinese	25-39
P5	Prof	Chemistry	M	British	50+
P6	Prof	Chemistry	M	British-Persian	40-49
P7	Research Fellow	Engineering	M	Spanish	25-39
P8	Research Fellow	Engineering	M	British	25-39
P9	Research Fellow	Engineering	M	British-Indian	40-49

P10	Prof	Mathematics	M	British-Chinese	50+
P11	Prof	Chemistry	F	American	50+
P12	Post-doc	Engineering	M	British	25-39
P13	Post-doc	Chemistry	M	German	25-39
P14	Prof	Medicine	F	British-Chinese	40-49
P15	Associate Prof	Mathematics	M	Vietnamese	25-39
P16	Prof	Chemistry	F	British-Scottish	50+
P17	Prof	Chemistry	M	British-French	50+
P18	Post-doc	Chemistry	F	British	40-49
P19	Prof	Chemistry	M	British	40-49
P20	Associate Prof	Medicine	F	British	50+
P21	Prof	Engineering	M	British	40-49
P22	Research Fellow	Physics	F	Czech	25-39
P23	Prof	Medicine	F	British-Romanian	40-49
P24	TTO		M	British	25-39
P25	Reader	Medicine	F	British	50+
P26	Associate Prof	Chemistry	M	British	50+
P27	Prof	Chemistry	M	British	50+
P28	TTO		F	Dutch	25-39
P29	Prof	Chemistry	F	British-Australian	40-49
P30	Prof	Chemistry	F	British	40-49
P31	Post-doc	Chemistry	F	British	25-39
P32	Post-doc	Chemistry	M	Thai	25-39

P33	Prof	Medicine	M	British	40-49
P34	Prof	Medicine	M	British	50+
P35	TTO		F	British	40-49
P36	Post-doc	Chemistry	M	British	25-39
P37	Prof	Medicine	F	British	50+
P38	Associate Prof	Medicine	F	British	25-39
P39	Post-doc	Medicine	F	Dutch	25-39
P40	Prof	Chemistry	F	British	50+
P41	Post-doc	Chemistry	F	Danish	25-39
P42	Post-doc	Chemistry	F	British	40-49
P43	Post-doc	Chemistry	F	British	25-39
P44	Post-doc	Chemistry	M	French	25-39
P45	Prof	Chemistry	F	British	40-49
P46	TTO		F	Indian	25-39
P47	TTO		M	British-Italian	25-39
P48	TTO		M	British	25-39
P49	Prof	Medicine	M	British	50+
P50	TTO		F	South African	40-49
P51	TTO		M	British	25-39
P52	Post-doc	Chemistry	F	Italian	25-39
P53	Post-doc	Chemistry	M	British	25-39
P54	Post-doc	Chemistry	F	British	50+
P55	Post-doc	Chemistry	M	British-American	25-39
P56	Post-doc	Chemistry	F	German	25-39
P57	TTO		F	Indian	25-39
P58	Associate Prof	Chemistry	F	Croatian	40-49

P59	PhD student	Bio/Medicine	F	British	25-39
P60	Post-doc	Bio/Medicine	F	German	25-39
P61	Research Fellow	Chemistry	F	British-Israeli	25-39
P62	Business Mentor	Bio/Medicine	F	British	50+
P63	PhD student	Bio/Medicine	F	Latvian	25-39
P64	Associate Prof	Medicine	F	British	25-39

4.3.2 Production and analysis of empirical data

Before each interview, participation information sheets were presented to the participants and consent forms were signed and collected. Following the research ethics procedures of the study, the identity of the participants was kept confidential. By providing the possibility and flexibility to explore new issues that emerged during the data collection and analysis process (Patton, 2015), the interview guideline included questions on participant's level of engagement in AE, key issues that underrepresented groups (mainly women) face, the ways they overcome those challenges, internal and external mechanism that plays any role on this issue and practices that encourages the participation of women in AE ecosystem.

The fieldwork involved travelling to the five cities in which the six targeted universities were located. Most of the interviews were held face to face in the interviewee's office or in a common area depending on the participants' convenience; few were conducted over the phone. All the interviews were recorded and transcribed verbatim to maintain precision of the data, supported by researcher's detailed field notes. (Miles and Huberman, 1994).

This study is a multi-level study, which sets out to address questions at meso-institutional and micro-individual levels. Multi-level methodological approach entails attending to

layers of findings that emanate from data, drawing on successful examples from the previous studies in this subject domain (e.g. Abreu et al., 2016; Karataş-Özkan and Chell, 2015). This multi-level approach has allowed us to "sustain the multilevel explanations of inequality and difference" (Nash, 2003, p. 43). In our case, this has meant abstracting from the data at the levels of meso and micro and revealing the patterns accordingly.

Following a thematic analysis approach (Myers, 2019; Nowell et al., 2017), the initial coding was based on identifying concepts from the participants' perspective (Miles and Huberman, 1994). First order, second order and third order codes emerged progressively during the data collection after analysing and interpreting the interview transcripts (Gioia *et al.*, 2013). This inductive process revealed the emerging codes and patterns were grounded empirically (Saldaña, 2015). While analysing the transcripts, key aims were to identify key institutional orders and differentiable logics in the AE ecosystem and understand the women academics' responses to inequality. As the first order codes contains vast amount of information, in this paper we focus on presenting the second and third order codes (See Table 4-2).

Table 4-2: Coding structure (Second and third order codes illustrated)

Second order codes	**Third order codes**
Intersection of research and science, AE culture in STEM departments, working in a male dominated work environment, institutional influence, TTOs role, their TTOs lack of experience, IP policies	Legitimation
The role of internal and external support structure, reinforcing their positions as academics, enforcing equal opportunities in mentorships, commercial output dilemma, joining new networks that supports women, creating new collaborations	Reinforcement

Academic reputation, creating social impact, understanding the industry expectations, improving the social environment, managing conflicting roles, choosing career over family, prioritize their research interest and manage their time	Shifting the focus
Challenging societal impositions of domestic roles, raising young female's awareness on STEM subjects by mentoring Impact generation, dealing with structured approach, unbalanced workload, lack of role models, bias and inappropriate behaviour towards women scientists in STEM, rejecting positive and negative discrimination	Resistance

The analysis focused on the multi-level nature of the empirical insights. Third order codes include legitimation, reinforcement, shifting focus and resistance which are aggregated clusters of women's response strategies. For example, at the meso-institutional level; strategies formed by industry in the AE ecosystem such as TTOs, internal and external networks/initiatives, influence women academic entrepreneurs' level of participation. However, women demand expanding diversity strategies to the AE ecosystem by promoting equal opportunities. Therefore, micro-individual level analysis identified that women develop individual strategies such as resisting against societal impositions by challenging domestic roles, choosing to sacrifice family life to be successful in the AE ecosystem, raising awareness of young females with mentoring and joining more inclusive business networks. At the intersection of meso-micro analysis, increasing the level of industry involvement to create impact and forming AE projects with interdisciplinary collaboration is presented in the data.

4.4 Findings

4.4.1 Institutional orders leading to logics

Our findings address the two questions that we set for the study which examines the institutional orders leading to logics (meso-level dimension) and responses of women academic entrepreneurs (micro-individual level dimension). Key institutional orders of AE that affect women scientist's engagement include university, industry, family and educational establishment, and they create certain ways of norms, mechanisms and practices, which form the logics as we conceptualise at the meso-level.

4.4.1.1 University

University as an institutional order generates four key logics that influence AE. Science, profession, market and diversity logics form an amalgamated set of logics that define organisational and individual level strategies in turn. As part of the university environments, Technology Transfer Offices (TTOs) are significant for the academic entrepreneurial ecosystem, at the intersection of market and science logics. Bringing scientific projects closer to the market, TTOs play an important role in providing support to the academics to manage intellectual property resulting from innovative research conducted in the university into commercially viable products or services. Even though some universities believe their role is simply helping academics who seek help, in the research-oriented universities technology transfer officers mentioned that they are trying to inform academics who are not involved in commercialization by organizing events and training in order to improve academic entrepreneurial activities. Therefore, they have an important dual role: raising awareness for academic entrepreneurship and providing technical and other support for the process. This also implies that they have a role in shaping professional logic as well, as their influence guides academics' understanding and practice of their profession, and particularly their engagement in AE.

In relation to the gender dimension, technology transfer officers that were interviewed pointed out that they are not following any special agenda in order to encourage women

to engage in AE. Even though they address the lack of women representation in commercialization and they mention they are interested in creating a diverse environment at the university, they are unable to find a remedy for this problem:

> *"We currently do not do anything that looks like women in entrepreneurship. We specifically target groups across the University that we can see are unrepresented, or equally Faculties or disciplines. Try and really target and tell them what we do is useful. But at the end of the day, we want to see the diversity in the room." (P24, Male)*

Similarly, another Technology Transfer Officer confirms the statement above and declares that even though they are aware that women are underrepresented in the ecosystem and aim to include more women, they are not developing strategies to achieve that. Instead they focus on people they already have contracted them before:

> *"We haven't specifically targeted women in what we do. But we always make sure that when we invite people, we specifically look at gender and diversity. We put on an event, which is the first question we ask on the programme, to make sure that we are representing them. And when we know that somebody's got something good, we will target them, especially if we think that they might not come forward. We looked at people we knew, and when they did not come forward of their own accord, we chased them." (P35, Female).*

In perpetuating this lack of gender-specific approach to support AE at the meso-level, there are issues with regard to gendered dynamics associated with workloads and female representation of academics in STEM departments of universities. It is possible to argue

that most of the time, female STEM scientists have more responsibilities within the universities, compared to their male colleagues. A female academic entrepreneur states that she made a complaint against the duties she needs to fulfil as a female professor:

> *"There are mundane things like appointment panels. There has to be a gender balance on every appointment panel. If you have 10 women in the department, however many appointment panels in a year, they are disproportionately you are going to have to serve on them rather than the men. [In the department] there are not enough women; it means the women have to attain that balance that they have to do more than men do. If you have kind of remittance from other things in place of doing that, it would not be quite so irritating. If you had to do less lectures for example or less tutorials because you were doing all this extra stuff. But that never happens." (P29, Female)*

As to the representation, a male participant states that, due to the hostile work environment, there are less women scientists and academic entrepreneurs in STEM departments. He argues that women are less resilient:

> *"This is awfully broad, but they are often not as resilient as males. Women drop out because they say, "I do not want to work in an atmosphere which is so frightening all the time." So it is really hard. I mean I think personally the work environment here is worse than it has been ever since I came to the University." (P49, Male)*

Another important criticism that was presented by female participants is addressing the academic entrepreneurial environments as being highly male dominated. Beyond that obvious fact, a female academic commented on how male colleagues underestimate them explicitly. They argue that even though they are respected entrepreneurs and

researchers with established records, they are exposed to bias and inappropriate behaviour that women scientists have to cope with most of the time, both within academia and industry:

> *"There was one moment where we were presenting our pitching in a kind of competition and my colleague and I were giving the presentation together. And then one of the other participants came and said something about us being a "girl band", and that was a derogatory thing. I think they were jealous that we had given a really good pitch." (P30, Female)*

Associated with this issue, most of the participants mentioned that the lack of strong female role models in STEM departments is a significant problem that triggers the lack of representation of women in science and science-based commercialization projects. She also mentions she did not realize the fact that she will be the first female Head of Department before she got the position:

> *"I think role models are important, all that sort of thing to try and push it. In some ways, it would be good to have some strategic ways of widening participation." (P45, Female)*

In order to understand underlying reasons of women's underrepresentation in AE and prevent it, promoting diversity of opportunity is also crucial. According to participants having access to equal opportunities and connectivity within the AE environment is a work in progress that needs to be persisted:

> *"In the university, we have this diversity initiative. It is a lot about giving women more equal opportunities to take part in academic jobs, not necessarily science focused. But I suppose, because in society women are supposed to take care of*

children, that is the obvious thing. I think recent initiatives sort of give both men and women equal opportunities to take children's leave. But it is a very slow process. It is a multi-dimensional, multi-factor thing that needs to be tackled." (P39, Female)

Another participant elaborates on how lack of an inclusive environment is the key obstacle for what should we do to change it:

"We cannot force change, if we force change it will go the other way. What we have to do is set an environment, in my opinion, where everybody has an equal opportunity. We encourage people in an equal way, and that gives hand in hand with incentives like shared parental and flexible working." (P38, Female)

One other interesting issue is the influence of internal and external initiatives and networks (such as Athena SWAN and research councils). The lack of representation of women in the STEM department discernibly affects the number of women representations in senior/leadership roles. However, comparing the other STEM departments, the number of women academics in Medicine and Chemistry departments are relatively more. Head of Department of Medicine of one of the research-oriented universities, argued that initiatives such as Athena SWAN are valuable, but the most important thing is to achieve their objectives by applying them into the system:

One of the functions of being a Head of Department is to promote diversity and gender. We have an Athena Swan Committee. But my approach to Athena Swan is you know, that's just the badge, if you like, and you collect that on the way, it's not the destination. You know, the destination is proper diversity, is inclusion so that gender, disability, ethnic origin, religion do not impact. You know, it is your ability to do the job. I think in that sense, this Department in a large part, due to my predecessor is very, very diverse. We have a large

number of women in professorial and senior positions. We formally looked at pay balance for that. (P33, Male)

On the other hand, more sceptical participants argued that these initiatives are great in theory but not in practice. Therefore, the objective and implications of such initiatives need to be revised:

"Athena Swan is absolutely great. But actually, all people want to do is get the silver and gold of Athena Swan. They are not interested in what it means. They are not interested in actually improving things for women. What they are interested in doing is creating something that you can tick the tick box that gets you your prize." (P49, Male)

"In STEM Departments in the UK in general - is actually we are not a country who actually cares about this - it is more white male dominated in general. But of course there are some initiatives in order to change that. What I am trying to understand if they work - are there enough initiatives or could they be improved?" (P34, Male)

Overall, the meso-level analysis indicates that as a significant part of the AE ecosystem, TTOs influence market and science logic and play and important role in shaping academic entrepreneurs' career yet fails to address diversity logic. Even though there are some networks that encourages women's participation in STEM, participants of this study criticize their service. In addition, there are not many initiatives specifically for creating an inclusive AE ecosystem. Due to the male dominated nature of the STEM environment at the universities, women often have to cope with disproportionate workload and bias, which hinders their contribution to the AE ecosystem.

4.4.1.2 Industry

Industry as an institutional order appears to be characterised by market and societal impact logics within the context of AE. Female participants claimed that due to the lack of women in the AE ecosystem, most of the time they were the only women in the industry meetings, and they feel like their capabilities are always questioned by people they do business with because of their gender. A female serial entrepreneur explains:

> *"The business people do not wish to talk to you. And quite often you are the only woman. And you're the only woman there, and they don't really want to talk to you. And they don't want to talk to you because you are a woman. They think that you are probably soft or something, or they just do not want to be seen to be talking to you, or they don't know what to talk to you about. And it's quite difficult. You know, so all through my academic life, I would be the only woman at a meeting. I hated it! It was just horrible being the only woman or the only woman at a dinner. So, you just get the impression that people think that if you are a woman you cannot run a company." (P40, Female)*

The above quote indicates women scientists challenge more when they try to build a relationship with industry and pitch their ideas. This is rather encouraging as it means women need to prove their credibility both in research and business when they engage AE.

Even though their improving connections with the industry can be difficult, participants mentioned that their motivation being solely based on the possible impact of commercializing their research. One participant demonstrates how the idea of being part of ground-breaking research that would have a social impact on the society encourages her to be part of her research group:

> *"I am happy that I can participate in this project, because I really want to do something that has potential applications which can be used for in medicine. I*

like science but I want to do something which is more practical. […] Like this spin out company sounds really good. I want to do something that has real applications." (P22, Female)

4.4.1.3 Family

As it was mentioned above, gender inclusiveness of entrepreneurial ecosystems is a new topic and our data indicate that there are several elements why women activity is underrepresented in the AE ecosystems. Many of the participants argued that domestic constraints are the main reason for the lack of women scientists in AE in STEM departments in all the stages of their career:

"Women tend to be the person who is the first port of call for looking after the children. And you are lucky if you have got a healthy child; you have got a helpful husband, you know and it all works fine, and you are determined about what you are going to do, then you will probably do fine. It is difficult in postdoctoral years; that is when people are having babies, and that is just a fact of life; you can't do that any other way! But we do need to be much more flexible about how we keep people on board and bringing them back." (P37, Female)

Underlying the female position in society and the imposed responsibilities attached to that, another female academic entrepreneur, mother of two, argues that the root of the problem is deeper. She believes that she had to overcome the prevailing perception of women academics starting a family i.e. they are not meant to stay in academia:

"I think this is a long-standing problem in STEM subjects. I think you have to trace this back years and years. So, I was rather unusual, and I could see the women dropping off as I progressed further and further, even in an academic

career. There is a perception, and I think it has been true across all sciences to some extent, with family. This has been I think, probably is the single biggest issue." (P38, Female)

This perception leading to inequality is manifest in biased thinking and actions mainly on the part of male colleagues, who tend to see successful women academic entrepreneurs as outliers. For example, a male participant academic mentioned one of his female colleagues' engagement in managing her own research lab and commercialising her research as part of AE activity, while she had two toddlers. Although she is a well-established scientist and entrepreneur, her achievement, as a mother of two, has been seen as a rare success among the department:

"She really is very impressive. But I think the downside is that she is really impressive because they are not that many other people doing that." (P31, Male)

4.4.1.4 Educational establishment

While addressing the male domination in the STEM field, the importance of education starting from the primary school that encourages interactions of girls with science subjects emerged from the data analysis. There is a consensus on the importance of having women role models, starting from primary school level. Majority of the participants argued that the lack of role models as women who are successful scientists and academic entrepreneurs in STEM departments are rare. This causes self-doubt among young girls:

I think the problem starts at an educational level. Starting from let's say elementary school, primary school. There is still a very old-fashioned view for which men are suited for science and women are suited for humanities. (P52, Female)

"The reason why women are under-represented in science is something that every meeting it comes up; and every meeting we come to the same conclusion, which is that it really has to start at school level. So, we try as a Department, to do a lot of outreach, especially to girls at high school. We had different people from different divisions such as Maths, Physical and Life Sciences and the girls could choose which workshop they went to. We have an unconscious bias and treat the boys different than how girls are treated. When girls come here to do chemistry, and all they see is men tutoring them, or lecturing them, they just think 'Well where are the women?' And they just think 'Well, am I actually going to be able to do this, because I don't see any women around me who are people to look up to, and people to advise me.'" (P43, Female)

As indicated in the quotes above, many of the female participants agreed that making information on STEM career options accessible to girls before they start higher education could make a great difference. The increasing awareness on this issue led many female STEM scientists to volunteer to educate girls on choosing a career in science, who show interest from an early point of their education. If the number of women STEM scientists increase, in connection with that the number of female academic entrepreneurs in these domains would improve as well.

4.4.2 Response strategies of women academic entrepreneurs

Both female and male participants mentioned several strategic responses that are used by women entrepreneurs to navigate through the academic systems in order to cope with inequality. Drawing on the above-mentioned logics (i.e. societal impact logic and diversity logic, profession logic, science logic and market logic) that are highly instrumental in shaping women academics' responses in an AE ecosystem, we focus on their agency as translation of these logics into strategic responses and actions in this section. Main strategic responses include legitimising AE at the intersection of science

and market logics, establishing stronger relationship with industry; reinforcing their position as academics rather than academic entrepreneurs and joining networks whereby women industry representatives are present; shifting the focus towards academic reputation and impact, choosing to sacrifice family life over career; resisting against inequalities by raising awareness of young females with mentoring, rejecting discrimination and challenging societal impositions of domestic roles.

4.4.2.1 Legitimation

In order to be a successful part of the AE ecosystem, it is crucial to understand the gaps in the industry. According to our participants, one of the major obstacles of good interaction between academics and industry is living in two different words. Most of the time, the expectation of the industry entails different goals with different ways to see a project. However, this relationship could be improved by understanding the importance of both economic and social impact:

> *"Engaging in commercialization allowed me to really understand what the impact is and how to demonstrate the impact that your research is having, whether it is an economic impact or a political/social impact. The relation between the academics and the industry has an effect on the impact." (P64, Female)*

Participants also recognise the value of academy-industry collaboration in order to improve the research implications and how they maintain this relationship:

> *"I represent the university on the translational research collaboration which is a way in which industry is introduced to academics to try and work together to bring new drugs into patients in a sort of win/win situation. We benefit by helping get the drugs into patients quicker, and they benefit by having access to our patients and getting drugs into them." (P25, Female)*

Another participant explained that their research group decided to continue their involvement with an industrial partner because they were supporting their diverse research staff, which allows them to hire PhD students and post-docs from diverse backgrounds.

> *"I had been working with one particular industrial partner, who was sponsoring PhD's with us, and that did represent a tangible opportunity, though there was no agreement in place or anything there. There had been some discussions. So, it was on the strength of that alone really that the decision was to keep going with it." (P2, Male)*

On the other hand, women mention receiving funds that support her versatile roles is another challenge. Even though there is some support from industry and research councils that provide funding for women with domestic responsibilities, one of the participants argued that receiving such funding awards are very difficult due to the high demand. Because awards that encourage women scientists are limited, often the eligibility rules are too complex and there are many restrictions to be qualified. Through an industrial funding scheme, she was able to get a special expense budget and as a mother of two toddlers, she argued that without this budget she could not attend meetings and conferences to present her research where she creates new contacts for her spin out company.

> "I was lucky to get the woman in Science Fellowship (from an industrial company), which means they give me a sum of money that I can use for anything I want like paying childcare costs. It's a personal grant that allows me to do my research. I was able to go to a conference and I could take my child with me, because I was breastfeeding. I was very grateful. And that was

exactly what allowed me to kind of succeed in a way, because I was given this amount of money, I could use for myself, and how I see fit around my life to help me with my work. And there should be way more of that." (P61, Female)

4.4.2.2 Reinforcement

Our data demonstrated that women academics use reinforcement as a common strategy. Some of them mentioned that they reinforce their status as an academic rather than academic entrepreneur because expectation from an academic is overwhelming. Thus, in order to prioritize their work around their interests and manage their time efficiently, they choose not to engage in AE.

"As an academic, I jungle my teaching, my research, my supervision of my research students, the administrative tasks I have to do. Then they ask me to do entrepreneurship on top of that. I mean, I have never actively sought consultancies, I am sure I could get them if I did. But I haven't chosen to do that because of the time that it takes." (P11, Female)

Equally important, some academics find blue sky research more desirable and they prioritize their curiosity over commercial activities. Presumably money is a big motivation in the industry whereas in academia if scientists are interested in a problem, they simply try to solve it.

"Some academics don't want to do any applied research and are only motivated to do blue sky research and the fact that they want to understand how the system works, how different organisms or molecular pathways work without having an interest in their application." (P64, Female)

Having said that, many other participants mentioned that they are still interested in being part of the AE ecosystem. For women who aim to be involved in AE, being part of women's networks is a suggested strategy as it can help female entrepreneurs to get inspired, build up confidence and receive anticipated advice. Women want to help to and learn from each other and being part of such networks could provide an assistance to do both. This networking groups organize events with the contribution of women industry representatives such as CEOs, business angels, mentors and VPs, which allows women entrepreneurs to be exposed to new opportunities.

> *"In Germany I was part of a mentor network. It was only for women, and I was doing my PhD, I was partnered with an industry contact, who had generally high contacts in some (parts of) the industry. And that was quite helpful." (P60, Female)*

Another participant explained how these events helped her to understand the business culture in her area. She mentioned she was intimidated due to her lack of knowledge in the language associated to entrepreneurship as an academic, which is a subject she had the opportunity to improve since attending these workshops:

> *"I think the most useful thing from it (the workshop on entrepreneurship) was that it meant that I wasn't scared of the language associated with entrepreneurship anymore, because it can be quite daunting if you go into meetings with people and you've got all these kind of contract negotiations and people are talking about all these sort of things that you just never heard, and you have absolutely no idea what they're talking about. And you kind of*

feel really alienated. But these events opened that language to me; all the jargon that goes with entrepreneurship that meant that I kind of felt I could engage a bit more when I heard other people talking about it." (P30, Female)

4.4.2.3 Shifting the focus

Participants also argued that the impact of their research extends beyond the academic environment when managing their projects. Especially women academic entrepreneurs acknowledged the importance of creating a societal impact is more meaningful than merely having financial outcome. Therefore, their projects aim to enhance cultural development and quality of life. To have an influence on public policies by adding value to the sector is a primary motivation. One of the participants from School of Medicine explained her enthusiasm for developing interventions, ways in which she might try and improve people's health behaviours encourages her commercial engagements:

"For my personality and my own ambition, it's about inventing new things, making new things happen. It's about interacting with the people that you would never interact with. That's the thing what academic entrepreneurship allows to help you do. "(P14, Female)

A Chemistry scholar also explained that creating impact is often a requirement for promotion and her engagement in commercialization is valued in her department. But beyond that she demonstrated the significance of creating sustainable products that can improve people's life in her commercial activities:

"This is purposely the philosophy that I try to transfer also to my group when we think about commercialisation of products. How can we address a need that is present, but also how can we go to green chemistry stages; that means we consider the impact that our product makes on the environment.

> *It's about sustainability, green chemistry and the products which are not only doing what you want them to do, but they also leave low impact on the environment." (P58, Female)*

Similarly, another participant confirms this point and highlighted the importance of giving back to society:

> *"Giving something back. That's probably the biggest positive outcome of commercialisation. […] It has to have impact as well, and be of benefit to someone somewhere, that's very important." (P42, Female)*

In addition to shifting the focus of commercial activities from financial gain to societal impact, another women response strategy that is generated from data analysis is choosing to sacrifice family life over career and making a conscious decision to not have children. One of the serial academic entrepreneurs in the study explained that, from an early point of her career, it was obvious to her how difficult to become a mother and build a career she intended to have. She acknowledged that even though this is not the only way to become successful, women sometimes have to make hard decisions as such, whereas men rarely need to make similar sacrifices for their careers. Due to the nature of her irreplaceable role in her research capacity, leaving work for periods of time because of domestic responsibilities would have damaged her career progress. She also observes there are not enough research on this issue, which is directly related to lack equality in the AE ecosystem:

> *"I've thought about it a lot over the years, and thought 'Well, if I was going to be a mother, I would want to be there for my kids, and I wouldn't want to kind of be at home for a couple of months and then chuck them in childcare all day every day while I go back to my job.' There's a real clash there of what you would want to be and what is possible. And I think that's really difficult.*

And I think that's something that hasn't really been explored very much." (P29, Female)

4.4.2.4 Resistance

Following responsive action is echoed in the quotes of many of the participants who discussed the importance of mentoring for young female scientists, especially in STEM domains. However, as it was reported earlier, women academics have already high workloads and they have to multi-task in order to actively engage in the AE. As a result, being a mentor is another demanding task. Even so, it is a task that is accepted as noble by senior academics who wish to share their knowledge and experience with early-stage career female STEM scientists. One participant elaborates on this point and explains how this process inspires new people to become part of the AE ecosystem:

"I try, I love to stand up and do what I can (as a mentor) […] Last year, they asked me to go and sit in a panel and give my views, and that was to do with cooperation between industry and academia, which is an interesting topic in its own right. But a lot of the questions inevitably in that forum, was about trying to recognise women in entrepreneurship and business I think it's good, because it is actually getting people together, It is putting up role models of women in these sorts of areas, and that is inspiring to new people coming in and thinking about embarking on that sort of career, and that's what we need. That's what's going to change it." (P38, Female)

In another section of the same interview, the participant explains that as a female academic entrepreneur, who mentors early career researchers that are interested in commercialization, it is important to focus on the scientists' qualities rather than their gender. Therefore, she argues that discrimination based on gender (positive or negative),

is not helpful for women academic entrepreneurs. Instead, the focus should be on creating an environment that allows equal opportunities:

> *"So, allow people to properly understand their strengths and weaknesses, where that can build on things with someone. If that turns out to be especially helpful to women and allows them to let the playing fields be levelled out a little bit more, then that is a good thing too. The impact may be different, but the opportunities should be the same." (P38, Female)*

Another social factor that cannot be ignored in this research is the domestic commitments and constraints of women. The analysis indicated, many women academics who have domestic roles had to challenge societal impositions in order to compete for senior positions or continue their entrepreneurial activities. A post-doc researcher, who is also an academic entrepreneur, considers being a mother as an early career researcher as a disadvantage to get senior positions in her department. Addressing the difficulties to raise two toddlers she stated being determined is the only option:

> *"I had to take time off work for both my children and now I'm competing for the same professor job as a man. I think most of the time women take more responsibility for their kids than men. But I have to compete, and I need to have same amount of publications, same amount of travelling etc. But not everyone is so ambitious as me. Some women will just stay at home at the end, and gave up on their academic career, they just decided, well, it's financially better to stay at home. I cannot do that. I am very determined, but I don't know many people like me." (P61, Female)*

Similarly, a participant with two young children argued that things have moved a long way in terms of accepting flexible working to accommodate external activities, even though there is room for improvement. The recent changes in employment law provided an opportunity for her family to challenge the status quo on maternal leave:

> *"I had two children, one is four and one is very nearly two. For my first child, I took maternity leave; I took six months maternity leave, because that was the option. It was only me, so my husband had only two weeks paternity; he took an extra two weeks unpaid, at a later stage, great, but it was down to me. Between having my daughter and having my son, employment law changed, and there became the option to take shared parental leave. And my husband felt he missed out the first-time round. He said he would really like to take some leave, share the leave with me, and participate in our son's growing up in his early months. So that's what we did. And so that has been incredibly empowering." (P38, Female)*

These findings highlight the agency that women academics demonstrate as their response to cope with challenges they face in the AE ecosystem, drawing on the key institutional orders and differentiated logics, from which the root causes of such challenges stem. University, industry, family and educational establishment are fundamental orders that influence the AE ecosystem. Women STEM scientists seek for more effective internal and external support to overcome the challenges that are resulted by such institutionally driven inequalities in the AE ecosystem.

4.5 Discussion

4.5.1 Theoretical and empirical contributions

Employing an institutional perspective, we have addressed the following questions in this paper: What are the key institutional orders and logics in an AE ecosystem, which presents differentiated logics for women scientists? How do they respond to these logics in navigating through the AE ecosystem, in their efforts to tackle issues of inequality? By addressing these questions we offer empirical and theoretical contribution to the gendered nature of AE ecosystem literature by explicating the underpinning institutional forces and demonstrating the link between these institutional dynamics and agentic responses of the key actors (see Gehman, Lounsbury, Greenwood, 2016; Ocasio, Loewenstein, and Nigam, 2015). We have identified the key institutional orders generating the most instrumental logics that impact on women academic entrepreneurs' engagement in AE activity. These include the university, industry, family and educational establishments. Associated logics are identified as societal impact logic, diversity logic, profession logic, science logic and market logic. These institutional orders and logics have influence on women academics' responses in an AE ecosystem.

University as an institutional order acts both as an enabler and constraint; the role of TTOs is crucial in driving the AE agenda in universities. In university-based entrepreneurial ecosystems (Theodoraki et al., 2018), we have observed the intersection of science and market logics. Women academic entrepreneurs choose to strategize by legitimising AE at this intersection of science and market logics; and they tend to benefit from the wider institutional support mechanisms such as offering new PhD and postdoc positions, a better work environment that promotes equal opportunities, and initiatives like Athena SWAN. It is also possible to say to some extent technology transfer office support is important in order to achieve an entrepreneurial ecosystem at the universities that includes more women. TTOs should develop tools to encourage and reach out women, who are historically disadvantaged in this domain. Such tools might require a reflective

approach in considering outcomes of the AE process, which are not limited to male-dominated high-growth ventures (Neumeyer et al., 2019).

The salience of industry as an institutional order lies within the shifting focus towards academic reputation to create impact through AE activity, rather than solely focusing on commercial gains and productive or innovative capacity that an EE can generate via AE. This is crucial because this impact logic bridges the gap for social inclusion and allows for more women to get engaged in AE activity if not for purely market logic but also for impact and academic reputation reasons. Family is a constraint as an institutional order. Many women academic entrepreneurs choose not to have family commitments, particularly in their early career stages; they accept the need to work longer hours and have more responsibilities in order to achieve more and prove themselves. Educational establishment is another constraining institutional order that influences women scientists from an early age onwards. Associated logics are family and diversity logics in the sense that there is recently more effort to raise awareness of girls about women in science and technology as role models and mentors. While the structures of gender normalcy in society offer a limited capital for girls, they provide masculine power for boys through institutionalising forces (Skeggs 2004, McAdam et al., 2019). More inclusive schooling and educational systems are significant in order to help young girls develop an interest in science and build confidence in themselves. The following Table 4-3 encapsulates these institutional orders, logics and associated strategies.

Table 4-3: Institutional orders leading to logics and response strategies

Institutional order	***Associated logic***	***Types of strategies (micro-individual and meso-organisational level)***
University	Science logic Profession logic Market logic	• Expanding diversity strategy to AE (Meso-level) • Forming diverse research teams, industry level-benefits of having a diverse group (Meso-level)

	Diversity logic	● Legitimation of AE at the intersection of science and market logics (Meso- micro level) ● Engaging in interdisciplinary collaboration (AE, getting funds; grand challenges, large team-research) for forming AE projects (Meso-micro level)
Industry	Societal impact logic Market logic Diversity logic	● Shifting the focus towards academic reputation or societal impact (Meso-micro level) ● Reinforcing their position as academics rather than academic entrepreneurs (Micro-level) ● Establishing stronger relationships with industry (micro-level) ● Joining the networks whereby women industry representatives (e.g. business angels, CEOs, VPs, mentors) are present (micro-level)
Family	Family logic Diversity logic	● Resisting against societal imposition of the domestic role of women (Micro-level) ● Choosing to sacrifice family life over career (Micro-level)
Educational establishment	Diversity logic Profession logic	● Raising awareness of young females about women in science and technology (Meso-level) ● Benefiting from role models and mentors at earlier educational establishment (Micro-level)

Our findings also have implications for institutional orders and logics research, which is increasingly prevailing in the business, management and organization studies.

Institutional logics derive from institutional orders (Ertuna et al., 2019) that shape the modus operandi in that domain. Linking these logics with the multi-level strategies such as legitimation, reinforcement, shifting and resistance (as exemplified by women academic entrepreneurs) addresses a call made by institutional scholars (e.g. Nicolini et al., 2016; Huq et al., 2017; Reay et al., 2017) about the need for further research that focuses on micro-level dynamics theoretically and empirically. In so doing, we contribute to theory by demonstrating the role of agency in affecting social change, social inclusion in this case. Relating to the notion of bounded agency (Evans, 2008; Evans, 2017), we reveal the constrained nature of agency in such institutional contexts i.e. AE ecosystems. Our research aligns with the previous research in that sense that women have agency in such circumstances, and they develop agentic strategic responses, rather than being a problem to be fixed (McAdam et al., 2019). Even so, such individual strategies are effective to a limited extent without a supportive institutional environment.

4.6 Conclusion and implications for policy, practice and further research

This paper demonstrates the prominent institutional orders and logics that shape the gendered nature of the AE ecosystem; and women academics' agency to engage with these orders and logics to develop response strategies to address inequality. Our multi-level analysis explicitly shows that further collaboration between meso and micro forces within the AE ecosystem is essential to overcome women's underrepresentation in STEM. In conjunction with our theoretical and empirical contributions, we offer policy interventions for organizations and recommended career strategies for women. This paper ends with recommendations for future research.

4.6.1 Policy interventions for organizations

Addressing issues pertaining to these institutional forces and associated strategies that we have revealed in this process will entail a re-examination of not only the process of AE related policies in universities and wider ecosystems but also the content of such policy

interventions. In terms of process, positive discrimination i.e. developing women-only solutions have limited effectiveness and their perception can be negative among the major players. Equally, one-size fits all approach leading to non-gendered provision of support structures should be avoided. A more tailored approach that addresses specific needs of women in specific stages of the process of AE and beyond (i.e. developing their careers as female scientists) is required. In terms of content, support mechanisms should be reconsidered carefully by considering how inequalities take different shapes and forms for women academics and by preventing the issue of reinforcing male academics' structural advantage supported by institutional forces.

Imposing cultural change within the workplace is needed. If the universities provide a better work environment for women who have family commitments who must multitask and divide their time between their research and domestic responsibilities, more women scientists might be willing to extend their research into commercialization. In this regard, university regulations and policies regarding maternity leave and family commitments need to be reorganized and be more supportive.

4.6.2 Recommended career strategies for women academics

Our study reveals how gendered dynamics of AE influence women academics' involvement in AE, by highlighting the diversity of their experiences. Indisputably, some women individually or collectively developed response strategies to exist and survive in an environment that they are not fully supported. Such response strategies of incorporation and resistance help women to make a difference by challenging male dominated STEM culture (Parsons and Priola, 2013). Unfortunately, influencing change is difficult to achieve by individual-level (micro) strategies. People's capabilities depend on both agency and openness of the social structure (Suzuki, 2017). Thus, we recommend the following career strategies for women academics, who can be active agents to create a socially inclusive AE ecosystem, as well as benefit from such an environment.

Especially in the early stage of their career, women academics in STEM should focus on forming or being part of more inclusive research groups. Engaging in interdisciplinary

collaboration could increase the possibility of receiving funds, from a range of funding bodies as well as industry, which could then lead to research that is more tuned with commercialisation. Improving their skills by receiving leadership training could be beneficial for promotion, if they are interested in more responsibility. Networking is key for academic careers (Kindsiko and Baruch, 2019), as in many other career routes. In order to avoid resistance from male financiers, clients and subordinates (Ezzedeen and Zikic, 2012), joining the networks whereby women industry representatives (e.g. business angels, CEOs, VPs, mentors) are present could increase the opportunity of engaging in successful AE activity and getting more recognition in their field.

4.6.3 Recommendations for future research

Our findings imply that further research might be required on the intersectionality of the diversity strands in looking into AE ecosystems, such as age, ethnicity, career stage etc. Future research could also explore each institutional order separately and in more-depth and reveal how such institutional orders and gender differences shape entrepreneurial activity. Another direction for future research is related to study design. A longitudinal perspective and associated empirical data would provide a better understanding of the progress made towards social inclusion of underserved groups such as women in the context of AE.

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Chapter 5 Paper 3

Accounting for equality and inclusiveness: Neoliberalism and academic entrepreneurship

Abstract

In this paper, we focus on demonstrating the significance of wider institutional dynamics that academic entrepreneurship culture present for social inclusion and highlight policy and practical insights. Drawing on empirical research with 64 STEM academics and 9 technology transfer officers, this paper unpacks the effect of neoliberal policies at higher education and inherently in academic entrepreneurship environment. Our findings support most of the debates on institutional policies lead to institutional change on; however, more emphasis is added on the significant bearings for pressures that academics experience, outcomes of diversification of funding and creating impact for not only economic but societal change. The contributions of this paper lie in demonstrating the relevant empirical and policy debates for AE through the concepts of Bourdieu's field and Foucault's governmentality by linking them with institutional logics perspective to offer policy implications.

Key words: Academic entrepreneurship, neo-liberal policies, institutional logics, field and governmentality

5.1 Introduction

Policy makers often introduce new regulations with the aim of developing the institutional structures. Despite the positive intentions to reshape the institutional environments, insufficient regulation designs could undermine the outcomes. These regulations have a direct effect on the way in which people act in particular fields. In the UK, with the emerge of neoliberal policies, higher education organisations are restructured (Radice, 2013; Olssen, 2016). Subject to these changes, approach to academic research (Moore, Kleinmann, Hess and Frickel, 2011), and evidently AE process influenced by neo-liberal policies (Brown, 2015). The ongoing conflict between academics over academic freedom and managerial pressures in the universities (Howells, Karatas-Özkan, Yavuz and Atiq, 2014), has caused tensions in the AE culture. Neo-liberal policies leading to less government support for research funding (Barr, 2004) have caused the universities being dependent on other sources of income (Middleton, 2000).

In order to navigate within the academic system, individual actors (academics) develop response strategies to deal with inequalities. Even so, such individual strategies are effective to a limited extent without a supportive institutional environment (see Chapter 4); for that reason, it is important to investigate the influence of macro-institutional forces on AE culture. A critical approach to expand our understanding of institutional forces and their role in shaping diverse groups of academics' experiences in engaging in AE process is required. Acker (2006) has developed a conceptual strategy for analysis the mutual production of gender, race and class inequalities in work organisations. For example, gendered nature of hierarchies is usually racialised as well and top positions historically dominated by white men. Inequality regimes are interlinked organising processes exits in all organisations one way or the other, that produce patterns of complex inequalities and therefore shape, and degree of inequalities are not always easy to detect. She argued that possibilities for change toward less inequality depends on the severity and visibility of inequalities.

This study aims to provide a better understanding of neoliberal policies reshaping macro-institutional processes to create an inclusive academic entrepreneurship environment. Social scientists must engage in persistent critique to develop political thinking and action, in the neo-liberal systems, this is even a greater responsivity (Bourdieu, 1998). The need for more research on the outcome of managerial and organisational studies to compete with neo-liberal policies and individualistic tendencies in these disciplines is required (Tatli et al, 2015). We address the following research questions:

1) How neo-liberal policies implemented by macro-institutional forces transformed academic entrepreneurship in the UK?
2) What are the policy insights that can create an inclusive academic entrepreneurial culture?

The contribution of this paper is three-fold. First, we contribute to the theoretical framework of institutional logics by utilizing key concepts of Bourdieu's field and Foucault's governmentality. We explore the influential role of the institutional environment on AE culture and advance the understanding of inclusive AE culture by analysing the perspectives of the influential actors, their actions and interest. Second, we provide recommendations for policy makers, by highlighting the shortfalls of the main problems in the field and proposing ways forward for inclusive academic entrepreneurship. Third, this paper offers practical recommendations for universities implementing academic entrepreneurship, holding organisational responsibility and capacity that can lead the way to positive change in the AE culture.

The reminder of this paper is structured as follows. We present and overview on the effect of neoliberal policies in UK higher education system, then review the underpinning framework of intuitional logics, field and governmentality in the context of AE. The methodology section explains sample strategy, data collection and data analysis techniques; followed by the empirical research findings. In the discussion and conclusion section, the findings are discussed in view theoretical framework and present research and policy implications.

5.2 Literature Review

There are several studies revolving around institutional changes from macro-level perspectives (i.e. government policies), focusing on university-industry relations and the role universities play in economic development (Lockett and Wright, 2005; Bjerregaard, 2010; Belitski et al., 2019). However, there is a dearth of research on the effect of macro-institutional forces and policies on AE and the lack of inclusivity within that field. In order to explore the lack of inclusivity in AE environment, it is essential to investigate the influence of neoliberal policies implemented in the UK higher education system.

5.2.1 The effects of neoliberal policies in UK higher education and AE

With the implementation of new public management reforms in the 1980s, UK universities are subject to institutional pressures that had multiple effects on the UK academic culture (Radice, 2013; Olssen, 2016). Deregulation of markets, promoting privatization and minimizing the role of the government weakened some institutions and changed the roles of public organizations with free-market principles (Greene, 1982; Baltodano, 2012; Lorenz, 2012). These reforms caused a transformation in public organizations, practices and strategies (Meyer and Hammerschmid, 2006), and indisputably this process has been more demanding and challenging on service-oriented organizations such as higher education and healthcare institutions (Carvalho, 2014).

The influence of these neo-liberal policies redefined the approach to academic research (Olssen and Peters, 2005; Moore, Kleinmann, Hess and Frickel, 2011), academic culture and the role of higher education institutions in the society (Brown, 2015). There is an ongoing conflict between academic scholars who value academic freedom and autonomy; and administrators who prioritize maintenance of the university management (Bartel, 2003; Howells et al., 2014). This divergence in approach results in tension between the key actors of academic entrepreneurship (AE) as well. Consequently, AE environment has been contingent upon such shifts in policy and academic domains as the state aims to create individuals with competitive entrepreneurial traits (Foucault, Davidson and

Burchell, 2008). This has brought about changes in the expectations from the academic scholars engaging in AE activity.

Another parallel development in higher education has been the rise in the number of universities and marketisation of the higher education. In the UK, the number of universities almost doubled in 1960s, which was followed by another expansion of the system in 1990s (Deem, Hillyard and Reed, 2007). This expansion had consequences both for academics and students. When the right of free higher education was lost, with gradually increasing university tuition fees, the expectation and behaviour of the students had changed (Deem, Hillyard and Reed, 2007). They perceived themselves as customers, as higher education institutions treat students as such (Seeman and O'Hara, 2006; Guilbault, 2016). When the students see themselves as privileged stakeholders purchasing the service of the teaching staff, they become less tolerant to unwanted poor results, as they also believe that academics should be responsible for their learning outcomes (Gross and Hogler, 2005). In parallel with the notion of students as customers approach, the academic staff felt pressured to meet the new expectations of students. As a result, academic culture in the UK has been changing as the role and mission of the universities are redefined. The changes in the policy field of higher education have transformed internal management structures, systems practices, and the professional academic culture of the universities. Organizational restructuring in most universities has led to cultural change triggering a new competitive environment at the universities, which compelled the academics to be more entrepreneurial and efficient. Conflicting interests in AE have intensified institutional pressures, and it has also caused inequalities within the AE ecosystem (Chapter 3 and 4).

Another significant outcome of the neo-liberal policies is related to the changes it caused in research funding. In line with the neo-liberal policies, increasing withdrawal of government financial support from higher education has entailed diversification of funding (Barr, 2004), which increased dependency of universities on other sources of income, namely commercialisation (Middleton, 2000). According to a recent OECD report (2019), UK government spending on research and development is below the OECD

average as a portion of GDP, which makes receiving public funding even more challenging (ONS, 2015; House of Common Library, 2020).

While the state's role as the funder of research transformed into a facilitator, the system is clearly built for continuing of control (Foucault, 1982,1991; Foucault, Davidson and Burchell, 2008; Lemke, 2002). In order to evaluate performance of academics in higher education institutions, new institutional accountability tools were introduced. Replacing the Research Assessment Exercise (RAE) in 2014, the Research Excellence Framework (REF), aims to assess the quality of research in UK higher education institutions. Through four UK higher education funding bodies (Research England, the Scottish Funding Council, the Higher Education Funding Council for Wales and the Department for the Economy, Northern Ireland), the REF assesses the value of research outputs, their impact beyond academic word and the environment that supports research activities, in order to determine the allocation of funding to universities (REF, 2021). The next REF is planned for 2021 by introducing a broader definition of impact that includes impact on teaching and public engagement. Universities' performance in the REF impact their reputation, whereas research groups and individual who contribute their institution's REF scores, enhance their reputation. As a result, REF has become one of the main funding sources.

As for equality, diversity, and inclusion agenda, it is stated that REF is governed by principles such as equity, equality and transparency (REF,2021). Equality and Diversity Advisory Panel (EDAP) has been established to advise the funding bodies to support equality and diversity in the research environment. The founding bodies recognize the importance of equality of opportunity. The significance of promoting equality and diversity in the UK Higher Education sector addressed in an open letter from the chair of EDAP (Berry, 2018), suggesting improved systems are in place against discrimination. The letter argues, for REF 2021, EDAP intends to minimize any potential negative impact on academics who were not able to produce output because of their equality-related circumstances. However, as REF plays an important role in individual researchers' career, the question remains on how to cope with invisible inequalities and unchallenged barriers that are affecting the engagement level of underrepresented groups in academia to this

assessment process (Yarrow and Davies, 2020). Academic researchers from underserved groups (i.e. gender, ethnicity and age/career development), suffers from influence of networks of male researchers and the predominance of British male senior decision makers. The dearth of women impact case study leaders in the last REF clearly shows the gravity of the situation (Yarrow and Davies, 2018). This also puts another level of pressure on academics from underserved groups who already deal with versatile job responsibilities. For that reason, it is significant to investigate if funding options are equally accessible for all academic researchers.

Considering the primary purpose of the REF is accessing the quality of research to decide how to allocate funding, REF submissions have influence on the AE process as well. AE process aims to create financial and societal impact at university level, and for that academic entrepreneurs need funding. Innovative research at UK universities contributes to economic growth and creates financial gain through AE in higher education institutions. However, the implementation of neoliberal policies has limited the access road to AE process with its restrictive approach to funding, creating unequal work environment for academics belongs to underserved groups and overall, in some cases, seeing AE as technology transfer rather than societal impact creation (Chapter 3 and 4). We argue that, the values underpinned this process is disputable. In the next section, the theoretical framework drawn from institutional logics perspective, amplified through the Bourdieusian concept of field and Foucaldian concept of governmentality.

5.3 Institutional logics, field and governmentality

The institutional logics perspective is a multi-level, meta-theoretical framework that can be integrated to social science theories to explain the effects of institutions on individuals, organisations, and societies (Friedland and Alford, 1991; Thornton et al., 2012). The significance of plurality of logics and their capacity to transform institutional fields, as explained in Chapter 3, when key logics (profession logic, market logic and science logic) and new logics (diversity logic and societal impact logic) of AE identified.

Accordingly, the interactions between the agents and institutions (macro-forces) conducted by differentiated logics. Building on that argument, in this paper we highlight applying institutional logics as negotiable strategies to influence change in organisations (Dalpiaz et al., 2016; Purdy et al., 2017). Related to this, co-existing and conflicting logics, and their interplay may generate different outcomes for different agents (Pache and Santos, 2010; Jaskiewicz et al., 2016).

Given the emphasis on the macro-context shaping AE, influences in a field are important to understand. Scott (2012) argues that, when individuals are subject to similar institutional forces, they constitute a common field. Understanding the concept of field is significant to conceptualize the relationship between policy and agency. Emirbayer and Johnson (2008) explain that early studies of institutional theory relies on Bourdieu's understanding of field. Bourdieu's field provides a foundation for the concept of organisational field in new institutionalism (Powell and DiMaggio, 2012). All the actors in the field struggle to transform or preserve the field with the power at their disposal, which defines their position in the field. In other words, structure of the field reflects power relations among the agents (Bourdieu, 1984, 1998). Fields are defined by their distinctive logics in which agents compete and struggle (Bourdieu, 1998; Powell and DiMaggio, 2012). Logics, structuring principles for action, enables analysis between different logics in the AE fields (Bjerregaard, 2010). For instance, it is observed that the political field constraints the logics that are available to universities and individual agents (Upton and Warshaw, 2017).

Individual agents in a given field strive to accumulate, increase and convert their capitals to enhance their position. This links us to another key concept of Bourdieusian theory, which is capitals. Bourdieu describes capitals as the property of the individuals, actual and potential resources they can use in the field (Bourdieu, 1984, 1987, 1998). Economic capital within the field is prominently economic gain, in other words, increasing university's financial fitness. Social capital is a shared sense of identity, norms, values that can create strategic alliance and cooperation, which is important to understand the road to inclusive work environment. Cultural capital refers to cultural knowledge, social status,

intellect and education. For instance, in the context of AE, we can refer to institutionalised cultural capital, when an academic institution recognizes a person's cultural capital (i.e. academic credentials, professional qualifications, experience in engaging in AE).

Even though there are critiques against Bourdieu's vision of individuals as passive agents pulled and pushed into varies actions and positions in life by structural forces (Vandenberghe, 1999). We accept the argument on Bourdieu's idea on agentic and structured forces shaped in not the unidirectional but iterative and relational way (Tatli et al., 2015). Bourdieu acknowledges social agents' potential to transform their setting and condition through capital (Bourdieu, 1984, 1987; Bourdieu and Wacquant, 1992). However, organisations draw the boundaries of individual agency through the defining principles of social field, reinforce or change the logic of the field (Chapter 3). Capitals and strategies are available to individual agents but governed by the logic of the field (Tatli et al, 2015). For example, inequality is constant and permanent; hence agents develop strategies to cope based on their positions in the field (Bourdieu, 1998). However, micro-individual strategies of any underserved groups are only effective to some degree (Chapter 4). Therefore, investigating on organisational insights utilizing social approaches is important in diversity management (Tatli and Özbilgin, 2012).

Foucault (1979, 1982, 1991), on the other hand, highlights the importance of the relationship between power and knowledge. He studied on how power operated, how power justifies doing something one way over other and how social systems make us to do certain things in certain ways. He has dealt with different modes of objectification, which transformed human beings into subjects, providing a unique perspective of the subject and how the human mind is constructed. He argues that through a set of mechanisms people are subjects and objects at the same time of a political strategy of

power. According to Foucauldian aspect, government shape and guide the conduct of people, and self-governance is a guidance force for the agents.

Governmentality as a concept, combines the term of government (practice of governing) and rationality (knowledge of governing practices), developed to explain the fundamentals of power relations that state exercise to control the population (Foucault, 1979, 1982, 1991; Lemke, 2002). The idea of governing at distance, "conduct of conducts", (Foucault, 1979, p.88), explains how government perform the art of governing. Unlike more traditional definitions of power, Foucault argues that, states produce more subtle ways of exercising power in the liberal societies', in which people are instructed to govern themselves by shifting power from the centre (Foucault, 1982, 1991; Joseph, 2010). Neo-liberal policies promote creating self-governed people by minimizing the agent's reliance on state resources and suggesting that is the natural thing for the people to do (Foucault, 1979).

Foucault argues that neo-liberal reforms created an environment that legitimate government's distance from the subjects and highlighted economic gain. Values and norms of the market logic have been accepted and internalised in all kinds of organisations, which eventually influenced the individual traits by penetrating into other areas of social life. Individuals have developed new characteristics to survive in the system, such as being competitive, resilient, innovative, risk-taking and flexible people with a strong sense of self (Leander and Van Munster, 2007). For example, in the higher education context, it is possible to argue the expectations from academics have changed dramatically with the influence of neo-liberal policies. They are increasingly obliged to adopt and develop more individualistic-driven entrepreneurial qualities, which often causes conflicts between professional logic and market logic.

Foucault out forward the concept of governmentality as a useful tool to tackle the problem of state and population. He had a critical approach and often encouraged people to analyse the rationalization of power and knowledge (Foucault, 1979). Bourdieu agrees

with Foucault that knowledge must be deconstructed. “Structures of discourse on the social world are often politically charged social preconstructions” (Bourdieu and Wacquant, 1992, p. 47). In parallel with this, our empirical investigation focuses on the following research questions that guided this research: *How neo-liberal policies implemented by macro-institutional forces have transformed academic entrepreneurship in the UK?* and *What are the policy insights that can create an inclusive academic entrepreneurial culture?* In exploring the influence of macro-institutional forces over AE and the policy insights attached to AE culture, the findings from this research highlight the importance of creating inclusive policies in the AE field. The empirical findings build on above-mentioned multi-layered theoretical framework and consider the implications for development and policy.

5.4 Methodology

In this paper, qualitative exploratory study was employed by taking an interpretivist stance. According to Gartner and Birley (2002), many of the important questions related to entrepreneurship should be asked through qualitative approach. Qualitative research on entrepreneurship can generate insights on public policies that promote and regulate entrepreneurial activities, which can enforce benefits to society (Gartner and Birley, 2002). Even though this approach has gained some recognition within different entrepreneurship domains (Berlung, 2007; Cope, 2011), have yet to be applied more to AE context.

Research data was collected from the UK context, as part of Engineering and Physical Sciences Research Council (EPSRC) funded project. Six leading research-oriented universities were selected based on their overall research intensity (University League Tables, 2018; see Table 2-4) for the semi-structured interviews. Purposeful sampling strategy was deemed appropriate for this research (Miles and Huberman, 1994; Patton, 2015). To provide a holistic assessment, the sample has included multiple actors from AE ecosystem such as academic entrepreneurs from different STEM departments, academics

with different level of experience and engagement in AE and academics who do not engage with AE. The sample also consisted on technology transfer officers as they are also part of the AE ecosystem. In order to address the diversity dimensions, both women and men academics were recruited, as well as academics from different ethnical backgrounds and age groups/career stages. Overall, 64 semi-structured interviews were conducted with 55 academic members of the staff (29 women and 26 men), and 9 Technology Transfer Officers. The details of the participants are presented in the methodology chapter (see Table 2-5), whereas Table 5-1 illustrates the number of the recruited participants based on their position, gender and nationality.

Table 5-1 Number of the recruited participants (position, gender, nationality)

Position	Professor: 27 Early Stage Career: 28
Gender	Women academics: 29 Men academics: 26
Nationality	British (without second nationality): 33 British (with second nationality): 11 Other nationality: 20

Data collection was carried out by the lead author through semi-structured interviews (see 2.3.3). The qualitative interview protocol (Appendix A) was designed understand the internal and external factors facilitating or impeding AE process. In addition, diversity workforce in STEM and underrepresentation of certain groups were investigated. The interviews lasted between 30 minutes to two hours. The interviews were conducted face to face when possible, and over the phone in rare instances. They took place either in the academic's offices or labs, common areas at the university buildings or coffee shops. All the interviews were audio-recorded and saved in multiple platforms. Each interview transcribed verbatim.

Data analysis conducted through thematic analysis technique, which enabled identifying the main patterns of data (Myers, 2019; Miles and Huberman, 1994). After the initial coding first order codes were developed main concepts were identified. This process allows the researcher to focus on specific characteristics of the data. Then, during the second phase, themes were reviewed and defined which were formed from the interpretation of the interview data. By focusing on the process and policies of macro-institutional forces, a more focused analysis determined the aggregate dimensions as *pressure on academics*, *diversification of funding* and *creating impact for change*. Table 5-2 presents the first code orders, second order themes, and aggregate dimensions (based on Gioia et al., 2013) It is essential to acknowledge that researcher becomes an instrument for thematic analysis. Thereby, insightful findings generated from the data, ensuring rigor and trustworthiness of the data analyses process (Nowell et al., 2017).

Table 5-2 Coding structure

First order Codes		**Second order themes**		**Aggregate dimensions**
Restriction of academic freedom, multitasking, time management, research and teaching pressure, expectations of students, entrepreneurial culture, performance evaluation, policy decisions, importance		Managing changing expectations Policy regulations		Pressure on academics

of university rankings, international accreditations, credibility, communication				
International and interdisciplinary collaboration, limited university funding, research councils, industry-university relationship, competition, creating network, mentoring, VC perception, accelerator, training programmes, Brexit, lack of equal opportunities		Collaboration and networking Internal and external support structure		Diversification of funding
REF, assessing quality of research, solving real problems, giving back to society, problem solving, curiosity, financial gain, growth, research outputs, having inclusive teams, underrepresentation, domestic constraints,		Impact agenda Societal benefits		Creating impact for change

risk taking, building community		Inclusive work environments		

5.5 Research findings

The UK higher education field is one of the institutional settings influenced by the neo-liberal policies, causing institutional challenges over the AE process. These challenges mainly stem from enforcing pressure on academics to respond to different expectations, dealing with the diversification of funding and acknowledging the lack of inclusivity in the AE workplace. The following three sub-sections based on the third order codes address the research questions based on the empirical data. Table 5-3 presents the illustrated quotes.

Table 5-3 Illustrated quotes

Third order codes	**Illustrated quotes**
Pressure on academics	"Work-life balance is important. In academic career you work crazy hours and it is often incompatible with family life." (P63) "If you send out the message that success is, taking your salary, doing some research, doing some teaching, and there is no opportunity to learn anything more than that, then people will bound their aspirations." (P21)

Diversification of funding	"Because there are already so many spin out companies at the university, there is a good network. We've got lots of contacts in spin out companies, and we're just in the process of getting back in touch with all of them again to ask advice" (P30) "I think you need to have a good network. And if you have a good network, you can easily engage with more people. Not in terms of selling things or of getting money – everything. It's very useful I think to know people. And if you know more people, the better. I think if you want to know more people you need to have links. I need an introduction." (P9) I think sometimes the research councils aren't quite forward, they need to catch up with what's required, for flexibility. And I don't just mean flexibility in working hours, I mean flexibility in funding, whether it can be started, and it can be stopped, and it can be part time. You know, and those things aren't difficult." (P18)
Creating impact for change	"So that change, I think, the attitudes of some academic staff to impact an entrepreneurship and exploitation changes, because it was seen as something that you need to do in order to contribute to the standing of the department in terms (outcomes)of the REF, the outcomes of the REF…" (P5)

	"Having a group of people that are a little bit more diverse means that you often you know, spot things you wouldn't have otherwise spotted. Or people bring different perspectives to the table, if you – you know, people are all kind of similar to what you are, it's very easy to miss things. Whereas that entrepreneurship, that kind of spotting a gap, spotting something someone else hasn't seen, often requires lots of different viewpoints to be brought together." (21) "Doing something for society, that's always an important driver. Seeing your scientific hypotheses play out, ultimately you want it to be a benefit to society." (P6)

5.5.1 Pressure on academics

Many of the academics, whether they are active agents in the AE field or not, mentioned that they find multitasking responsibilities of being an academic scholar is highly challenging. They argued that due to the competitive nature of academic environments at universities (including the field of AE), they need to find a way to balance their work-life to avoid the restrictions of academic freedom. Their responsibilities often include research, teaching and taking on admin roles. Dealing with the workload and delivering expected outcomes is time-consuming and causes pressure. Many of them also stated that learning new traits such as commercialization takes time, even if when they are willing learn to be more entrepreneurial in the system.

"It is competition between, research, teaching, administration and entrepreneurship. And like anything else, you have got to compete with your time" (P5)

"Lack of time is a barrier, because you have so many different roles that you need to take on. And not all of us have the talents. Commercialisation of a product takes a certain time, effort and also prevents you from publishing for the time being" (P58)

Apart from the challenges emerged from performing multiple roles, academics have always been assessed by the quality of their work; in research, teaching and admin responsivities they take over. The outcome of these assessments is quite significant to retain their position and progress in their fields. In addition to that, now they are also evaluated on how entrepreneurial they are due to the institutional change lead by neo-liberal policy applications:

"In my appraisal reading, there's a box to fill in for enterprise. As a Professor, I get appraised every year, and one of the things I comment on is my enterprise activities and what I do or what I don't do." (P11)

As having entrepreneurial traits is required and considered as an achievement, an Engineering Professor indicates he consider himself lucky to become an academic entrepreneur. His successful initiatives make way for his promotion and ensured him more recognition in his faculty:

"I was very lucky to able to have some time out in spin out company, and also retain my role as an academic as well. So actually, I was able to do both at the

same time, when I came back to the full time (actually that's what originated the role of Associate Dean for Enterprise)" (P21)

Participants also recognised the influence of policy regulations and government interventions. Institutional changes experienced as a posing challenged to both universities and academics, affecting the positions of actors within the AE environment. University rankings and receiving international accreditations are very important to advance universities' credibility, which in a way increase the pressure academics are experiencing. For instance, a post-doc stated the pressure to produce economic impact is a significant factor in the field and this process determined by the government regulations:

"There is this reality of working in UK universities right now, you are consistently being assessed on your ability to engage beyond academic ecosystem, There is this pressure on you to produce economic impacts and it measured by (the rules) set by the Government." (P55)

Moreover, an early-stage career research fellow argued that the policies determining the AE process in universities are not efficient. Considering the lack of resources and operation as the core of the problem, the responsibility to develop these policies depends on the policy makers and other macro forces.

"I think currently the major problem is the commercialization process, the policy itself, it's just very slow. The university really a lack of resources to the work. I'm not saying they are doing a bad job, it's just that the policy itself just makes the whole process very slow." (P4)

5.5.2 Diversification of funding

As highlighted by the participants, being part of networks and projects that are promote collaboration is one of the most important tools when having access to funding. The importance of being part of a network and engaging with new people in your area of research, is highly instrumental for academic entrepreneurs, especially for early stage career academics who lack of such connections in the beginning of their academic career.

> *"Reaching out to people […] help you to pitch your idea, present it in an understandable way and then you have the chance to secure the funding to make the products." (P58)*

Moreover, new research directions can be developed from funding which can lead to more academic collaborations. One of the participants, a Professor of Chemistry who works in international and multidisciplinary projects, explained how they expanded their lab after getting initial funding through a network. They were able to invite people from other departments into their research, as new job opportunities were created for academics from different levels.

> *"We've had all sorts of new research directions that have sort of come off that main project. Some of those have been really academically exciting, relating to new academic collaborations." (P30)*

More pertinently, being part of such projects can help academic entrepreneurs to learn commercial skills on the job. For instance, another participant explained how being part of commercial projects enhanced his knowledge on AE and develop his instincts while deciding on entrepreneurial actions:

"Being involved in multiple projects was helpful for my professional development. Because I have learned so much. So, in the future, if I come up with something, I can say if that works on a big scale. And then, having that experience of knowing the first steps; realistically how long to do things, how hard it is and how to break a project down" (P31)

Notably, in many of the interviews, the role of internal and external structures and lack of funding opportunities were mentioned, when applying and receiving funding. Research is produced by academic and successful collaborations driven by researchers. However, without the integrative support from the institutions and appropriate funding, delivering impactful outcome is not possible. With university's limited funding due to the government's distance approach, puts academic entrepreneurs in an unsupported AE environment. Even though research councils play an important role in distributing funding, the opportunities are limited in the competitive and fierce AE field. In addition, and the availability of these opportunities up for discussion

"I mean in general; I think that the University is under-funding itself in this area that the resources are stretched so thinly" (P2)

"Well I suppose it's hard to get big academic grants, it's hard, because you don't know where you're going to be next, and you don't know if you're going to get another grant to stay in the university you're in, and you might have to move universities, so you're constantly worried about your next grant, and your next funding opportunity." (P42)

"And the bigger challenge in the UK is actually finding the funding that's available" (P6)

Several participants, who predominantly works at international projects funded by different international funding schemes, expressed their concerns on possible outcomes of Brexit. EU, as a political and economic union support researcher across Europe with funding awards. Even though there are some developments to preserve these opportunities, unknowns regarding the future availability of EU funding for UK researchers remain still.

"In the short term, there's the whole Brexit uncertainty as well. I think we've been quite successful in the UK at getting the EU funding for STEM Research in the last few years. [..] But the conversations I've had with colleagues in Europe very recently, were a bit worrying." (P12)

"Very recently there's been a seminar organised by the University on European funding. And since the whole Brexit thing, I thought, No, I'm not going to apply for European funding because it's just going to be a disaster, and I'm not going to get it." (P23)

5.5.3 Creating impact for change

The increasing importance of REF and determining impact agenda discussed many times during the interviews. All participants are aware that this framework is designed to measure research impact and plays an important role in allocation of funding to universities. As AE has the means to create impact at universities at national and international level, it could serve as useful tool to promote themselves in the field. Academics with established track records, senior researchers and experienced scholars

have major advantage when submitting their work to REF. Some of the senior academic entrepreneurs argued:

> *"I think, through things like REF impact case studies enable people to talk about how they've taken research and, in some way, had impact." (P21)*

> *"We know have this impact acceleration awards. If you look at REF, my research could go in impact case studies. The likelihood is slim, but it might be good for future to get some investment into it." (P45)*

> *"It does help you if you have a spinout company or a commercial product, because it shows your research impact. Then the impact is important for promotion, for REF. I think, this is all gaining a lot of importance in the last years." (P58)*

While it can be seen an excellent motivation source to create impactful research, it can also create many inequalities in a very competitive environment. The inequality element is linked with a lack of network and lack of equal opportunities within the field.

> *"There is REF impact, you are constantly being assessed on your ability to engage with business and engage beyond the academic ecosystem, and there is a pressure on you to produce economic impacts." (P47)*

A post-doc s reveals the importance of the REF outcome referring to the impact scores. When supported by their department and faculty, researchers have better access to funding schemes. However, it is unclear what happens to researchers who are not involved in impact case studies, without experience, when there less support in their field.

> *"The impact scores get added together and they give a general rating to the department as a whole. People applying funding withing the department, if they've got a really good score, the funders support you." (P31)*

One of the major changes of REF 2014, which is highlighted in REF 2021, is introducing stronger measures for responsibility and willingness to create societal impact. For many STEM academic entrepreneurs, creating social impact by solving problems that can help people and societies, has been identified as a substantial motivation for commercialising research.

> *"I always want to have a real impact on the society because as an academic we can generate innovative idea and how shall I put it, put it down on paper, and then publish them. But I don't think we should end there; we should go beyond." (P3)*

Another participant refers creating societal impact as a duty for responsible academic entrepreneurs:

> *"A lot of academics actually do research in areas that are much closer to applications in the real world. In those cases, I think they have a duty actually, to try and make sure that they create impact from the research that they do." (P8)*

The importance of having diverse people in research projects to create societal impact highlighted in the findings as well. Restructuring the AE field to attract academics from underrepresented groups should be the priority. Bringing people from different science, intellectual and cultural backgrounds could secure creating new research impacts and adopting different perspectives, otherwise would not have been delivered. Diverse

groups tend to be better at problem-solving and more creative in dealing with complex challenges.

> *"I think what you need is a mixture of people. You need people who do the research and you need people who help with the impact creation, working together on a day to day basis" (P2)*

Similarly, our research also reveals the significance of attracting early stage careers and females into science subjects and the commercial field. A female academic entrepreneur mentions that inequality has historical roots in academia, as well as in AE environment.

> *"We have to make effort to attract, in general, more young people into the sciences. And we do have to empower more female future scientists to take the lead. I think there is a general feeling of fear in getting into, for example, academia or if we talk about commercialisation as well, which is partially – which is partially based on historical evidence. It is difficult." (P58)*

In parallel with the growing importance of diverse work teams, participants stressed the role of institutions and organisations in influencing the inclusivity of AE work environment. If such environment is not built to support agents from unserved groups, such as non-white academic scholars in UK with required talent, might decide to leave the field.

> *"It depends on the department and the school, but some universities are pretty white to me. It is hardly a welcoming environment at the moment. I imagine most of them (non-British academics) want to go home and probably get much better careers in their own country" (P54)*

Overall findings reveal the competitive nature of AE, that forces academics to deal with multiple responsibilities in the AE environment. They try to manage ever-changing and expanding expectations that come being an academic entrepreneur. Policy regulations and lack of governmental support influence the field and agents respond to the pressure caused by them. Due to this lack of institutional support, universities and academic entrepreneurs aim to find additional financial contributors. This highlights the importance of external support such as research councils, which presents new challenges for receiving funds. While academics sometimes motivated by the impact creation idea implemented and measured by frameworks such as REF; in other times they feel restricted by the pressure and competition around them. Unsupported and underrepresented group members in the AE field, directly affected by these restrictions.

5.6 Discussion and Conclusions

As the role and mission of the universities have changed, professional logic and science logic have conflicted with market logic in the AE field. Diversity and societal impact logic (Chapter 3 and 4) are mostly overlooked in with the emerge of neo-liberal policies. Even though societal logic started to gain more importance in the last years, with recognition comes from internal and external structures; diversity logic has lesser influence in the field, due to lack of efficiency of the initiatives introduced to implement inclusivity related strategies and actions.

Bourdieu's notion of field provides a systemic approach for researchers to explore structure and agency. Through this approach, in this paper the specific properties (capital) of the academics possess as individual agents acting the field of AE identified. Their volume of capital determines the boundaries of agency; shape and change the logic of the field and could transform the AE environment (Bourdieu, 1984, 1987; Bourdieu and Wacquant, 1992). In addition, building on Foucault's governmentality, the individual agents become one of the most important targets in neo-liberalism, as they are programmed to be self-sufficient. He argues that knowledge intimately associated with power; knowledge is not operating outside of the more value driven realm of political,

social and economic power relations, hence human knowledge is locked in an intimate relationship with power. Knowledge that exists at any given time, heavily influenced by the power relations of that era. Under the influence of neo-liberal policies. (Foucault, 1979, 1982, 2007).

5.6.1 Recommendations for policy makers

Policy makers and decision makers often provide convenient regulations so that privileged groups can strengthened their dominance (Baker and Powell, 2016). Moving away from exclusionary policies and re-examine the current policy design is a must. Research is produced by people, but they need support from institutions; hence appropriative funding should be available especially for underrepresented group members in the AE. Appropriate institutional considerations should be given to the effect of research evaluation and the impact agenda. For example, addressing of the issues surrounding REF submission is highly important.

In addition, policy and funding for research collaboration should support flexibility, effective and inclusion. Policies that encourage international collaborations as it increases research outcomes should be developed. Most research-oriented universities are more collaborate than others (Adams and Gurney, 2016), which affects the societal impact of research. Reconceptualizing the AE process to carry entrepreneurial motivation beyond economic gain that supports not just the individual but groups of people (Powell and Baker, 2017)

In regard to inclusivity, in the workplace, the most frequently adopted strategy is to avoid talking about issues related to inequality. However, creating open communication channels between policy makers and researchers to raising awareness of equality, diversity and inclusion could help implement a more inclusive impact agenda for research.

5.6.2 Implications for academic entrepreneurship

It is imperative to develop a more egalitarian an inclusive way of assessing research and its impact. On organisational level, universities can play a central role in driving inclusive economic growth locally, regionally and nationally. University management should evaluate the current state of AE process, address underrepresentation in the AE field and beyond that focus on creating inclusive work environment for all actors. This endeavour may be difficult and uncomfortable, especially for academics who belong to privileged groups.

As Acker (2006) argued in some organisations, the embedded nature of inequality regimes is not easy to detect due to the shape and degree of the inequality, and in some cases, inequalities being legitimised. In order to change these inequality regimes, she suggests implementing high visibility and low legitimacy in the work environment. The degree of awareness of inequalities varies in different organisations. Even though lack of awareness is not the issue in the AE field, legitimised and accepted norms are difficult to change. Real culture change requires a top-down approach. Leaders and managers should be held accountable for progress towards organisational change (Thomas-Hunt, 2019) They should practice inclusive behaviours by acknowledging their privilege and checking their biases such as prejudice and stereotyping. Although universities claim they want to overcome explicit and implicit biases by hiring and promoting diverse candidates, they rarely do so in effective ways (Roberts and Mayo, 2019).

In any case, valuing diversity is not enough, organisations need to create inclusivity in the workplace. Even though when organisations put diversity initiatives into action with good intentions, if they do north acknowledge the roots of discrimination, they can't implement efficient change in the workplace much (Kang, DeCelles, Tilcsik and Jun, 2016). Therefore, new opportunities should be created to capture the contributions of academics from underrepresented groups. For instance, UK's first forum for female academic entrepreneurs was launched recently (Ounsworth, 2020). Similar initiates should be developed to inform all agents of the field.

UK universities need clear routes of communication with potential partners, stakeholders within the AE ecosystem. The influence of cultural factors should not be underestimated.

Working in diverse research groups could create challenges, these should be ignored but acknowledged and understand. Then, focusing on the innovation, creativity and strength that can bring to create impact should be addressed.

Universities should encourage academics from underrepresented group (i.e. early stage careers, women, ethnic minorities) to be more involved in REF impact cases. In doing that, other actors in the AE field (i.e. TTOs) can be utilized. Cultivating a community of academics who support each other is essential. Academic at every level should be encouraged to be in groups where more experienced staff can mentor them on commercialization process and REF related issues.

5.6.3 Limitations and directions for future research

Moving forward, the limitations of this work could represent opportunities for future research. First, our analysis is based on one country. Extension of this study to other Western countries that are exposed to similar neo-liberal policies in the AE field, can be researched in order to compare the influence of macro-forces in neo-liberal structures. Second, extending the data in terms of including different diversity elements such as disability and gender orientation; or focusing specific ethnical minorizes such as on BAME academic entrepreneurs into the empirical study could generate significant and more comprehensive insights.

Chapter 6 Conclusion

6.1 Introduction

The aim of this chapter is to present the conclusions of this research. This PhD thesis examined the process of academic entrepreneurship from diversity, equality and social inclusion perspectives in three linked empirical papers (Chapter 3, 4 and 5). Although each paper stands independently, they are linked through a multi-layered analytical framework that has been utilized to unpack the role of institutional forces that are instrumental for a socially inclusive academic entrepreneurship environment.

This study was informed by an interpretive philosophical paradigm and followed a qualitative approach. It drew on 64 semi-structured interviews with STEM academics and Technology Transfer Officers. The research data were supported with secondary sources such as policy documents and reports on AE that presents key activities and strategies developed by the decision-makers and the researcher's field notes. The collected data were analysed using thematic analysis technique. Careful consideration was given to all particularities to achieve trustworthy findings.

This chapter provides a brief summary of the research aims and questions, findings, contributions and suggestions for future research. It begins with revisiting research aims and questions by providing details of how they were addressed. Then theoretical and managerial contributions of the research were presented together with the policy implications. The chapter concludes with opportunities for future research.

6.2 Revisiting thesis aims and research questions

This study aims to unpack the process of academic entrepreneurship from diversity, equality social inclusion perspectives. In order to address this wide aim, three sub-aims have been developed and respectively addressed in the three interrelating papers.

6.2.1 The first research aim

The first research aim of this thesis was *to investigate the role of institutional logics that are instrumental for socially inclusive academic entrepreneurship environments*. This aim was addressed in Chapter 3, by advancing the theory of institutional logics as well as shaping AE process by addressing issues related to inclusivity. Through analysis and discussion, this study answered the following research questions: 1) What logics do shape and characterize the process of AE as engaged by academics with diverse profiles? and 2) How does the interplay of logics shape actions in creating and sustaining socially inclusive environments for AE?

Research-oriented universities encourage academics to engage in entrepreneurial activities (commercialization of university research) to increase industry-university collaboration (Haeussler and Colyvas, 2011; Karataş-Özkan and Chell, 2015), which ensures economic productivity (Siegel et al., 2003) and creates societal impact (Gunn and Mintrom, 2016). In the scholarly literature on entrepreneurship, different diversity strands have been investigated (Koning and Verner, 2009; Karataş-Özkan, 2017; Guzman and Kacperczyk, 2019) and recent scholarly policy documents (i.e. NESTA 2018, NSTC 2018) emphasized the importance of creating a more inclusive and socially sustainable society. However, multiple diversity categories in the context of AE is an understudied field and the findings of this research suggest that integrating diverse categories of academics into the AE process is impetrative.

This research identified co-existing key institutional logics (profession, science and market) and reveal the emergence of two new logics (diversity and societal impact) in achieving the first aim of this study. The dual nature of these institutional logics demonstrates both enabling and constraining aspects of the AE environment which contributes to the institutional complexity discourse (Greenwood et al., 2011). Even though the key institutional logics serve as dominant logics, these two new logics can be instrumental in shaping the AE process and policies in the STEM departments. In this context, diversity logic represents the overlooked experiences of academics who belong

to different diversity groups, whereas societal impact logic explains the importance of engaging in socially conscious research that can contributes to society as well as the economy. Diversity logic and societal impact logic could trigger new debates on addressing inequalities within the AE environment by demonstrates the value of institutional pluralism.

Our results indicate that diversity and societal impact logics has the potential to develop a more inclusive AE environment with required managerial policies. This conceptual framework contributes to institutional logics theory from a pluralism perspective and dwell upon the significance of policy changes on this matter. In this respect, the results suggest that universities should implement new institutional strategies to create an inclusive AE environment. STEM academics from underrepresented groups should be supported so that they can be fully engaged in AE as part of their professional career development. These results highlight the role of university management in fostering a diverse and inclusive AE culture. The tension between established responsibilities of academics (such as research, teaching, and admin roles) and entrepreneurial activities can be resolved by designing new structures to serve this purpose.

6.2.2 The second research aim

The second research aim sough *to examine investigate the gendered dynamics of institutional orders and logics that condition women academics' engagement in academic entrepreneurship*. This aim was discussed in Chapter 4, by examining institutional orders and institutional logics that characterise gendered nature of AE ecosystem by demonstrating the link between these institutional dynamics and agentic responses of key actors. Associated research questions are as follows: 1) What are the key institutional orders in an AE ecosystem, which presents differentiated logics for women scientists? and 2) How do women scientists/academics respond to these logics in navigating through the ecosystem, tackling issues of inequality?

Developing an effective AE ecosystem would be extremely beneficial for commercial outcomes that can generate socio-economic and political implications (Malecki, 2018). The analysis of the empirical findings illustrates the prevailing institutional orders as university, industry, family and educational establishment and their associated logics as societal impact logic, diversity logic, profession logic, science logic and market logic. Drawing on these established co-existing logics presented in Chapter 3, this research recognizes women academics' agency in AE ecosystem and explains how they utilize these logics as strategic responses in order to cope issues of inequality. In this respect this study contributes to continuing research on institutional orders and logics by bridging meso/organisational process with the micro/individual level-strategies.

The findings uncover that due to the gender inequality in the AE ecosystem, women academics develop individual level response strategies to navigate through the system. Women have agency and they develop agentic strategic responses (McAdam et al., 2019). Main strategic responses identified in the analyses as (1) legitimising AE at the intersection of science and market logics, building a stronger relationship with industry; (2) reinforcing their position as academics rather than academic entrepreneurs, joining networks supports women academic entrepreneurs ; (3) shifting the focus towards academic reputation and societal impact, choosing to sacrifice domestic life over career; (4) resisting against inequalities by mentoring young females, rejecting discrimination and challenging societal constraints of domestic roles.

While most of the individual level strategies based on securing well-deserved positions, some of the response strategies explores the underlying reasons of the self-imposed absence of women's in AE ecosystem. Many women academic feel obliged to make the choice of not extending their research into commercialization due to their multiple responsibilities. If universities can ensure a better work environment for women who must multitask between family commitments and research, women academics' involvement in academic entrepreneurship could increase drastically.

Nevertheless, the findings also indicate that women academics' individual-level strategies are not solely effective to overcome inequalities that they are facing in the AE ecosystem. As a result, better collaboration between meso and micro forces within the AE ecosystem

is crucial. More importantly, in the absence of a supportive institutional environment, coping with women's underrepresentation in STEM and including women to AE ecosystem is highly challenging. In other words, to implement effective and positive change, meso-macro forces should take part a more significant role in creating inclusive AE ecosystem.

6.2.3 The third research aim

The last research aim of this thesis was *to understand the role of neoliberal policies reshaping macro-institutional processes to create an inclusive academic entrepreneurship environment.* Chapter 5 addresses this aim, by linking the theory of institutional logics with Foucault's governmentality and Bourdieu's notion of field. Following research questions were answered in the paper: 1) How neo-liberal policies implemented by macro-institutional forces transformed academic entrepreneurship in the UK? And 2) What are the policy insights that can create an inclusive academic entrepreneurial culture? This paper focuses on the influence of neo-liberal policies in UK higher education system. By investigating the role of macro-institutional forces such as governments and funding bodies, we introduce new policy implications and recommendation to academic entrepreneurs to form a socially inclusive AE environment. A multi-layered approach was taken to understand the effect of neo-liberal policies on AE work environment. Rich qualitative data was collected and analysed in order to explain the actor's dispositions in the AE ecosystem.

The research findings of the third paper reveal the challenges and difficulties academic entrepreneurs experience due to the implemented policies. Participants mentioned that as being an academic scholar requires multitasking (i.e. research, teaching, admin roles). Many of them stated they found balancing their work-life, delivering the expected outcomes of their job and dealing with pressure is difficult as the competitive nature of the academic environment is not supportive for academic entrepreneurs. In addition, receiving internal and external funding was another important issue that emerged from our data. Participants highlighted the significance of being a part of a network and

extending that network by engaging with researchers. On the other hand, creating impact for change is accepted as the high goal, even though there are frameworks that are designed to encourage the impact creation creates inequality within the AE ecosystem. As a result, this paper demonstrated a critical approach to neoliberal policies and their effect on AE. We suggest that, institutional support should be redesigned for an inclusive AE ecosystem. As the current system may be effective to some degree in order to present some equality of opportunity, the equality of outcome is missing. Therefore, policy makers should improve the communication between them and the academic entrepreneurs while reforming the discourse of AE.

6.3 Thesis contributions

This research generated a multi-level understanding of academic entrepreneurship and social inclusion, by proving multiple contribution to the knowledge. Key contributions of each individual paper and overarching theoretical and methodological contributions of this thesis are presented in this section.

6.3.1 Theoretical contributions

The first paper advanced the research on institutional complexity surrounding AE by uncovering the dual nature of institutional logics that serve as enablers and constraints in different forms (i.e. strategic resources and institutional procedures). In particular, this paper highlighted the co-existence of profession, science and market logic in shaping AE. We also revealed the emergence of two new logics; diversity and societal impact logics that intersect in forming the process of AE to address inequalities and lack of inclusion. These new logics could not only co-exist but also could serve as a powerful tool to address the problems that underrepresented groups (such as gender, ethnicity and age) are experiencing in AE. Even though addressing inequality and social inclusion in organizations is challenging, diversity logic with its associated values, norms and practices, could contribute to enhancing AE by fostering a diverse culture in science and academic community in STEM. In addition, societal impact logic put an emphasis on the

significance of creating social impact as well as economic impact through AE, that responses many academic's motivation on engaging meaningful research thar address societal challenges. Therefore, we claim that the new emerged logics can be very influential in shaping AE process and the wider societal agenda of diversity, equality and inclusiveness. In other words, we proposed a framework for unpacking the relationship between academic entrepreneurship and diversity, that contributes to the institutional logics theory and suggests the need for policy changes in order to achieve a more effective integration of a diverse academic workforce.

In addition, building on the framework we introduced in Chapter 3, second paper offers theoretical contribution to the AE ecosystem and its gendered nature. In this paper, we revealed the institution orders leading to logics and agentic responses of the key actors in the AE ecosystem. Key institutional orders influencing women academic entrepreneurs' engagement in AE, are identified as university, industry, family and educational establishment; and their associated logics are identified as diversity logic, societal impact logic, profession logic, science logic and market logic. As it was argued above, different kinds of institutional influences create enablers or barriers for AE. We argue that, university as an institutional order acts both as an enabler and constraint, as women academic entrepreneurs often strategize by legitimising AE at this intersection of science and market logics and they seek for institutional support where available. The role of societal impact logic is highlighted when we look at industry as an order, as long as a balance is established between logics (i.e. market logic) which can improve women participation in AE. On the other hand, both family and educational establishment are accepted as constraining institutional orders. We argue that the limitations that are emerged from these orders can be resolved with the implantation of more inclusive policies. Moreover, the multi-level strategies such as legitimation, reinforcement, shifting and resistance explicitly demonstrate the role of agency in affecting social change and social inclusion. This link was investigated in order to understand the response strategies of women scientists within the AE ecosystem. By investigating underpinning institutional

orders and associated logics we demonstrated the link between these institutional dynamics and agentic responses of the key actors involved in the AE process.

Furthermore, the third paper links institutional logics approach with Bourdieu's field and Foucault's governmentality, by adopting more critical approach to investigate the influence of neo-liberal policies in Higher Education, and consequently in AE. Our findings demonstrated that, neo-liberal policies changed the policy field of higher education of UK universities' management structures. Academic profession culture influenced the AE environment as a direct result of redefining the responsibilities of academic's roles. Drawing on Foucauldian aspect, we argue that neo-liberal reforms impowered market logic due to moving away from centralized government activities that allows state's limited interfering (Lemke, 2002). As Individual agents are encouraged to adopt entrepreneurial traits in a society (Leander and Van Munster, 2007), values and norms of the market was accepted as norms. Taking field is a useful concept while studying AE and analyse the linkages between institutions and agents (Bourdieu and Wacquant, 1992), third paper shows professional, science and market logics are remaining dominant in the field, even though diversity and societal impact logic mostly ignored in with the emerge of neo-liberal policies. It is possible to argue that societal logic started to gain more importance in the last years, supported by both internal and external structures. However, diversity logic still does not a strong influence in the field. In order to change that we argue policies and initiatives introduced to implement inclusivity in AE should be more efficient.

6.3.2 Methodological contributions

On a methodological level, the research follows a qualitative research design that presents an understanding of AE and social inclusion by providing a multi-layered approach that demonstrates interplay among different actors within the AE ecosystem (Tatli et al., 2014). This research makes a methodological contribution, by applying an interpretivist lens to explore the experiences of different actors in the AE environment (i.e. academic entrepreneurs from different STEM departments, academics with different level of experience and engagement in AE, STEM academics who are not involved in AE and technology transfer officers) in order to present a multi-level analysis. Both the

influence of the actors' responses and the role of the institutions/organisation are taken into consideration in this research, as they are embedded in the wider AE ecosystem.

The findings reveal that the factors influencing the social inclusivity of AE at each level of analysis are complex and sometimes intercorrelated. First paper adopts a macro-level analysis that outlines the state of this research by examining the AE process in STEM departments and the social inclusivity of the environment. Second paper presents micro-meso level analysis by presenting gendered nature of the AE ecosystem. It focuses on meso-organisational level orders that influence micro-level response strategies in the AE ecosystem. The multi-level analysis highlights the importance of further collaboration between meso and micro forces within the AE ecosystem in order to overcome underrepresentation of women academics in STEM. Lastly, third paper presents a multi-layered nature of academic entrepreneurial process and its embeddedness at the intersection of macro-institutional and meso-organisational factors. The multi-level nature of the research problematisation ensures bridging the gap between institutional complexity and organizational response.

6.4 Implications for research, policy and practice

Addressing the importance of policy engagement in AE lies at the core of this research. My research provides an in-depth examination to present implications and recommendation for the underlying processes based on academic's experiences and organizational responses for societal change in the field. My findings revealed that underrepresented group members do not feel supported within the AE ecosystem by the current practices of institutions.

Therefore, implications for policy makers include the following recommendations: they should acknowledge the problem instead of avoiding it and presenting one-size-fits-all policies. They should be open to communication to understand the reason behind the inefficiency of the current policies in order to develop more tailored policies to address

the needs of underrepresented groups in AE. Hence, adopting a collaborative approach is one of the key issues to be addressed. In addition, reconstruction on policies about research funding should be in the impact agenda for research. Even though the founding bodies recognize the importance of equality of opportunity, the lack of efficient policies regarding this causes inequality of outcome. A more flexible, inclusive and rewarding structure should be adopted.

On the other hand, organizational culture should include fair practices that promote inclusion, participation and integration of underserved group members proactively in the workplace. In other words, universities should raise a high level of awareness of AE in order to address the lack of inclusivity and diversity in the ecosystem. They should be able to create a work environment that nurtures entrepreneurial and socially inclusive mindsets by incorporating relevant entrepreneurship and diversity training alongside business practices for academics. As I argued above (Chapter 3,4 and 5), there are structural and functional tensions that prevent building socially inclusive work environments. These should be addresses appropriately to provide equal resources and opportunities for all academics who seek for support (such as receiving funding and extending network). Through collaborative and digitally enhanced and inclusive platforms, universities could improve access to resources for AE.

While the role of policy maker is essential for improvement, senior managers and leader should be hold responsible for progress towards organisational change. For that reason, inclusive leadership that facilitates constructive dialogues, fosters collaboration for underrepresented groups to embrace researchers from different social and academic backgrounds should be one of the main practices in universities. Especially senior managers, who are often white males in this context, should improve their knowledge and skillset to practice inclusive behaviours by acknowledging their privilege and checking their biases. They should focus on identifying the academic's unique strengths and help them to enhance their skills by positing them to fulfil their full potential in the AE environment.

6.5 Limitations and opportunities for future research

Although the research questions were answered through implementing an exploratory approach, the findings suggest that further research might be required in order to gather a more holistic understanding of the phenomenon. The limitations of the current study pave the way for future research opportunities.

As the results of this research might be affected by specific characteristics of the universities under study, exploring different institutional settings (i.e. different types of universities) in other regions and counties (i.e. EU countries, USA or developing countries) to understand macro policies would be a worthy research investigation.

Another opportunity for research would be to extend the sample to other significant actors in the AE ecosystem to generate useful insights. For instance, including policy makers' perspectives in the research to get their perspective would create a bridge between the decision-makers and academic entrepreneurs, which would open a road to create positive change in designing policies. To achieve this goal, further research approaches and instruments could be utilized.

Focusing on the intersectionality of the diversity strands in the AE ecosystem is essential. This PhD research focused on three diversity strands (gender, ethnicity and age/career development) while problematizing AE process. However, further research and investigation on social inclusion by adding disability and sexual orientation elements into this transdisciplinary approach could provide wider and deeper understanding.

6.6 Chapter summary

This chapter presented the conclusion of the current study. The research aims and questions were revisited, conclusions drawn from the research findings were highlighted and contributions to theory, methodology, policy and practice were presented. This

research involved three qualitative papers that examine the academic entrepreneurship process from diversity, equality and social inclusion perspectives. The first paper outlined the role of institutional logics that are instrumental for socially inclusive academic entrepreneurship environments. The second paper focused on the role of gender in academic entrepreneurship by investigating different dynamics of institutional orders and logics that impose on women academics' engagement. The third paper demonstrated the role of neoliberal policies reshaping macro-institutional processes to create an inclusive academic entrepreneurship environment. Having an inclusive AE ecosystem not only helps to generate wider economic impact but also generate social impact that would benefit all the actors in the ecosystem. Therefore, the conclusions of this research highlight the role of macro-institutional forces such as governments, policy makers in creating socially inclusive AE work environment.

The findings provide multiple implications for researchers, academic entrepreneurs and policymakers. The overall thesis provides multiple contributions to the literature. It contributes theoretically by generating new insights to institutional logics theory and linking the theory of institutional logics with Foucault's governmentality and Bourdieu's notion of field. It advances literature that integrates a multi-layered perspective into academic entrepreneurship research and offers contextual contributions by examining emerging contexts, which are understudied in the academic entrepreneurship and social inclusion literature. This chapter concluded by presenting the limitations and opportunities for future research that may advance academic entrepreneurship and social inclusion literature.

Appendices

Appendix A Interview Guide

Qualitative Interview Protocol

Interview questions:

1.	Please tell us about your background prior to taking up your current position
2.	Please tell us about your current position
3.	Please tell us about your involvement in commercialization of research base/academic entrepreneurship/innovation. (Probing questions might include number of patents/licenses/ spin-off ventures they have been involved in).
4.	What contribution do you make to academic entrepreneurship in your university?
5.	What opportunities, if any, have you had in engaging with academic entrepreneurial activity?
6.	What internal initiatives currently exist in your university that will improve the likelihood of you contributing fully to your academic work and fostering academic entrepreneurship innovation in your field?
7.	What barriers have you experienced in your *professional* life that have possibly held back your professional development?
8.	What barriers have you experienced in your *professional* life that have possibly held back your engagement in academic entrepreneurship?
9.	What do you think enables academic entrepreneurship in STEM (Chemistry or Medicine) departments in the UK universities in general? (Probing questions might include their view on international comparisons)
10.	What do you think the enablers are for academic entrepreneurship at the University you are employed in particular?
11.	What do you think hinders academic entrepreneurship in STEM departments in UK universities in general? (Probing questions might include their view on international

	comparisons)
12.	Are there any factors that you would say have made a *positive* contribution to your career development (including your decision to work in the STEM field or to contribute to academic entrepreneurship in that field)?
13.	What do you think the impediments are for academic entrepreneurship at the University you are employed in particular?
14.	In what stage of your career did you decide to engage/not engage with academic entrepreneurship? Do you see any conflict between engaging academic entrepreneurship and your academic career development?
15.	In your opinion, what are the key issues facing women/ethnic minorities/people in certain age groups/people with disability etc. in engaging academic entrepreneurship? (Probing question might be intersectionality of these categories e.g. women/ethnic minority/disabled at the same time)
16.	What do you recommend to overcome such challenges? (Probing questions might include recommendations to others and recommendations to the University)
17.	What *external* initiatives / programmes institutions are you aware of that encourage participation by disadvantaged groups in the STEM field or encourage academic entrepreneurship by these STEM participants?

Personal Details:

Title: **Position:**

Gender: **Age:** 16-24 25-39 40-49 50+

Nationality: **Country of origin:**

Children: Yes No **Children still at home:** Yes No

Other dependents: Yes No

Do you have a disability? Yes No

Marital Status: Married Single Divorced Living with partner

Partner's Occupation (where applicable):

Mode of working: Full time Part time **Flexible Working:** Yes /No

Appendix B Sample e-mail

Dear XXXXX,

I am a PhD student at the Business School of University of Southampton, and I am delighted to inform you that I am seeking to recruit participants for my doctoral research on diversity, and academic entrepreneurship in the STEM research base of leading research-oriented UK universities. I will undertake interviews with academic staff who are involved in commercialisation of research (in all forms including licensing, patenting, spin-offs, consulting etc.) We will also interview those who have chosen not to engage with this sort of activity (or not been able to) for a variety of reasons.

I would like to ask if you could help us by participating in our project; and by sign posting us to relevant colleagues in your department/School? Your views will be so valuable to us in shaping this research.

I have obtained ethics approval; all responses will be kept confidential and participant anonymity (and that of the institution) will be maintained in publishing the research findings. Interview will last for approximately 45 minutes to 1.5 hours.

My supervisory team:

Prof Mine Karataş-Özkan: M.Karataş-Özkan@soton.ac.uk

Prof Yehuda Baruch: Y.Baruch@soton.ac.uk

Prof Laura Costanzo: Laura.Costanzo@soton.ac.uk

I look forward to hearing from you.

Kind regards,

Melike Nur Tunalioglu
PhD student
Department of Strategy, Innovation and Entrepreneurship
Faculty of Business, Law and Art
University of Southampton

Appendix C Participation Information Sheet

Participant Information Sheet

Study Title: Intersectionality of diversity categories in the context of academic entrepreneurship

Researchers: Melike Tunalıoğlu, Prof Mine Karataş-Özkan, Prof Yehuda Baruch and Prof Laura Costanzo

Ethics/ERGO ID number: 31308

Please read this information carefully before deciding to take part in this research. If you are happy to participate, you will be asked to sign a consent form.

What is the research about?

This research is a part of PhD thesis that focuses on academic entrepreneurship in the STEM research base with implications for career development and diversity. We hope that our findings will generate academic and practitioner insights to academic entrepreneurship from a diversity perspective.

Why have I been chosen?

We have employed purposeful sampling. You have been chosen because you are one of the academic staff members in STEM departments of the research-oriented Universities in the UK.

What will happen to me if I take part?

An interview will be booked at your earliest convenience. Interview will last for approximately 45 minutes. It will be audio-recorded if you provide consent. After analysis and writing-up of data, you will be provided with a copy of the report.

Are there any benefits in my taking part?

Academically, you will be contributing to a PhD research that adds to current knowledge and aims to develop an action framework on equality and diversity in STEM research base for the research-based Universities in the UK.

Are there any risks involved?

No.

Will my participation be confidential?

All responses will be kept confidential and participant anonymity will be maintained in publishing the research findings.

What happens if I change my mind?

You have the right to withdraw from the research at any time.

What happens if something goes wrong?

Participants may wish to contact the research support officer, Angela Faux (risethic@soton.ac.uk).

Where can I get more information?

Mine Karataş-Özkan: mko@soton.ac.uk

Yehuda Baruch: Y.Baruch@soton.ac.uk

Laura Costanzo: L.A.Costanzo@soton.ac.uk

Melike Nur Tunalıoğlu: M.N.Tunalioglu@soton.ac.uk

Appendix D Consent Form

Study title: Intersectionality of diversity categories in the context of academic entrepreneurship

Researchers: Melike Nur Tunalıoğlu, Prof Mine Karataş-Özkan, Prof Yehuda Baruch and Prof Laura Costanzo

Ethics reference: 31308

Please initial the box(es) if you agree with the statement(s):

I have read and understood the information sheet and have had the opportunity to ask questions about the study.	☐
I agree to take part in this research project and agree for my data to be	☐
I understand my participation is voluntary and I may withdraw at any	☐
I am happy for the interview to be tape recorded. (If not applicable,	☐
I am happy to be contacted regarding other unspecified research projects. I therefore consent to the University retaining my personal details on a database, kept separately from the research data detailed above. The 'validity' of my consent is conditional upon the University	☐

Data Protection

I understand that information collected about me during my participation in this study will be stored on a password protected computer and that this information will only be used for the purpose of this study. All files containing any personal data will be made anonymous.

Name of participant ……

Signature of participant ……

Date ……

Appendix E Debriefing Form

Debriefing Form

Study title: Intersectionality of diversity categories in the context of academic entrepreneurship

Researchers: Melike Nur Tunalıoğlu, Prof Mine Karataş-Özkan, Prof Yehuda Baruch and Prof Laura Costanzo

ERGO ID number: 31308

Thank you so much for participating in this study. Your participation was very valuable. It has been acknowledged that you are very busy and very much appreciate the time you devoted to participating in this study. There was some information about the study that could not be discussed with you prior to the study, because doing so probably would have influenced your actions and thus skewed the study results. This form explains these things to you now.

What is the research about?

This research aims to provide an analysis of academic entrepreneurship and social inclusion while considering relationship between diversity dimensions, such as gender, age, and ethnicity, and commercialization process of academic research. Emphasising on the context of academic entrepreneurship, the focus of the study is to unpack the complex relationship between intersectionality of diversity categories and commercialization in STEM (Science, Technology, Engineering, Maths) disciplines. We have conducted this study by asking questions around the process of academic entrepreneurship, enablers and barriers for academic entrepreneurship, any diversity-related issues that might affect this relationship.

Our research questions include:

1. How does academic entrepreneurship unfold in STEM departments of universities? How do the macro structures (university structures/mechanisms such as TTOs/accelerators etc.) influence the commercialization process?

2. What is the importance of STEM departments and cultures for commercialisation? Are these cultures and processes (of academic entrepreneurship) conducive to diversity and inclusiveness? What are the enablers and barriers?

Commercialization of university research is highly encouraged by research-oriented universities in order to increase the importance of collaboration with industry and hence to improve economic productivity. Economic productivity is one dimension of the subject. Increasingly, social impact of academic entrepreneurship has also been acknowledged. One element of social impact is social inclusion i.e. the inclusivity of the academic entrepreneurship in terms of integrating diverse categories of researchers into the process. These categories include gender, ethnicity, age etc. In this research, we aim to question the established research gap in the area of the relationship between academic entrepreneurship and intersectionality of diversity.

We hope this clarifies the purpose of the research, and the reason why we could not tell you all the details about the study prior to your participation.

If you have any questions or concerns, you may contact us:

Melike Nur Tunalıoğlu: M.N.Tunalioglu@soton.ac.uk

Mine Karataş-Özkan: mko@soton.ac.uk

Yehuda Baruch: Y.Baruch@soton.ac.uk

Laura Costanzo: L.A.Costanzo@soton.ac.uk

It is very important that you do not discuss this study with anyone else until the study is complete. Our efforts will be greatly compromised if participants come into this study knowing what is about and how the ideas are being tested. Once again results of this study will not include your name or any other identifying characteristics.

If you have questions about your rights as a participant in this research, or if you feel that you have been placed at risk, you may contact the research support officer, Angela Faux (risethic@soton.ac.uk) or Dr Martina Prude, Head of Research Governance, Research

Governance Office, University of Southampton, Southampton, SO17 1BJ. Phone: (mad4@soton.ac.uk).

Appendix F Sample Interview Transcript

Could you please tell me about your background prior to taking up this current position of yours?

Ok, so I did my PhD at the University X, and then a Post Doc at the US Naval Research Lab. And from there I moved from temporary lectureship at the Y, and that was in 1991. I worked there for two- and a-bit years, and I moved to another temporary position at the University of Z (these are all in Chemistry). And then in 1997 I moved here as a lecturer; and then I've gradually moved my way up to being a full Professor.

That's also your current position as well?

Yes.

Have you ever get involved in the commercialisation of your research?

I have some patents. I haven't been actively involved in the commercialisation beyond that.

Is there a specific reason for that?

Well the -. One of the patents wound up being taken over mostly by ILICA which is a spin out company of one of my colleagues. And when given the opportunity to be a member of the spin out company, I turned it down, for very personal reasons. And the other patents are associated with companies who already were in the commercialisation, so I didn't need to be involved.

What contributions, if any, do you make academic entrepreneurship in your University?

I think I need you to identify academic entrepreneurship before I can answer your question.

I think it's about what we talk about service as – working in a spin off company, having or licence. Basically, your research and commercialisation?

Ok, so most of my research projects have an industrial partner. So that's probably the greatest bit of entrepreneurship I do, and then I actively work with industry. So I currently have research grants that are partnered with Johnson Matthey and City Technology. In the past I've worked other companies, tech Innovations, a whole bunch of different companies.

So most of my PhD students and research projects have had an industrial component. And that's the biggest big of entrepreneurship. Although I often had a Royal Society Industrial Fellowships (Industry Fellowship) where I spent half my time working at a research centre, for two years. Ok?

What if any have you had engaging with academic entrepreneur activities? Did any opportunities arise along the way?

Because I'm part of the companies, my projects are funded by the company, I'm aware of the industrial and the applications. (I'm going to ignore the ringing phone).

It's ok.

That's fine, they can call me back, I'm in a meeting. So … huh, do I have an engaging with academic entrepreneurial activity? I – I have colleagues who do entrepreneurial activity and I talk to them, and discuss things with them, but … I don't understand what else you want from the question, so -.

That's all right. We are basically working on STEM Departments because they've more entrepreneurial activity so, are there any factors that you would say have made positive contribution to career development, engaging any entrepreneurial activity at all?

Oh yeah, the fact that I took the Industry Fellowship for two years at Johnson Matthew was definitely a contribution toward my career development. It was just before I got my promotion to full Professor; so that period of time and understanding the needs of industry and research, definitely made an impact on my personal career. And most of my research funding, as I said before, is related to my interactions with industry; so without that I wouldn't have the research group and the career that I've had, so -.

Are there any internal initiatives currently that exist in the University that you are aware of that improve the contributing your academic work about academic entrepreneurship in your field, if they're …

All right. Well there is an annual call for industrial case studentships, and I have probably put one in each year, so yeah. So I've just put in an application for a PhD Studentship with the company.

Currently?

Currently, I've just put one in last week, so yeah.

Great.

So there's those kinds of initiatives. I'm not involved in any other ones, so -.

Are there any specific reasons?

The specific reason is that I like my research group to be of a controlled side. I am the Director of Programmes, so my time is largely taken up by running the Degree Programme for Chemistry. So there are only so many hours in the day. I have very strong – enhanced strength. Very demanding administrative duties, and so yeah. So there's only so many hours in the day, and I choose what I do.

So that answers this question actually, but just in case I'm going to ask it. Are there any barriers that you experience in your professional life that hold you back in your professional development in general?

In my professional development in general or with respect to entrepreneurial activities?

In general and – well if you can answer both.

In general, yeah, it would be like anybody, it's the demands of time, and time management. I've had some health issues over the years that have held me back a little bit. At the beginning of my career I'd say I experienced some pretty bad sexism, but you know, I overcame that, and dealt with it. So those types of things, yeah.

That's one of the reasons we are doing this research actually. We are looking at the diverse dimensions, like gender and ethnicity. If you can provide me an insight about what kind of difficulties, you faced during the process.

Ok, so the beginning of my career not being taken seriously by my male superior Faculty members.

Is it because of gender or maybe age, because you were young?

[laughing] I think it had to do with the fact that I was an American woman and on a temporary contract.

And can you tell me how did you deal with that?

How did I deal with that? I dealt with it head on. I just told them not to behave so badly. And then I left. That's why I moved.

I see. And how is it in your current university?

It's been very good here. I've had one issue, and when I discussed it with my Line Manager, I got some very good advice, and I just dealt with it that way then, so yeah, I've had one issue since – in the time I've been here.

Do you think the University can improve its skills with the diversity issues?

The University is seeking to improve its skills all the time. I mean that's why we are -. As evidence I wouldn't say that's why we as evidenced by Athena Swan, and we are still in Chemistry because we actually take these issues very, very seriously and proactively do things to encourage diversity and develop people.

Develop people's understanding of diversity, so that they recognise when they're unconsciously putting in barriers and – and I think we do a really good of job of that here in Chemistry.

Can you give me an example, maybe?

I don't think I want to discuss people's personal issues, just as I'm not good as describing exactly what happened to me at the beginning of my career, especially not on a recording.

That's all right., so what are the enablers for academic entrepreneurship at your university?

The enablers are the fact that my colleagues have commercialised things previously, so there are people to go talk to, so there's a wealth of experience, and that's probably the biggest enabler. Because I would have to say the biggest barriers are the fact that our research innovation services don't have the funds or the capacity to really assist you with the small bits of commercialisation. They're good if you get to the point where you're ready to have the spin out. That's very good. But if you have a little bit of an idea, there's just not the money there to be able to help you patent some of the things that you might patent. The problem is, if you patent something, you have to be willing to defend it, and you need to be able to get out there and make contact with companies, so they take up the patent and – and take it forward. Very few of us are going to have spin out companies, so that's – that is a bit of a problem.

Do you think this is because of the funding or the problem of giving the funding to the right project?

I think overall, there's always going to be a limited amount of funding, and … understanding -. I don't think people understand how to access it very well. People in departments don't understand how to access it very well. And then when they got to RIS, they only has a limited capacity, so you have to really want it, right, to make it come … and it takes time. And we all have loads of time!

Of course. And do you think they could be more helpful to you, or can support you, the funding, like giving advice and coming to their – getting the perfect idea?

I'm sure that there are ways that they could help you more, but I don't know what they are! [laughs]

What do you think the impediments are for academic entrepreneurship at your university?

Time and money.

Can you open it up a little bit?

So … in terms of time. As an academic, I juggle my teaching, my research, my supervision of my research students, the administrative tasks I have to do. And then to ask me to do entrepreneurship on top (or enterprise) on top of that, I have to look at it and think in terms of time, there are things that have to get done, and they get done. Then there's the things that you'd like to do. For example, I could expand my enterprise by doing much more consulting. I've never actively sought consultancies. I'm sure I could get them if I did. But I haven't chosen to do that because of the time that it takes. And the other things is that in terms of money, there's the money the University is able to put forward in terms of assisting me in going out to meet companies and make those contacts to do consultancy, and also things like filing the patent applications and help me develop that. So that money is limited.

But the other thing is in terms of money in that … … I don't need any more money, right? So I am very comfortably well off in my post; my husband and I, we have no children, right. So I have no need to have a great big huge salary; I have a comfortable salary and a comfortable life. And so I'm not motivated by more money. And the only motivation the University give me in terms of going out and doing these additional things, are money. But I don't want any more money! So they're failing to motivate me to go do any of those consultancy type things or to form a spin out or anything like that, because I don't want the more money! That's why I turned – one of the reasons I turned down being involved in the spin out company ILLICA years ago is that I weighed up the value of the more money to me, to my life, and my lifestyle, and I didn't value the money enough to sacrifice my lifestyle, right? And so that's the balancing. And so I choose not to do a lot of those things, because I've chosen this level of balance, right?

It's about your priorities?

It's about my priorities; my personal priorities. So the University would have to come up with other types of incentives if they want me to do more of some of these other things.

Do you think the University encourage you to do entrepreneurship?

Oh yes! In my – in my appraisal reading, there are -. There's a box to fill in for enterprise, right. As the Professor, I get appraised every year, and one of the things I comment on is my enterprise activities and what I do or what I don't do. And you know, so -.

And you are already doing the research, the teaching, the administrative duties …

Yes, and I think I have enough enterprise activities by having industrial contacts as part of my research. I don't personally want to take on a lot of consultancies, so -.

You said that they fail to motivate you because you don't see the money as the most important thing

Yeah, and the University doesn't know any other way to motivate people.

Do you have any suggestions how they can overcome this problem? Are there any solutions for you? What could motivate you?

It would have to be a problem I really wanted to work on, right? So it -. Somebody would have to come to me with a problem I really wanted to work on, right, as opposed to – yeah. That – that would motivate me. So if I'm intrigued intellectually in the problem, or I think it is important enough, then I would work on it.

I see. And you said that money is the big for getting enterprise entrepreneurial activities?

> Well that's the way the University treats it yeah. So you can keep this much of the money; if you give the consultancy, you get 10% much of the money. If you spin out the company, you keep this much of the equity. Well everything is all about money. And I

think that the University thinks. The University and things need to think beyond money in terms of ways of motivating people you know.

So you know, resource. Instead of paying me, maybe I should have access to more support. So -. And if you paid -. If you didn't increase your professors salaries all the time, but said "You could choose a pay raise, or you could choose … a – I don't know – 50 hours a year of secretarial support."

Which I think you need!

It would be kind of nice, yeah. It would be lovely. Right?

Because you've been to different universities in different countries, I just want to ask you, do you think there are similar problems in other universities, or is it a UK thing?

I didn't work as an academic in the US. I was a student and a Post Doc. The environment is a little bit different. I think they have similar problems in terms of entrepreneurial activity. In the UK, I don't think this university is at all unique, I think it's pretty common. I've worked at two other universities; I think it's pretty much similar.

I just took a note in here that when money is the main object for entrepreneurial, do you think that's the main motivation behind your colleagues who are involved in entrepreneurship?

Some people really want to run their own business. So it might be that. Other people have different personal motivations, you know, so the pride of running their own business; actually finally getting to see this bit of their research being out there being used. Yeah. So people have that type of motivation as well in terms of entrepreneurship. So yeah. But the way the University incentivises you is mostly money. And I just think that, you know, not everybody responds to that motivation. Hello over there! Right. Some of us respond other ways, ok.

So it's been really great, and this is pretty much what I wanted to ask.

Oh is that all you wanted to ask. Ok.

Yeah. Is there anything you want to add? Maybe a question you think I needed to ask, or any comment at all, you're welcome and -. Otherwise I won't take up much more of your time.

Eerm, no. I mean it – it's interesting that you're going to go around and talk to various people, like as you do, who have different levels of entrepreneurial engagement. So you must be also talking to some people who have spin out companies.

Yes.

And I kind of see myself as a almost baseline academic. I have a -. I've had a very long research career over 25 years now, and I have been involved with lots of companies. But I haven't … I haven't gone out of my way to develop a consultancy side of my career, or gone out of my way to develop things in aspects. All of my research has applied aspects, but I work on a lot of fundamentals that you can see where the applications are going. And I find that really interesting. There is one bit of activity that I'm thinking of developing in the future when I stop being Director of Programmes. I work quite a bit with – at the Diamond Light Source, the synchrotron source. And I'm … thinking of trying to make it that I work there maybe a day a week or something, sort of shift my focus a bit. So it will be good for my research.

But in doing that, I might get involved in more of the entrepreneurial over there, and that's just because I can see that they would be able to make quite a bit of use of what I know. But they have a really good support infrastructure where they would be getting the companies and things, and I would just be assisting where needed. And that would be to help benefit the facilities that I want to use.

It's a win-win.

It would be a win-win, yeah. So there's be win-win without necessarily putting money in my own pocket. And that – I think that's quite a good thing. So I can see that developing in the future, but for where I am right now, I'm tired! [laughs]

I can totally understand. Thank you very much.

You're very welcome, yeah. So yeah, so how … … [*interview break, and then continues*]

The aspect from me about possibly about gender, when it comes to being involved or not, is … the fact than I'm less motivated by money. And there may be a gender bias to that. I don't know. And the fact that I'm very conscious about my work/life balance a bit more. Again, there may be a gender bias about that. That may be me imposing [laughing] my gender bias on my views, I think.

And so … But I don't think my gender is a barrier to entrepreneurship and enterprise at all. I just have made personal choices about really about mostly about my time, and that I know there's only so many hours [laughing] in a day, and I choose to spend it on certain things. So I spent that time out in industry for two years, working at Johnson Matthey, so it was a Royal Society Industry Fellowship. So it was 50 : 50 split.

The way the industry fellowship work, you can have up to two full years of funding. So I could have extended that to make it four years. I only applied for two, and I chose to do them part time, so it was effectively one year funding. Other people have done the full four that I know of. But it was really difficult splitting it, and one of the things I learned about myself whilst I was there working in industry, was how much I value the educational aspect of what I do in my job. And that, for me, the motivations from my career and the enjoyment that I get out of it, come from educating that next generation of students.

And for me the motivations in this job are education-led, even though I look like a research-led member of academic staff. I have a very good research track record. From the outside, you look at me and go "She's very research motivated." But internally, I know I'm very education motivated. And so that's probably the other thing that compromises the amount of entrepreneur type things I do, because this is what drives my enjoyment of the job.

But even with your administrative duties, do you still teach?

Oh yeah! I have a full teaching workload.

So of course, you have no time, that's understandable!

Before you came in here, I was counselling a junior colleague about time management and how none of us have any time! [laughs]. And basically, it's always a compromise, so yeah.

So is it a personal choice?

Ok, for me, being a foreigner, actually, because I'm American, I get away with a level of directness and brashness. [chuckles] … British people wouldn't try I think; they're all too polite. So yeah, so that's an advantage isn't it, the advantage of times that I don't always read the signals correctly, but you know, I know British people that don't read the signals amongst each other very correctly, so yeah.

That's a good explanation.

But the only thing is I don't -. I guess I don't have the network of the people that I went to university with here in the UK to call on, so it's – I have to go out of my way to meet people as opposed to calling up the friends I had from when I was at … And I think a lot of networking happens when you're in your late teens and 20's, and those people you meet at university, you probably know them for the rest of your life, one way or the other.

You may not engage with them all the time, but you know, when so and so winds up high up in this company, you're thinking about something and you notice they're there, then you call them up and you each have that shared experience. I'd like the shared experience, and that makes it a bit difficult, but I don't let it stop me from doing most things.

Perfect, thank you!

You're welcome, you're welcome.

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