Exploring the Motivations for and Modes of Academic Engagement among Irish Academic Researchers: A Qualitative Investigation

Utieyineshola Adeleke Yusuff

Thesis submitted in fulfilment of the requirements of the MLitt Degree,
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Dedication

This thesis is dedicated to the memory of my late father, Elder John Bernard Yusuff, whose guidance and support continue to inspire me; his passing shortly after I began this program has deeply impacted this journey.

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Abstract

Government and research funding bodies have increasingly emphasized the societal impact of research prompting the need for increased engagement between academic researchers and non-academic external partners. There are numerous benefits that this academic engagement brings to the collaborating partners. Such benefits include facilitating advancement in research, providing researchers access to resources, and the provision of opportunities for post-graduate student mentoring by industry partitioners. Increased levels of academic engagement also offer researchers opportunities to generate new scientific research ideas and questions, exploit new research opportunities, or even test research theories and findings that are aimed towards solving practical problems outside the academic domain. Academic engagement with external non-academic partners, while beneficial, also incurs costs and typically remains at the discretion of the individual researcher. The increasing demand for additional engagement with non-academic partners may increase pressure on academics as such interactions add to their research and teaching responsibilities. This thesis investigates why and how academics engage with non-academic collaborators, applying self-determination theory to explore their motivations and modes of interaction. Using snowball sampling technique, the study conducted nineteen qualitative interviews with academic researchers from diverse fields—social sciences, physical sciences, life sciences, engineering, medicine, and humanities—across several public universities in Ireland. The selection of interviewees was based on careful representation of both male and female researchers who are at different stages of their career, in different disciplines, and either currently are, or have been, actively engaged with non-academic external partners. The findings indicate that motivations and modes of engagement between academic researchers and non-academic partners are shaped by a mix of intrinsic and extrinsic factors, intertwined with personal, organizational, and policy-related institutional elements. The thesis argues for tailored strategies that consider these diverse motivations and contextual dynamics to enhance interactions within Ireland's innovation ecosystem. Although this study has limitations, it outlines areas for further research and offers significant theoretical, managerial, and policy implications by enhancing understanding of academic researchers' engagement behaviours.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

For countries striving towards a knowledge-based economy, the interaction between academia and industry is critical for the attainment of sustainable economic growth and sustainable societal development (Duval-Couetil et al., 2021; Silva et al., 2021). Over the years, scholars have suggested various models and mechanisms that may foster a knowledge-driven society (Albuquerque et al., 2015; Asheim & Coenen, 2005; Fernández-Esquinas et al., 2016; Innovation Working Group, 2015; Nelson, 1993), while also emphasising the strategic role of all the key actors for a productive innovation ecosystem (Zheng & Cai, 2022). One of such models is the "Triple Helix model" (Etzkowitz & Leydesdorff, 2000) which is based on a tripartite link of government-industry-academia (GIA) partnership (Zhou & Wang, 2023). Further improvement on the rationale and effectiveness of the triple helix called for the need to also consider the inclusion of a new actor the "community" or "society" who are perceived as beneficiary of innovation, hence the "Quadruple helix evolved (Hasche et al., 2020; MacGregor et al., 2010; McAdam et al., 2018; Miller et al., 2018; Schütz et al., 2019).

Subsequently, with the role of the society coming to the fore within the innovation literature, the concept of a "Third Mission" (Knudsen et al., 2021; Taxt, 2023) changed the dynamics of innovation studies reflecting a paradigm shift in research models where universities, as a centre for knowledge production, are expected to engage in research that would benefit their immediate environment (Compagnucci & Spigarelli, 2020; Petersen et al., 2022; Spânu et al., 2024). This paradigm shift led to the reaffirmation of the concept of "academic engagement" within the academic community where interest has continued to grow regarding how knowledge produced in the academia is transferred or exchanged with the industry (Huggins et al., 2020). Academic engagement refers to a "knowledge-related collaboration by academic researchers with non-academic organisations" (Perkmann et al., 2013: 424). In essence, academic engagement involves "person-to-person interactions" which links universities to other external organisations such as industry (Cohen et al., 2002). The interaction between universities and industry takes many forms based on the different type of knowledge interaction or technology transfer activities involved and can also be differentiated based on the intended purpose (Perkmann et al., 2021a). For instance, some literature categorised interaction between university and industry to commonly take place through three main channels which are collaborative research, contract research, and research-oriented consulting (D'Este & Perkmann, 2011; Rossoni et al., 2023). Outcomes of collaboration between university and industry may include spin-offs, design artifacts, study reports, prototypes, patents (Perkmann & Walsh, 2007).

Interactions between universities and industry can be developed for the purpose of exchanging knowledge or for commercialisation (technology transfer) of research (Fernández-Pérez de la Lastra et al., 2023; Heng et al., 2022; Perkmann, et al., 2013). Also, based on three dimensions noted in the last paragraph, Dip (2021) described academic engagement as a multidimensional concept that encompasses multiple activities. More specifically, it includes (i) the social dimension – those activities performed as services to the society without expectations of its direct pecuniary or monetary benefits to researchers themselves; (ii) the entrepreneurial dimension – those activities relating to engagement in collaborative research with industry, generation of patents, or intellectual property commercialisation; and (iii) the innovation dimension – include such activities that could lead to joint venture or establishment of commercial networks and services with industry, including developing products that could be transferred to the society.

In extant literature, there are controversies as to whether academic engagement activities actually follow commercialisation (Ferreira & Carayannis, 2019; Huggins et al., 2020), although there are claims that commercialising is in fact a result of academic engagement activities with industry (Perkmann et al., 2013). Perkmann et al. (2013) documented a situation where academic researchers' collaboration with industry partner in a project encouraged researchers to identify opportunities leading to innovations that could be subsequently commercialised with industry partners. In summary, studies on the mechanism that promote the interaction between academia and industry have continued to grow (Mascarenhas et al., 2024). A reason for this development is the central role that academic engagement plays in strengthening innovation strategies in various countries and within higher education institutions (Messeni Petruzzelli & Murgia, 2020; W. Wang & Liu, 2022). As a result, scholars have continued to explore ways to better achieve a sustainable relationship between the university and other stakeholders outside the academic domain. A core motivation of this thesis is to join in with and add to this conversation by exploring ways to better enhance these important interorganisational interactions, through concentrating on the motivation for academic researchers to engage with non-academic partners. Through the theoretical lens of self-determination theory, this thesis explored these interorganisational interactions by building on the existing framework of Clauss et al. (2022). In this regard, it was of interest to this thesis to examine beyond the influence of individual factors but also that of organisational and institutional factors an area not considered in the work of Clauss et al (2022), where they studied factors influencing engagement between engineering professors and industry partners in joint research projects.

1.2 Research Gap

There has been an increasing call by government and research funding bodies for a greater level of societal impact in research being carried out and it is becoming a key factor in winning research grants from certain agencies. This pressure demands more engagement between academic researchers and non-academic external partners (Marzocchi et al., 2023). However, such demands will put more pressure on academic researchers considering that such interactions are an additional responsibility, on top of their research and teaching roles in the university (Atta-Owusu & Fitjar, 2022). Also, this demand for a "societal impact agenda" could result into a paradigm shift in orientation within academia from an *academic-impact* focus (research contributing to scientific advancement, advancement of theory, methodologies, application of valuable knowledge to its academic community alone) to a greater focus on *economic and societal impact* (research contributing to economic and societal developments that are beneficial to individual, organisations and nations) (Johnson, 2022). This pressure for more economic and societal impact has seen academics engaging more with non-academic external partners, which often comes with benefits and costs. For instance, Tartari and Breschi (2012) believe that the decision of academics to collaborate with external partners (industry, for example) is a discretionary behaviour of academics themselves which is often shaped by two factors - their perception of the potential benefits and costs of such engagement to their research productivity; and the institutional environment within which such interactions will exist.

When academic researchers engage externally, the benefits are multifaceted to all stakeholders which include government, academic community, practitioners and the wider public. Government intervention in fostering engagement between academia and industry is seen as a springboard for achieving economic development, strengthening regional and national systems of innovation (Leydesdorff & Meyer, 2006; Philpott et al., 2011; Rajalo & Vadi, 2017) or even in transforming its innovation systems into innovation ecosystems (Zheng & Cai, 2022), making these countries more innovative and technologically competitive. The provision of access to additional sources of funding, improvement in research and teaching, investment in infrastructure, achievement of prestige and opportunities for building networks are some of the benefits of academic engagement both to academic institutions and academic researchers (Duval-Couetil et al., 2021; Rake, 2021). Therefore, considering the multifaceted benefits of the interaction between the academia and the society, academic engagement as a phenomenon has continued to attract interest from scholars (Huang et al., 2015). More importantly, the university is seen to play a more strategic role in societal development because it is considered as the source of new ideas, knowledge, technologies, and innovations (Reed et al., 2021).

Literature reviews conducted by scholars on facilitators or barriers to academic engagement identified three factors: Individual factors (demographics, attitude, motivation); organisational characteristics (support structure, departmental climate, university/department quality), and institutional characteristics (scientific discipline, public policy and regulations), and these are considered to also be the determinants of academic engagement (Perkmann et al., 2013, 2021). Some studies have also attempted to reconceptualise academic engagement in an effort to provide more evidence on what are seen to be key aspects such as motivations, channels, and stakeholders(Marzocchi et al., 2023). Several studies have also reviewed factors that determine a successful university-industry collaboration (Belderbos et al., 2024; O'Dwyer et al., 2023; Thune et al., 2023), and more recently another study was conducted on researchers' motivation for academic engagement from the perspective of cross-border regions (Mascarenhas et al., 2024). Outcomes gathered from these extant studies indicate variations in the way and extent that academic researchers engage with non-academic external partners (Kongsted et al., 2017), and this differs from country to country, and motivation types differ across researchers (Mascarenhas et al., 2024).

This thesis identified two major research gaps based on extant literature on academic engagement reviewed. Firstly, as indicated in some recent studies, our understanding is still limited concerning academic researchers' behaviour towards academic engagement, particularly in terms of their motivations for and mode of engagement with non-academic external partners (Atta-Owusu & Fitjar, 2022; Muscio et al., 2017; Nelson, 2024; Noke et al., 2024; O'Dwyer et al., 2023; Orazbayeva & Plewa, 2022; Pekşen et al., 2021; Perkmann et al., 2021; Ramos-Vielba & D'Este, 2023; Taxt, 2023; Zhuang & Shi, 2022). Secondly, previous studies that investigated academic engagement focused on limited group of external stakeholders, particularly "industry partners" (Abramo & D'Angelo, 2022; Ankrah et al., 2013; Apa et al., 2021; Arnold et al., 2021; Bastos et al., 2021; Bhullar et al., 2019; Clauss et al., 2022; Compagnucci & Spigarelli, 2020; D'Este et al., 2019; Dias & Selan, 2023; Fernández-Pérez de la Lastra et al., 2023; Wang et al., 2023). More investigation has been suggested to enable us to understand why researchers' motivations for and mechanisms of interaction with external partners varies across different researchers and wider group of external stakeholders such as business firms, charity organisations, non-governmental organisations, government agencies (Marzocchi et al., 2023; Nelson, 2024; Noke et al., 2024; Taxt, 2023).

This thesis directly addresses the identified research gaps by exploring the motivations and modes of academic researchers' engagement with non-academic partners. The study explores why academic researchers are motivated to collaborate with a diverse range of non-academic external partners and examines how these collaborations are conducted through various modes of engagement. Furthermore, it investigates how individual, organizational, and institutional factors influence these

interactions and how academic freedom shapes researchers' engagement with non-academic external partners. By addressing these issues, the study contributes to filling the research gaps by expanding beyond the traditionally emphasized industry collaborations, offering new insights into a broader spectrum of non-academic external partners, and contributing to a more comprehensive understanding of researchers' behaviour in academic engagement.

1.3 Research Question and aim of the study

To address the research gaps as earlier identified and explained in Section 1.2, this thesis developed an overarching research question "**Why and how do academics engage with non-academic collaborators?**" which was further broken down into four sub-questions for the purpose of specificity, and they are as follows:

1. Why are academic researchers motivated to engage with non-academic partners?
2. How do academic researchers engage with non-academic partners?
3. How do individual, organizational, and institutional factors influence academic researchers' engagement with non-academic partners?
4. How does academic freedom influence academic researchers' engagement with non-academic partners?

These four research sub-questions are useful in exploring experiences of academic researchers affiliated with various academic institutions in Ireland who have engaged with wide range of external stakeholders at different stages of the career lifecycle. Using the lens of self-determination theory, the aim of this thesis is to gain deeper insights into academic researchers' disposition towards external engagement with non-academic external partners. In essence, it seeks to understand individual academic researchers' rationale and patterns of behaviour towards academic engagement. Additionally, to gain a clearer insight into those factors that shapes researchers' behaviour, this study also explores the role played by individual, organisational and institutional factors, across a wide range of external stakeholders including Industry, non-governmental organisations (NGOs), charity organisations, civil society organisations, government agencies from the perspective of the individual researcher.

1.4 Scope of the Study

The scope of this study is limited to academic researchers affiliated to Irish universities who are currently or have been involved in working with external non-academic partners through one of the various modes of academic engagement (as discussed in the literature review) over the last five years. So, essentially the location where this research will be carried out is in Ireland. Ireland was selected for two reasons. Firstly, because the outcome of the study will be useful for making evidence-based policy decisions in the country (Ireland) as this was suggested in some previous studies conducted in Ireland (Zhang et al., 2017). Secondly, because it is the country where I am currently based and carrying out my master's degree program. Hence, choosing Ireland enabled me to access participants and collect data easily.

In terms of academic engagement, the scope of my study is limited to the antecedent-side of academic engagement based on the analytical framework suggested in existing research (Perkmann et al., 2013, 2021). On the antecedent-side of academic engagement are those factors that influence the behaviour of academic researchers towards interaction with non-academic partners. Such factors include individual characteristics, organisational factors, and institutional factors. Also, all modes of interaction such joint research, contract research, consulting, participation in industry-sponsored conferences and workshops, joint creation of facilities, join-supervision of doctoral research projects, training of industry personnel and other form of informal contact with external partners were explored.

Lastly, in terms of external actors, this study includes all non-academic external collaborators including industry, charity organisations, non-government organisations and government bodies as identified in the literature (Marzocchi et al., 2023) though from the perspective of the individual academic carrying out the engagement. Overall, the scope of this study was guided by existing literature with the intention that the study can gain insight into the way academic researchers engage, their motivation for engaging, barriers encountered, and their overall experiences during their external engagements.

1.5 Contribution of the Study

This thesis extends our knowledge of academic researchers' behaviour in engaging with non-academic external collaborators. The theoretical framework adapted from the previous works of Clauss et al., (2022), which relies on self-determination theory, was limited to individual factors only. This thesis includes all the factors - individual, organisational, and organisational- hence providing a more comprehensive understanding of how these three factors influence academic researchers' behaviour in engaging with non-academic external partners. Additionally, this research provides valuable insights

into researchers' interactions with a broader range of external partners. Previous studies have identified the need for further exploration in this area (Marzocchi et al., 2023; Noke et al., 2024; Taxt, 2023). While earlier research has predominantly focused on industry partners (Ankrah et al., 2013; Bekkers & Freitas, 2008), this study expands the scope to include a variety of external stakeholders, thereby addressing a critical gap in the existing literature.

This thesis contributes to understanding of researchers' motivation by challenging the claim that engagement with external collaborators is primarily driven by access to monetary benefits (Atta-Owusu & Fitjar, 2022; Zheng et al., 2023). Instead, this thesis provides more insight indicating that non-monetary resources play a significant role. Furthermore, this thesis contributes significantly by explaining why academic engagement does not hinder research and innovation, contrary to some claims in previous literature (Collyer, 2015). Instead, it highlights the benefits of academic engagement to researchers, supporting the findings of earlier studies (Bhullar et al., 2019; D'Este & Perkmann, 2011b; O'Dwyer et al., 2023). Lastly, this thesis makes a notable contribution to knowledge on academic engagement, affirming the assertion that the need for relatedness, as a component of self-determination theory, positively influences academic researchers' involvement in academic engagement (Orazbayeva et al., 2021). This study provides more insight to clarify the perception presented in some studies that underestimate the role of researchers' perceived need for relatedness in participating in academic engagement (Queirós et al., 2022).

1.6 Thesis Structure and Chapter Outline

This thesis consists of five chapters. Chapter one introduces the study as a whole and shares insights on the background of the study, rationale for the study, aims of the study the research problem, scope of the thesis, and contribution of the findings of the thesis.

Chapter two is the literature review where the core concepts of the study are discussed in relation to extant studies. The chapter starts with an introduction section which briefly describes the purpose of the chapter and the expected key outcomes. The section on academic engagement is next, which provided perspectives on the concepts, key determinants, and the various modes of academic engagement. A section was also dedicated to exploring academic freedom issues which are connected to external activities of researchers including the conceptualisation of academic freedom, identification of various external stakeholders influencing researchers' freedom.

Chapter three examines the theoretical background of the study. Here, theories applicable to the study of motivation for academic engagement were discussed which led to the selection of the appropriate

theory for the thesis. Self-determination theory (SDT) was identified as the most appropriate for this thesis. Chapter three discusses SDT in some detail and then applies SDT as the lens through which issues around academic engagement are discussed, thus setting up the theoretical framework for this study.

Chapter four presents the research methodology. The chapter starts with an introduction section which describes the purpose of the thesis, and the methodology used in addressing the research question motivating the thesis. The next sections provide the overall research design and other details on sample selection, data collection and analysis approach, ethical consideration, and a summary section to recap the chapter.

Chapter five, Results and Discussion starts with introduction section. This section provides an overview of the chapter with respect to the analysed results from the semi-structure interview conducted. In following sections, results and discussions are presented on the rationale as to "why" academic researchers engage with non-academic external partners. The focus here is the motivation factors of researchers towards academic engagement which could either be extrinsic or intrinsic. Next section discusses the patterns on "how" individual characteristics, organisational and institutional factors shape academic researchers' engagement with non-academic external partners.

Chapter six is the conclusion chapter of the thesis. This section focuses on reviewing the research question developed for the thesis based on the results obtained and discussed in the previous chapter. Another section is dedicated to discussion on the limitations of the study and suggestions for future research. The last section in the chapter provides practical implications and recommendations of the thesis to policymakers, university managers, practitioners, and academics.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter reviews existing literature pertinent to the key components of this study, structured into three main sections. Section 2.2 explores the concept of academic engagement, defining the term and discussing its types, determinants, motivations, barriers, and benefits. This sets the stage for understanding how academic researchers interact with their scholarly environment. Section 2.3 addresses academic freedom, examining its conceptualization in the literature, the limits placed on it in research contexts, the influence of external actors on researchers' academic freedom, and the relationship between academic freedom and academic engagement.

2.2 Academic Engagement

Extant literature has frequently discussed knowledge transferring from universities to industry from the perspective of technology transfer. This perspective has historically focused on the commercialization of knowledge (Pekşen et al., 2021). However, this narrow focus has been broadened to encompass all other knowledge interaction mechanisms of “academic engagement” that universities utilize in their external activities (Perkmann et al., 2013). In this thesis, academic engagement refers to “knowledge-related collaboration by academic researchers with non-academic organisations” (Perkmann et al., 2013: 424). Essentially, academic engagement involves a "person-to-person interaction" (Cohen et al. 2002) consisting of academic researchers and individual stakeholders from external organisations, such as business firms, policymakers, practitioners, non-governmental/charity organisations, and the public (Perkmann et al., 2021).

Academic engagement consists of several activities distinguished by their interaction channels. On the one hand, *informal engagement activities* are knowledge transfer mechanisms for less formal communication with external organisations (Link et al., 2007). These activities include attending meetings, giving talks and public lectures, information exchanges at practitioner conferences or other occasions. These informal engagement activities are often based on trust, as no contractual agreement is established between academic researchers and their industry counterparts when building such relationships (Bodas Freitas et al., 2013). On the other hand, *formal engagement activities*, including contract research, explore technology transfer mechanisms, such as patents, and spin-offs, with external partners for commercial gain (Grimpe & Hussinger, 2013).

Informal engagement activities tend to occur more frequently than formal activities, and informal activities further help improve the quality of relationships between patterns during formal activities(Grimpe & Hussinger, 2013). Also, it is common to see both informal and formal engagement happening simultaneously (Siegel et al., 2003). Similarly to how strategic academic engagement is related to socio-economic development, policymakers and university managers have shown interest in the need for academic researchers to engage more with external partners. Aside from the fact that universities may generate additional funds through such engagement (Czerwińska-Lubszczyk et al., 2020), it is also a means to exhibit their legitimacy by engaging in research that will impact wider society (Perkmann et al., 2013).

There are numerous benefits that academic engagement brings to the collaborating partners. Such benefits include facilitating advancement in research (Bhullar et al., 2019; D'Este & Perkmann, 2011), providing researchers access to resources (Franco & Haase, 2015; Tartari & Breschi, 2012), and provision for post-graduate student mentoring by industry partitioners (Sun & Turner, 2023). Other studies have also noted that it could offer opportunities to generate scientific research ideas/questions, exploit new research opportunities, or even test research theories and findings in a more applied context (Bodas Freitas et al., 2013; Figueiredo & Ferreira, 2022). Some studies further investigate what motivates academic researchers to engage with other non-academic actors. These studies suggest that academics are motivated by individuals' ambitions to advance their research, prosocial motivation (that is, the ambition to contribute to society), or the pecuniary motivation of the monetary benefits that may come with engaging with partners from outside academia (Atta-Owusu & Fitjar, 2022). In addition, opportunities to gain status or raise their academic profile motivates researchers to engage with external partners (Dietz & Bozeman, 2005; Siegel et al., 2004).

Evidence from the literature has shown that despite the potential benefits of academic engagement, such initiatives may fail to achieve their underlying goals and objectives. There are many reasons why collaborations do not meet expected goals and objectives. Management issues is one of the reasons cited in extant literature why these goals may not be achieved because "public research institutes and private industry are characterised by highly divergent missions, organisational structures and management systems" (Abramo et al., 2009; 503). Hence, academic researchers may fear that collaborating with an external partner could result in conflict issues. For instance, issues like "when" and "how" research results should be disseminated, and whether the orientation of the research should be directed towards producing publications (which will benefit the academic researcher more) or if it should be tilted towards the commercial interest of the industry partner (David, 2004). This is often the case as the interest of the industry partner is usually to commodify knowledge, which may be detrimental to the researcher's academic freedom to freely conduct and disseminate research

results (Collyer, 2015; Welsh et al., 2008). For individual researchers to meet their expected goals in engagement, they need a significant degree of professional autonomy to pursue their research agenda; they need to be self-motivated and not be subjected to "command and control" (Perkmann et al., 2013). Beyond these challenges, a well-managed academic engagement system has the propensity to be beneficial to both parties involved as it "allows firms and universities to tap into complementary skills of each other and thus potentially help with saving cost and enhancing research outcomes" (Hemmert et al., 2014: 605).

Recent studies have emphasized challenges faced during interaction between collaborating partners from academia and non-academia. Issues such as industry partners' "unrealistic expectations" and "conflicting timelines" are often at variance with those of academic researchers (Austin et al., 2021). These issues also include cultural differences, managing systemic barriers (such as finance and knowledge), and the modalities for improving cognitive and affective trust (Rossoni et al., 2023). Differences in goals, interests and incentives may form a communication gap between university researchers and their industry partners (Nasirov & Joshi, 2023). Effective ways collaborating partners can manage their differences in goals have also been suggested (Canhoto et al., 2016). One of those proposed is that at the early stage of collaboration, universities and their external partners should start with smaller projects before extending them into larger projects to enable them to gain more experience and familiarise themselves with partners (Wit-de Vries et al., 2019).

Contextually, because of variability in the different types and forms of academic engagement, it may not be easy to generalise what leads to a successful collaboration (Sun & Turner, 2023). The way academic researchers interact with other non-academic external partners varies across countries, disciplines, and academic fields (Jong et al., 2022). Investigation into the different types of these interactions, particularly within social science and humanities (Olmos-Peñuela et al., 2014) and within medical and engineering fields (O'Dwyer et al., 2023) have been reported. In the next section, the different types and channels of academic engagement will be explored to generate insight into some of the complexities surrounding academic engagement, as elaborated above.

2.2.1 Types and channels of academic engagement

Table 2.1 is a summary of how and why academic researchers interact with external partners. The "how" column focuses on the various types of informal activities of academic engagement activities as identified by Perkmann et al. (2021), which include collaborative research, contract research and consulting, while those informal activities are informal contacts/advice, training of personnel, placement/supervision of students, industry fundings, joint publication, conferences and workshops,

membership in advisory boards, joint creation of physical facilitates; and work with standardisation bodies. It also comprises formal activities which are essentially commercially driven, such as patents and spin-offs (Lawson et al., 2016).

All these formal and informal activities are then grouped together based on the four channels of interaction as suggested by Dutrénit and Arza, (2010). These channels of interaction between academic researchers and external partners (in this case, industry) include traditional, services, commercial and bi-directional channels. The distinguishing characteristic of these channels is also presented in Table 2.1. The last column also provides a basis for "why" academic researchers will engage with industry specifically related to the different forms of interaction and the associated channels identified. As identified by D'Este et al. (2019), academic researchers are motivated to engage with industry based on their preferences and motives. On the one hand, some are relationally motivated groups of researchers, which refers to those whose motivation for engagement is based on the need to acquire knowledge-driven, non-commercial benefits to enhance their research. Academic engagement activities that interest these people are those within the following three channels: traditional, services, and bi-directional. On the other hand, there is a transactionally motivated group of researchers whose participation in external engagement is for commercial benefits. These groups of researchers are motivated to engage with industry to patent their research or create a spin-off firm to test their research outputs' proof-of-concept (Battaglia et al., 2021). Further analysis of all these activities is discussed in detail in the following sub-sections.

How			***Why***
Forms of interactions	**Channel**	**Channel characteristics**	**Motivation for interaction**
Joint/Collaborative Research Contract research Industry funding Joint creation of physical facilities	Bi-directional	• Both academic researchers and industry partners jointly provide knowledge resources. • Interaction is usually on a long-term basis.	Relational (personal based)
Patents	Commercial	• Interactions are motivated by an attempt to commercialise the scientific outcomes already produced by academic researchers • Require formal contractual agreement.	Transactional (commercially driven)
Informal contacts/advice Academic Consulting Training of personnel Internships placement/supervision of PhD students, membership of advisory boards	Services	• Includes the provision of scientific and technological services in exchange for money. • Interaction is usually on a short-term basis.	Relational (personal based)
Conferences and seminars Joint Publications	Traditional	• Related to traditional ways, the industry benefits from academic researchers' informal activities.	Relational (personal based)

Table 2.1: Various forms and channels of academic engagement

Source: Adapted from (D'Este et al., 2019; Dutrénit & Arza, 2010; Perkmann et al., 2021)

Joint/Collaborative Research

Joint or collaborative research, is a formal inter-organisational channel of engagement between universities and non-academic external partners which forms a cooperative agreement between both parties to conduct a research and development (R&D) project together (D'Este & Perkmann, 2011). Evidence shows that joint research collaboration positively impacts individual researchers' performance in terms of scholarly publications outputs (Lee & Bozeman, 2005). This claim has also been substantiated in a study by Abramo et al. (2009), as collaborative research with non-academic external partners provides complementary assets to academic researchers in the university. These assets play a critical role in advancing knowledge. When comparing collaborative research formed between university researchers only, between academic researchers and industry, or between the academic researchers with other non-academic external partners such as government bodies at the national, state or local government levels, or with organised interest groups such as charitable organisations, Landry et al., (1996) provided evidence that collaboration between academic researchers and non-academic external partners has a more significant impact on researcher performance.

Performance indicators measuring the success of joint research projects between universities and non-academic external partners, as provided by Albats et al. (2018), include the number of resources that the partner allocated to a collaborative research project, the efficiency of the management structure in the collaboration, which stipulates their roles and responsibilities, and the number of innovations beneficial to industry firms in collaboration with the university. Managing autonomy in a joint research project has also been raised, which is critical to a successful interaction (Zalewska-Kurek & Harms, 2020). Recent studies also show that researchers with strategic research agendas geared towards gaining prestige among peers and discovering novel and ground-breaking research breakthroughs are more eager to participate in joint research (Santos et al., 2022).

Contract Research

Contract research is a form of interaction where firms explicitly commission projects by university researchers based on research areas of direct commercial relevance to the firm (D'Este & Perkmann, 2011). This type of interaction is performed mainly by research groups (Schmoch, 1999). Recent studies have also provided evidence on the conditions (e.g. academic researchers with high-ability to conduct academic research and have high academic publications) that business firms and other non-academic external partners consider as a basis for hiring academic researchers for engagement in contract research projects (Martínez & Parlane, 2023; Rijnsoever & Hessels, 2021; Shen et al., 2022).

Bozeman & Gaughan (2007) surveyed 1564 individual academic researchers, selected from universities in the United States, to investigate how the grants and contracts sourced from industry and government determine individual researchers' level of involvement with industrial research. Their results show that individual academic researchers' propensity to work with industry partners on a project is subject to the availability of grants and contracts that the industry will provide. In addition, contracts from government bodies, in the form of public grants to a moderate level, can facilitate researchers' willingness to work with the non-academic external partners. This is because government contracts typically seek to promote interaction between academia and non-academic external partners.

Some scholars have argued that academic researchers may sacrifice scholarly research to pursue their commercial goals, especially when the growing share of a university's funding comes from contract research projects with non-academic external partners (Goldfarb, 2008). Studies have also examined the conditions under which firms renew research contracts with researchers. In a collaborative project between academia and non-academic external partners such as industry firms, industry firms will likely renew contract research with academic researchers if they perceive that such projects will facilitate technological knowledge learning or promote co-authorship of academic papers (O'Kane, Haar, et al., 2021).

Industry funding

As a result of the decline in the government's public funds for research in universities (Gulbrandsen & Smeby, 2005), academic researchers are being encouraged to explore external sources to acquire financial resources for their research (Hottenrott & Lawson, 2017). Industry funding refers to financial resources which academic researchers' source from industry or external companies, mainly provided to address problems that the industry is facing (Amara et al., 2013). Aside from the industry, researchers could derive external funding for their research endeavours from research granting councils, foundations, government (public) agencies, and international funding organisations such as the European Union (Gulbrandsen & Smeby, 2005). The private sector supports university research by providing industry funding during university-industry collaboration (Perkmann et al., 2013). Industry funding is, thus, vital to academic researchers because it enables them to maintain and expand their research programs while also facilitating them to contribute to advancing technology and scientific innovations for societal benefits (Bozeman & Gaughan, 2007). Also, industry funding offers academic researchers' various channels to engage with the industry (De Fuentes & Dutrénit, 2012; D'Este & Patel, 2007).

Academic researchers who acquire industry funding tend to collaborate more with other researchers within the university community or with external non-academic partners such as industry (Gulbrandsen & Smeby, 2005). Also, academic researchers who can acquire industry funding are more likely to be involved in consulting with industry partners (Arvanitis et al., 2008; Boardman & Ponomariov, 2009; Bruneel et al., 2010). Meanwhile, Hottenrott & Thorwarth (2011) opined that though one could say that academic researchers engage in consulting and contract research in exchange for accessing funding support from the industry, there is still limited evidence as to the direct influence of industry funding on university research practice.

Existing literature has shown mixed evidence on the implications of industry funding for academic research practice, particularly within the context of academic engagement. For this reason, some scholars have called for academic researchers to apply caution before engaging in industry-funded research, as there is documented evidence of research abuses and unethical practices in some industries (Louderback et al., 2021). Evidence of such abuses has been reported in research concerning the tobacco industry (Tong & Glantz, 2007), pharmaceutical industry (Goldacre, 2014), food and nutrition industry (Chartres et al., 2016), sugar industry (Kearns et al., 2016) and in the gambling industry (Louderback et al., 2021). This further buttress the idea that the source of funding could influence researchers' behaviour and research output because different selection and evaluation criteria characterise funding sources and, in some cases require that researchers realign their research to suit the external funders requirement (Gulbrandsen & Smeby, 2005).

Some studies have examined how industry funding could impact on supervision of PhD students. There is the claim that, in Australia, postgraduate students whose doctoral research was funded by the industry are more satisfied with their research than students whose doctoral research was funded by the government through the award of public scholarships and grants (Harman, 2001). Within the same Australian context, however, another study argues that academic researchers in the science and technology field reported that industry funding restricts their research autonomy more than government-funded projects (Harman, 2002). PhD supervisors have also reported issues of conflict of interest as industry partners funding the PhD research project tend to influence the project's scope, making students not feel as much ownership of their research work (Malfroy, 2011). When compared to government funding, industry funding was found to be more conducive for researchers to produce innovative research outputs (Thursby & Thursby, 2011). In a large-scale study conducted on 1690 doctoral students in Danish universities whose doctoral projects were funded by external funding acquired by the PhD supervisors, Wichmann-Hansen & Herrmann (2017) show that the PhD supervisors have more of an influence than industry partners in the direction of PhD students' research projects. This influence was reported to be prevalent among PhD students in health science, with no

impact on those in natural sciences. In contrast, the influence is ambiguous for humanities and social sciences students. Due to the ambiguity in the impact of industry funding on research, it is imperative to discuss how existing literature views the benefits and costs of industry funding.

On the positive side, extant literature has shown that academic researchers who were able to acquire industry funding are more productive in terms of research outcomes (e.g. increase in publications) as they have more financial resources to procure research equipment materials and hire more supporting research staff (Gulbrandsen & Smeby, 2005). In terms of producing innovative, commercially driven research outputs such as patents, spinoffs, and other commercial-related results, including opportunities for consulting services, there is a significant positive correlation between industry funding and collaboration (Gregorio & Shane, 2003). This is because industry partners will most likely be interested in funding more commercially driven research, which is helpful for university researchers in their goals to be entrepreneurial. Other studies posit that receiving industry funding does not affect academic researchers' tendencies to create spinoff companies (Boardman & Ponomariov, 2009). The study conducted by Hottenrott & Thorwarth (2011) also shows no effect on the number of patents, though noting that such funding could impact citations per patent. A further explanation by Hottenrott & Thorwarth (2011) is that industry funding influences novelty and quality of research.

On the negative impacts of industry funding, some studies have suggested that industry funding can lead to reduced publications and that this situation happens when industry funding constitutes a higher share of a researcher's budget (Hottenrott & Thorwarth, 2011). The reason put forward is that academic researchers may not be able to publish more in the subsequent year due to a “skewing problem” where, for example, industry funding tends to favour some research areas which may not align with academic researchers own research agenda. This action could have a detrimental effect on the development of science as publication is considered one of the means through which knowledge is disseminated to society (Hottenrott & Thorwarth, 2011). Evidence exists that industry-sponsored research could lead to delay in publication and could also lead to secrecy, withholding of research results, or even imposing a ban on publication (Blumenthal et al., 2006; Czarnitzki, Grimpe, & Pellens, 2015; Czarnitzki, Grimpe, & Toole, 2015; Hong & Walsh, 2009). Based on a report by Gans & Murray (2011), gathered from data on contract terms that industry sponsors provide in the funding agreement to academic researchers, most of the contract documents reviewed show that they contain clauses on restriction and withholding of research information that they consider confidential. Thus, academic researchers must be mindful of such clauses when signing agreements on industry-sponsored research projects to prevent problems associated with disseminating and communicating research results.

Some studies do not agree that industry funding could lead to the skewing problem, or suggest that its effect is not too profound, but in fact may be the opposite. For instance, some studies argue that

academic researchers who receive funding from the industry and collaborate with industry partners produce more publications (Blumenthal et al., 1996; Callaert et al., 2015; Gulbrandsen & Smeby, 2005). Industry funding, for example, increases the chances of academic researchers to co-publish with industry partners (Boardman & Ponomariov, 2009). Industry funding could also indirectly benefit academic researchers to expand their social network, considering that funding opportunities often demand collaboration between researchers and the industry partner (Defazio et al., 2009). This is further supported by Boardman & Ponomariov (2009) as they suggest that industry funding increases the propensity of academic researchers to initiate contact with industry partners concerning their research or to show interest in being engaged in paid consulting services (D'Este et al., 2013; Fudickar et al., 2018; Jensen et al., 2010; Yegros-Yegros et al., 2016).

Another pertinent concern of the negative implication of industry funding on research practice is the case of the gambling industry. Sismondo (2008) have criticised that receiving funding from the gambling industry could bring bias to the practice of research and its integrity, which academics are known for, because the gambling industry will want researchers to produce results that will not present the gambling industry in a negative light. There are opposing arguments that receiving funding may not bring bias to academic research practice in this industry but benefit researchers if adequately managed (Collins et al., 2020; Kim et al., 2016). In a recent study, Louderback et al. (2021) suggested a helpful guideline for ensuring open science practice in gambling industry-funded research, which they termed "Guidelines for Research Independence and Transparency (GRIT)".

Joint creation of physical facilities

Interaction between academia and external partners often involves both parties collaborating to establish physical facilities to enhance their research activities and promote commercialisation (D'Este & Patel, 2007; Zhao et al., 2020). Such activities grouped under creation of physical facilities include "setting up spin-off companies, campus laboratories, incubators and cooperative research centres" (D'Este & Patel, 2007: 1301) . Since these structures (laboratories, research centres and incubators) are highly capital-intensive and may be beyond the financial capacity of the university, interacting with external partners allows universities to overcome these barriers to accessing such facilities (Carayol & Matt, 2004; Dias & Selan, 2023). Recent studies have shown that cross-sectoral partnership between the academic researchers and non-academic external partners, particularly in utilization of physical infrastructural facilities, play a significant role in the dynamics of innovation ecosystems (Dzhengiz & Patala, 2024).

Several studies have explored the mechanisms for the creation of physical facilities. Innovation labs were found to serve as organisational catalysts for attaining innovation capacity development, and as a result a reference framework for assessing the maturity level of innovation labs has been developed (Schiuma & Santarsiero, 2023). Another study conducted using multiple case studies on chief executives and founders of 32 start-ups who have accessed incubator and other physical infrastructural facilities in the United Kingdom, reveals that availability of viable entrepreneurial ecosystems consisting of infrastructure and services (e.g incubators and accelerators), sharing of resources and formation of collaborations with companies, and universities, connection to science and technology parks and companies are critical knowledge spillovers platforms start-up companies use for product innovation (Cuvero et al., 2023).

In the context of Finland, Höyssä et al., (2004), investigated how the first biotechnology centre building "BioCity" in Turku, Finland emerged and found out that formation of a new kind of cross-sectoral collaboration between academia and non-academic external partners played an important role in the conceptualisation and creation of the BioCity. Similarly, using a case study approach where 59 semi-structured interviews were conducted to assess four Smart State Institutes created within the University of Queensland, Australia, findings shows that government policy (both federal and state levels), university managers' strategy, and participation of academic researchers played a significant role in the creation of these four institutes (Dodgson & Staggs, 2012). With respect to empirical study conducted on some countries in Asia, Latin America and Caribbean, it was revealed that investment in R&D enabling infrastructural facility positively influenced innovation (Qureshi et al., 2021).

Comparing determinants of innovation performance within 63 countries selected purposefully using data collected in the Global Innovation Index (GII), results reveal that creation of physical facilities in universities was among the key determinants that differentiate countries with higher innovation performance (Bate et al., 2023). Based on interview data gathered from 197 researchers based in Italian universities to assess their collaborative activities, findings show that creation of physical facility was among the channel of collaboration between academia and non-academia (Muscio & Vallanti, 2014). Some scholars have also argued that due to high degree of its difficulty, creation of physical facilities is among the least used channels by academic researchers to collaborate with non-academic external partners. For instance, citing high level of difficulty as a reason, Tartari et al., (2014) in their study on academic engagement found that only 17% of academic researchers were involved in activities like creation of physical facilities (e.g laboratories) with industry partners. Another survey conducted on collaborative activities of 564 university scientists in China reveals that academic researchers face a high degree of difficulty using industry funding to create new physical facilities (Zhao et al., 2020).

Patents

Licensing university patents by industry partners has been identified as one of the forms academic researchers collaborate with non-academic external partners and in particular with industry (Chryssou, 2020; Crescenzi et al., 2017; Murgia, 2018). However, potential conflicts over patents can constitute barriers to collaboration between universities and industry (Rossoni et al., 2023). Therefore, depending on the fundamental goal of forming engagement between academic researchers and non-academic external partners, patents are a critical indicator for measuring such engagement's success (Albats et al., 2018). Patents offer inventors an exclusive right and proprietary advantage to inventors for about 20 years (Van De Vrande et al., 2024) though this does vary. The progress in technology development achieved through collaboration between academic researchers and non-academic external partners is measured by the number of filed and granted patents, whether jointly owned or owned by a single collaborating partner, which also indicates the significance of university research for industry (Albats et al., 2018).

Extant literature claims a shift in patenting as a form of collaboration, which was commonly associated with fields such as engineering, "however, current trend towards higher accountability in academia means that a broader range of practice engagement is required and that this requirement now applies to social sciences as well" (Ryazanova & Jaskiene, 2022: 6). Historically, the enactment of the Bayh-Dole Act in 1980, an American law encouraging universities with federal funding to produce patents, is credited as the primary factor behind the expansion of collaboration between academia and industry (Mowery et al., 2015; Mowery & Sampat, 2005). Following these changes, other countries introduced similar legislation, leading to the rise in the creation of Technology Transfer Offices (TTOs) in various universities across these countries (Belitski et al., 2019; Bolzani et al., 2021; O'Kane, Cunningham, et al., 2021).

Informal contacts/advice

In a knowledge interaction, informal contacts refer to a medium of information exchange (such as contacts made through the phone and emails) between academic researchers and external partners, often used for seeking advice or making enquiries (Arvanitis et al., 2008). These informal contact channels are personal channels through which firms occasionally access public researchers to obtain informal advice (Faulkner & Senker, 1994). Informal contact between researchers from the university and their industry partners is a vital means of interaction beyond just a channel for exchanging information. Still, they can also facilitate inter-sectoral joint/collaborative research (Ponomariov & Craig Boardman, 2008). Recent studies emphasise how informal contacts and advice are relevant to

building confidence, trust, and meaningful relationships among collaborating partners (Tootell et al., 2021; Wit-de-Vries et al., 2019), which could also lead to knowledge-creation opportunities over time (Canhoto et al., 2016).

Academic Consulting

Academic consulting refers to the situation where non-academic partners directly engage with individual academics who help to solve problems that they face in their organisations (Sengupta & Rossi, 2023). Compared to other types of academic engagement, academic consulting seems to be the activity that academic researchers engage in the most (D'Este & Patel, 2007; Rentocchini et al., 2014). To facilitate more insight into the typology of academic consulting, Perkmann & Walsh (2008) categorised academic consulting into three types: opportunity-driven, commercialisation-driven, and research-driven. Based on the Perkmann & Walsh (2008) description of these types of academic consulting, opportunity-driven consulting is associated with researchers whose motive for interaction with non-academic external partner is to generate income. This type of relationship is typically short-term in nature and the type of knowledge produced is usually openly accessible. In the case of commercialization-driven consulting, researchers' motives for such interaction with non-academic external partner is generally for technology development. Such relationships are through joint projects and in terms of knowledge sharing, this is common among researchers with tacit expertise. Researcher-driven consulting is mostly engaged in by researchers whose motive for interacting with non-academic external partner is to explore research opportunities. This kind of relationship is often long-term in nature, and the type of knowledge involved in such consulting is commonly of the strategic judgment type.

According to Perkmann & Walsh (2008), consulting is at the discretion of individual researchers, a decision often based on personal motivation. Furthermore, the authors infer that researchers are motivated towards consulting based on specific reasons: (i) income that can be generated through it, (ii) it offers an opportunity for them to commercialise their inventions, and (iii) researchers need to form more viable research opportunities, e.g. to expand their social network. Driven by the opportunities to apply research knowledge to practice, academic consulting serves as a vital means to transfer knowledge between public and private but may negatively affect academic research practices and the dissemination of knowledge (Fudickar et al., 2018). Academic consulting may be a channel for sourcing additional funding for researchers or departments to procure laboratory equipment or enable researchers to network with their counterparts in private firms (Azoulay et al., 2009). Sengupta & Rossi

(2023) stated that researchers can generate income from consulting services based on contractually agreed fees with the external partner who engages them.

Some authors (Bozeman & Gaughan, 2007) have argued that even though consulting services can generate income for researchers, this should not be misinterpreted as another form of university funding stream. Their reason is that consulting is often a form of the bilateral agreement reached between non-academic external partners and individual researchers, and, as a result, it is a way that researchers could source additional funding to meet their personal research costs, and may not lead to an increase in income for the university. Bianchini et al., (2016) argue that consulting is time-consuming and may lead to trade-offs in researchers' commitment to research. There are concerns that consulting activities with non-academic external public and private partners could impact research outcomes in terms of publications or even lead to researchers exiting academia for a better opportunity in the practice domain (Fudickar et al., 2018). A deeper explanation for why researchers may leave academic research for full-time consulting may be due to either the non-relevance of consulting activities to the research or time constraints preventing them from pursuing research that could lead to publications (Hottenrott & Lawson, 2017).

Training of personnel

Training of personnel has been found as one of the variety of channels (alongside joint research, consulting and contract research) that academic researchers engage with non-academic external partners (D'Este & Patel, 2007; Schartinger et al., 2002). Shortage of human capital skilled in the promotion of research and development (R&D) activities constitute the biggest challenge to innovation (Bate et al., 2023). Through joint programmes, academic researchers and non-academic external partners often engage in training to upgrade the capacity of their human resources (Caloghirou et al., 2021). Within the context of academic engagement, training of personnel refers to academic researchers offering teaching services to employees of the organisation, doctoral students from university undertaking postgraduate training in industry, and academic researchers on secondments to industry including university playing host to researchers from industry (Bruneel et al., 2010; Muscio & Vallanti, 2014; Nelson et al., 2024; Olmos-Peñuela et al., 2014).

The rationale for personnel training is often to build knowledge capacity in employees from non-academic external partner or researchers alike, hence academia and non-academia explore collaboration to address this gap. O'Dwyer et al., (2023) gave an instance where academia organises in-house technical meetings and trainings for their academic researchers because they lack significant understanding of the technical (science and engineering) challenges of industry's manufacturing

process. In such trainings workshops, paper presentations are made by experts drawn both academia and industry who possess more experience in this area of knowledge. There are also instances where industry partners offer opportunities for academic researchers and postgraduate students from universities to engage in practical research in their laboratories for a specific period or engage in industry-specific projects to enable academic researchers upgrade their knowledge of manufacturing process (O'Dwyer et al., 2023). Regular training between academia and non-academia have been identified to build trust between both actors (researchers and external collaborators), and this is critical for initiating other channels of interactions such as joint research, contract research or consulting over time (Ankrah & AL-Tabbaa, 2015; Sherwood & Covin, 2008). To foster more engagement with the public through designing studies with broader impacts for societal benefits, organisations like the Centre for Advancing Research Impact in Society (USA) organise training events for academic researchers (Drummond Otten & Fischhoff, 2022).

Extant literature has shown the effect of training on academic engagement. Olmos-Peñuela et al., (2014) found that academic researchers belonging to research groups having a strong focus on attaining societal impact and relevance through their research have the tendency to engage in training with non-academic external partners. There is also evidence that academic researchers working in research groups in the field of social sciences and humanities that are headed by researchers with the status of full professors engage more in training activities with non-academic external partners (Olmos-Peñuela et al., 2014). However, Schartinger et al., (2002) argues that the department size that an academic researcher belong significantly impacts the intensity of their training activities with non-academic external partners. Furthermore, it was also argued that academic researchers in the fields of social sciences and economics are more interested in organising lectures and offering training courses for industry employees (Schartinger et al., 2002). Another study has argued that academic researchers who were trained by industry partners during the "Ivory Tower" historical era of university when academic engagement was of less relevance, are likely to develop norms considered to be problematic towards engaging with non-academic partners subsequently(Bercovitz & Feldman, 2008).

Internship Placement/Joint supervision

In an interaction between the university and industry partners, the role of doctoral students is vital. In this type of relationship, either as a student or after graduation, these individuals strategically foster linkage with external partners (Thune, 2009). Doctoral students constitute part of the producers of knowledge within the academic community; they are also considered as a constituent of knowledge distribution, and lastly, as active nodes for networks that link university and industry together when

engaged in industry-sponsored PhD research projects (Plantec et al., 2023). Lee & Miozz (2015) explain that collaboration between university and industry allows doctoral or post-doctoral students a placement opportunity in the industry as in the "industry-based PhD" program structure. According to Wang et al., (2016), knowledge interaction between universities and industry partners enhances the research and learning capacity of the university lecturer and student while it also helps solve industry problems. The quality of supervision a PhD student receives from their PhD supervisor during a collaborative research project significantly impacts how the PhD student perceives its success (Butcher & Jeffrey, 2007).

Having stated the vital role that supervision of students plays in collaboration, there are concerns about how students can cope with working in this environment, which demands a particular form of socialising. There is a divergent perspective on how scholars perceive this issue. For instance, a study conducted by Slaughter et al., (2002) observed that because PhD students involved in collaborative research with industry are exposed to a value system different from the university systems they come from, they are likely to face some problems in their research. However, other scholars believe such problems can be mitigated and pose no challenge to the PhD student if joint supervisory support is drawn from the university and industry (Salminen-Karlsson & Wallgren, 2008). A recent study conducted by Reymert and Thune (2022) suggests a significant positive relationship between knowledge interaction with external partners and supervision of students. Their study provided evidence that, unlike collaboration with industry partners, research collaborations with public sector organisations support student placement. Their reason for this claim is that because public sector research collaborations are mostly research projects that are long-term based, they, therefore, offer more time-based opportunities for students to pursue research.

Membership of advisory boards

Membership in advisory boards refers to a situation where academic researchers are constituted into the advisory board of a firm to provide their expert services (Hooi & Wang, 2020). Academics may take advisory roles in the management board or the scientific advisory board that many science and technology-driven companies establish. In such cases, according to Jacobsson & Vico (2010), the academics' advisory role includes providing knowledge during policy formulation and technical advice to government and industry actors alike during the design and implementation of a research-oriented project. Also, membership of academics in such boards is said to be useful as it serves to provide advisory support and render expert opinions on a project (Hooi & Wang, 2020). In addition to this, Bjørnåli & Gulbrandsen (2010) posit that because experienced academics (e.g. professors with years

of experience in the academic community) tend to have a vast network cutting across academic and practitioner spheres, they become a valuable addition as a member of such boards. Academics with broad networks within academia capable of attracting critical external resources are sometimes constituted as members of boards in entrepreneurial companies (Bjørnåli & Gulbrandsen, 2010).

Conferences/seminars

One of the interaction channels through which academic researchers contribute to industry-based R&D is their attendance at conferences, workshops and meetings sponsored or organised by industry partners (Cohen et al., 2002; D'Este & Patel, 2007). In these knowledge interactions, academic researchers share their academic knowledge by presenting research papers and giving public lectures at such events (Abreu & Grinevich, 2013). Studies have also shown that academic engagement does not have a negative impact on academic researchers' communication of their research findings at conferences or workshops (Welsh et al., 2008) but that it has a positive impact on them as it facilitates them to expand their networks and as a result their participation in further conference and workshop events (Sun & Turner, 2023).

Joint publications

Gonzalez-Brambila et al. (2013) refer to joint publication as co-publication/co-authorship between partners involved in a collaborative project. Genest and Thibault (2001) posit that joint publications, also known as co-authorship, are a product of the collaboration between interrelated authors involved in a research project. Joint publications in academic journals frequently result from research collaborations between academic and industry partners (McKelvey & Rake, 2020). Using social network analysis to investigate collaboration and co-authorship patterns in finance, Samitas and Kampouris (2018) infer from their research that co-authorship networks are well integrated and that this network size has continued to expand over the years. Based on this outcome, they affirm that not only does interaction among individual researchers and their external collaborating partners facilitate the promotion of innovation and increase their research performance, but it also increases the quality of papers they publish from such interactions. Bidault and Hildebrand (2014) noted that the benefits and cost of joint publications, especially at the individual levels, have raised a critical question as yet unsolved – "Does collaboration lead to a better publication"? As part of the benefits, the authors believe that jointly publishing a paper can facilitate a greater volume of research productivity. For instance, some studies have revealed that articles jointly published by research teams are more cited than those published by a single author (Wuchty et al., 2007).

2.2.2 Determinants of Academic Engagement

Identifying the determinants of academic engagement helps us to understand why academic researchers may be willing to engage with external partners. For instance, Atta-Owusu & Fitjar (2022) stated that three motivational factors are important in determining why academic researchers will engage with external partners. First is the *research advancement motivation* (e.g. gaining new insights in their area of research), prosocial *motivation* (ambition to promote the practical application of research in addressing societal problems), and *pecuniary motivation* (to secure personal income).

Further, the analytical framework of these determinants has been articulated in two systematic literature reviews by Perkmann et al., (2013; 2021) which provide evidence of the interplay between these broader factors and offer a more nuanced understanding of both antecedents and consequences of academic engagement. In this regard, as shown in Figure 2.1, the three major determinants of academic engagement as identified by Perkmann et al., (2021) can be classified as:

- Individual characteristics., i.e. demographics attributes such as gender, prior experience, research productivity, research quality, and life cycle effects.
- Organisational and relational context, i.e., organisational support, formal incentives, university/departmental quality, and peer effects.
- Institutional context i.e., academic discipline, regulation, public policy, and international comparison.

In Figure 2.1, the dashed line indicates factors that require further research because existing evidence is limited, conflicting or ambiguous. In contrast, continuous lines represent factors with sufficient evidence and convergence in existing literature (Perkmann et al., 2021) .

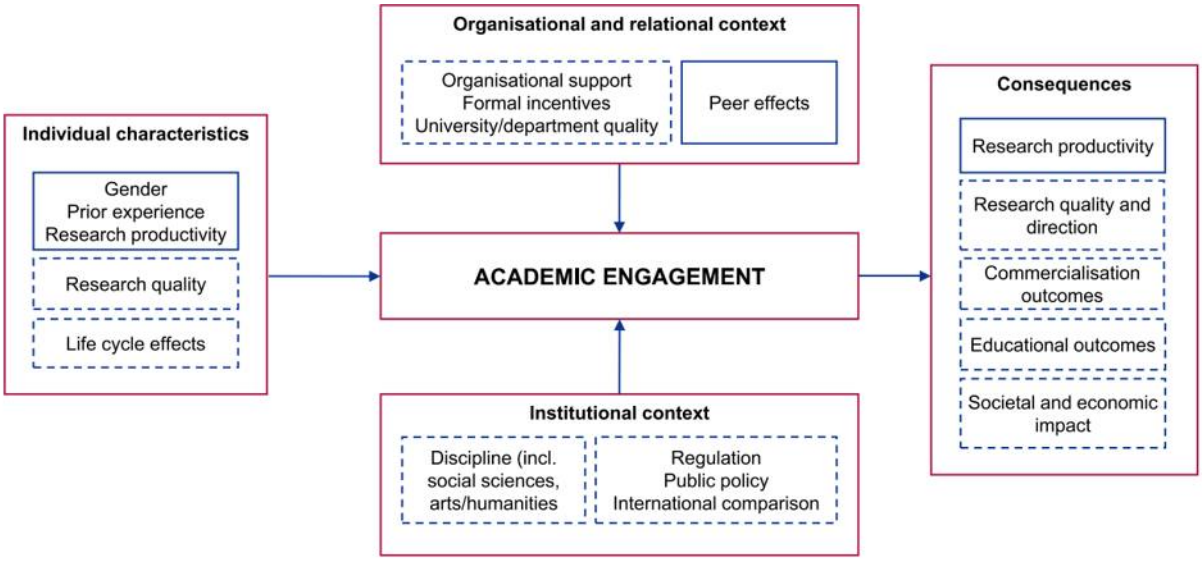

Figure 2.1: An analytical framework of academic engagement

Source: (Perkmann et al., 2021: p.8)

Individual characteristics

The literature has thoroughly examined academic engagement, identified individual characteristics as an antecedent for academic engagement, and found that academic researchers play a pivotal role in engagement with non-academic external collaborators (Clauss et al., 2022; Heng et al., 2020; Perkmann et al., 2021; Sormani & Sijde, 2023; Zhao et al., 2020). Among the individual characteristics, *research quality* and *lifecycle effects* were identified to have been understudied (Perkmann et al., 2021).

Gender is a demographic attribute that has been well-studied in literature. Most studies have shown a relationship between gender and academic engagement (Lawson et al., 2019; Tartari & Salter, 2015). A study conducted on 32,792 Italian professors shows that professors who collaborate more with the industry are primarily male, are more productive in research, and are highly diversified in terms of variety of disciplines (Abramo & D'Angelo, 2022). These results also confirm claims by similar studies conducted in the United Kingdom, where it was reported that male academic researchers collaborate more with industry partners than their female colleagues (Abreu & Grinevich, 2017). Further investigation has also indicated that the number of male academic researchers engaging in contract research and consulting services with non-academic external partners is twice as high as the number of females (Abreu & Grinevich, 2017). However, an earlier study by Lawson et al. (2016) reported that more female researchers than their male counterparts engage with external partners through academic engagement channels such as public engagement, meetings, and informal advice.

Prior experience: Some studies have found a positive link between an individual researcher's previous career experience and the possibility of pursuing academic engagement (Scandura & Iammarino, 2022). Past studies that have considered individual-level characteristics argued that academic researchers' behaviour towards academic engagement is positively influenced by the experiences of their past collaborations with industry (D'Este & Patel, 2007). Academic researchers' previous experiences in patenting and other commercialisation activities have also been identified as predictors of their participation in academic engagement (Bekkers & Bodas Freitas, 2008; Scandura & Iammarino, 2022). Based on a study conducted on academic researchers in the field of science and engineering in the UK, Tartari & Breschi (2012) argue that academic researchers who have worked with external partners in the past and who have also experience in R&D commercialisation will likely have lower barriers to collaborating with industry partners. Similarly, another study conducted in the UK has shown that depending on the type of academic channel, previous engagement of interacting with industry partners raises the chance of researchers engaging again (Lawson et al., 2016). Extant literature has also shown that academic researchers' tendency to interact with external partners from industry is subject to the extent to which they were involved in industry-funded joint research projects (Bozeman & Gaughan, 2007; Link et al., 2007). The reasoning provided by Ponomariov and Boardman (2008) is that researchers who have successfully attracted industry funding in the past are considered to be experienced and have a better working knowledge of managing research agendas beneficial to the growth of the industry in the past.

Research productivity: Individual academic research productivity has been linked to academic engagement. Extant literature suggests that academic researchers with more publications tend to engage more with industry (Aschoff & Grimpe, 2014; D'Este et al., 2019; Tartari et al., 2014). Studies have found evidence of a positive relationship between research productivity and successful engagement in commercial activities by academic researchers (Azoulay et al., 2009; Lowe & Gonzalez-Brambila, 2007). It is further suggested that the most productive researchers usually engage in joint research with industry (Bekkers & Bodas Freitas, 2008; Crescenzi et al., 2017; Gulbrandsen & Smeby, 2005). The reasoning is that engagement with industry partners expands individual academics' research agendas and exposes them to a pool of new research ideas, thereby boosting their research performance (Banal-Estañol et al., 2015).

Similarly, studies reveal that academic researchers in the physical sciences and engineering fields who are more productive are more actively involved in collaboration with the industry (Jensen et al., 2008). Nelson et al., (2023) argue that it is still unclear if these findings can apply to social science academic researchers. In their assessment of industry engagement by academic researchers in the physical sciences, Perkmann et al. (2021) findings show a positive relationship between research productivity

and a few types of academic engagement, excluding consulting, for which they found a negative association.

Research quality: The research quality of academic researchers is measured in terms of the quality of their publications (Perkmann et al., 2021). Further to this definition, Kifor et al., (2023) explain that the quality of the publication is an indicator of its value, which also reflects the impact factor of the journal where the research is published and also that it provides more information on the researchers' activity, the research group which they belong to, as well as the university and country where they carry out their research activities. Analysis of extant literature has shown ambiguity regarding the effect of research quality on the academic engagement of academic researchers (Tartari et al., 2014; Zi & Blind, 2015). Within the Italian context, Tartari & Breschi (2012) argue that academic researchers' tendency to publish in journals focusing on applied research will positively influence researchers' propensity to collaborate with industry.

In their study on German researchers, Zi & Blind (2015) suggest that academic researchers who publish their research papers in applied and industry-focused journals have a higher tendency to engage in standardisation activities with external organisations. Studies also reported a positive effect of patenting on collaboration with industry (Tartari & Breschi, 2012). Still, such a claim does not universally hold as it was found not applicable when applied to academic researchers in the field of life sciences in some German universities (Aschhoff & Grimpe, 2014).

Life cycle effects: The career life cycle of an academic researcher shows a variation in their research performance, which can be partially attributed to researchers' characteristics (Albats et al., 2018). Extant literature has found evidence of a correlation between the career life cycle of individual academic researchers and their propensity to collaborate with industry partners. It is noted that the impact of age may be non-linear (Weerasinghe & Dedunu, 2020). A report by Abramo & D'Angelo (2022) on 32,792 Italian professors to investigate the impact of individual academic researcher characteristics on their propensity to collaborate with industry reveals that professors in their late-career stage have a higher intensity of collaboration with industry.

Several studies have been conducted to assess how the life cycle effect of academic researchers influences their technology transfer activities. To investigate the technology transfer activity of academic researchers at MIT in the United States within the different age groups, Hayter et al. (2017) found that most entrepreneurs (two-thirds of them) who had successfully created a spin-off company and then later founded a new company achieved this when they were between the age of 28-47 years, while those younger than 28 years and older than 48 years representing 7% and 10% respectively could marginally succeed in doing that at such age.

It is believed that academic researchers at their earlier career stage are more motivated to pursue academic engagement that will lead to publication to achieve career progression (knowledge-driven). In contrast, those in the later career stage will be more motivated to engage in commercially driven activities (Link et al., 2007). Others have also argued that academic researchers in their later career stage are more confident to take the risk associated with research commercialization, as failure in such activity may have less effect on their academic career trajectory (Bercovitz & Feldmann, 2006), therefore, career life cycle could be a predictor of academic engagement (Haeussler, 2011).

Organisational context

Organisational characteristics shape individual academic researchers' cognition and, thus, play a role in influencing their attitude towards external engagement (Atta-Owusu & Fitjar, 2022; Zhao et al., 2020).

Support structure: This organisational characteristic is associated with the availability of a university policy that puts in place support structures, e.g. technology transfer offices (TTOs), which provide academic researchers with a medium for technology transfer and diffusion of knowledge activities from the university domain to the external environment (Zhao et al., 2020). Establishment of technology parks, business incubators and industry liaison offices were also identified as supportive structures university managers can provide to stimulate academic researchers to interact with industry (Moraes et al., 2023; Ribeiro & Nagano, 2021; Tootell et al., 2021). Universities with well-structured TTOs positively impact collaboration activities (Phan & Siegel, 2006). This is because the availability of a TTO in a university reduces the influence of "cognitive distance" between academic researchers and their external collaborating partners (Muscio, 2013). Scholars have explained that TTOs serve as a strategic intermediary for knowledge interaction and can also effectively link academic researchers and engineers in the industry by organising sensitization workshops and seminars (Shen et al., 2022).

Arguing from the perspective of academic capitalism, Stuart & Ding (2006) pointed out that universities with such supportive structures tend to influence their academic researchers' willingness to engage in academic engagement positively. However, the absence of such policy initiatives may discourage academic engagement in such universities. Aside from creating TTOs, universities also enable broader participation in academic engagement among academic researchers through far-reaching policies on issues relating to royalties and equity of commercial outputs such as patents (Haeussler et al., 2014; Thursby & Thursby, 2011). Further to the organisational structure university managers provide is the implementation of effective policy framework for income distribution between academic researchers

and the university, generated from commissioned research projects (Link et al., 2007; Ponomariov & Craig Boardman, 2008).

Formal incentives: Higher education managers have introduced several incentives to facilitate academic engagement in their universities (Pinheiro et al., 2015). For instance, incentives such as the university's policy on promotion or pay rises may motivate academic researchers towards engagement with non-academic organisations (Van de Burgwal et al., 2019). However, Jong et al., (2015) believe there are discrepancies between how the universities design these incentives and how academic researchers perceive them as helpful enough to motivate them to engage with external partners. Cases are reported in literature where, despite university managers implementing an incentive system, academic researchers may decide not to initiate external collaborations if they consider such incentives counterproductive for their career progress (Lahikainen et al., 2019).

There is evidence that academic researchers who are motivated by monetary incentives (pecuniary benefit) are more eager to engage with external partners because such engagement will enable them to acquire more financial resources to supplement their income (Clauss et al., 2022; Lam, 2011; Orazbayeva et al., 2020). Therefore, this complementary incentive may motivate academic researchers to pursue academic engagement, especially for academic researchers motivated by the need for more research funding (Sormani et al., 2022). Extant literature has shown ambiguity as to the evidence of the effect of incentive structure as a motivation driver for academic researchers' external engagement. On the one hand, some scholars (Caldera & Debande, 2010; Lach & Schankerman, 2008) believe that universities with incentives are more likely to motivate their academic researchers to pursue commercialisation activities with the industry. On the other hand, others differ as they claim that providing incentives may not motivate researchers but rather make them lose interest in external engagement (Göktepe-Hulten & Mahagaonkar, 2010). This ambiguity may be because most existing studies have focused on incentives from the perspectives of monetary benefits and commercialisation activity as the only type of engagement (Atta-Owusu & Fitjar, 2022). However, some recent studies have considered broader incentive mechanisms beyond just monetary incentives. For instance, recent studies such as Van de Burgwal et al. (2019) have identified fairness in university policy as a more functional, non-monetary incentive that academic researchers perceive to motivate them to get involved in external engagement. This claim was further confirmed in a recent study where academic researchers consider fairness in university policy against pecuniary incentives (monetary reward) as a critical motivator for external engagement (Atta-Owusu & Fitjar, 2022).

University/departmental quality: As evident in some extant literature, the quality of the university and department where academic researchers work signals how interested an industry partner will be to collaborate. While some studies find departmental quality to have a positive effect on engagement

with industry because departments with higher-quality researchers may likely facilitate their interest in academic engagement (Scheulke-Leech, 2013), some other studies find no effect in the relationship between university research intensity status and academic engagement (Libaers, 2014); or with academic researchers' intentions to engage in commercialisation activities (Johnson et al., 2017). Contrary to this belief, Ponomariov (2008) agrees that although academic quality of a university is widely considered beneficial for ranking status, the higher the average quality of a university, the lower the possibility that an individual academic researcher is likely to engage with the industry. This is because higher-quality departments place more importance on research output and, as a result, are more motivated to engage in "blue sky" research rather than pursue engagement with industry (Ponomariov, 2008). When it comes to serving advisory boards (particularly in the public sector), high individual and high university reputation seem to make it more likely to get in and to engage in this type of activities. Some scholars - economists - find this very attractive as they may have opportunities to influence policies (Hughes et al., 2016; Nelson et al., 2024)

Furthermore, academic researchers more interested in academic research to produce more research outputs envisage that engaging with industry will take more time and resources, thereby distracting them from pursing their research (Calderini et al., 2007). However, D'Este & Perkmann (2011) argue that academic researchers in high-quality departments may be willing to engage in joint research with industry if such interactions will enable them to pursue novel research, source ideas and generate research outputs that are considered publishable in top-rated academic journals. Based on a survey conducted on academic researchers in some departments in UK universities, D'Este et al., (2013) argue that academic researchers' pursuit of academic quality in all departments does not facilitate or deter their engagement with industry partners. The argument for this claim is that at the departmental level, disciplinary differences come into play regarding how researchers will engage and to what extent they are eager to engage. As inferred by Filippetti & Savona (2017) and D'Este & Perkmann (2011) across the disciplines, academic researchers differ in how they will pursue academic engagement with industry based on their perceptions of the potential benefits they will gain if they engage in such interaction. The argument is that such criteria will influence academic researchers' motivation to the extent and type of engagement they would be willing to participate in.

Furthermore, in relation to disciplinary differences, some studies have also examined the link between departmental quality and academic engagement across various disciplines. For instance, some studies have shown that academic researchers from poorly rated departments in the applied sciences discipline often interact more with industry partners (D'Este & Patel, 2007). If the frequency of collaboration is considered, D'Este & Iammarino (2010) argue that research quality in the department matters more in the basic sciences than in the applied sciences. A study on researchers in social

sciences suggests that research group size is positively associated with contract research and consulting; however, no association was found with joint research, mobility of personnel, or training (Olmos-Peñuela et al., 2014). A recent study conducted in UK universities shows a negative link between research quality and the extent of engagement with industry for academic researchers in basic sciences departments. At the same time, it recorded a positive link for those in the applied sciences (Scandura & Iammarino, 2022).

Geography: A study by Laursen et al., (2011) has shown that locally based R&D intensive firms often consider low-quality universities as the best partner to engage with. This indicates that the "geographical proximity" of such a university may as well be of importance to the collaborating industrial partner (especially for small-medium scale enterprises) regardless of the lower-ranking status of such universities (Apa et al., 2021; Dabić et al., 2020; Love & Ganotakis, 2013). Distance between partners plays a significant factor during collaboration. Within the Italian context, Berbegal-Mirabent and Sabate (2015) reported that the proximity of a researcher's university to an industry or business firm influences the possibility of engaging with them.

Peer effects: For academic researchers deciding to be entrepreneurs, peer effect is seen as an influencing factor(Moog et al., 2015). Using the social comparison mechanism, Tartari et al., (2014) suggest that the peer effect can significantly influence the propensity of academic researchers' engagement in collaboration. The reason is that academic researchers seek inspiration and social approval from their peers, and researchers' external engagement patterns may vary along their career path, which reflects the choices made in the research group they belong to in the department.

Peer effect has been linked to influence academic researchers' intent in creating spin-offs. Aside from other knowledge commercialisation mechanism in external engagement such as consulting activities, contract research with industry partner and patenting, spin-offs are considered the most important and viable channel for academic researchers to commercialise university research (Landry et al., 2006). A recent study of 533 German and Swiss academic researchers in the life sciences finds that the peer effect influences academic researchers' intention to create spin-offs in their universities (Houweling & Wolff, 2020). The reasoning provided by Houweling & Wolff (2020) is that due to the accumulation of experience, a senior academic researcher who founded a spin-off can serve as a role model for younger academic researchers who wish to create a spin-off from their research output.

An earlier study conducted on 355 biotechnology researchers in German universities reveals that a positive influence of co-authorship with researchers from industry partners positively influences academic researchers' intention at universities towards establishing spin-offs. Their finding thus supports peer effect as an organisational determinant for viable academic engagement. The number

of patents a university has recorded was identified as a signal for measuring academic researchers' readiness to create spin-offs (Houweling & Wolff, 2020). Most universities have been found to rarely make an effort to transform their patents into spin-offs, and such practices are common among basic researchers (Ito et al., 2016). This claim was also supported in a recent study conducted within the South African context by Urban & Seely, (2023) that examines the influence of organisational factors on academic researchers' tendencies to create spin-offs.

Institutional characteristics

Discipline: Perkmann et al., (2021) opined that the disciplinary affiliation that an academic researcher belongs to will strongly influence the nature of such a researcher's engagement with external partners. Abreu & Grinevich (2013) state that academic researchers from disparate disciplines respond differently when collaborating with external partners. Sigl and Leišytė (2018) reported that academic researchers in applied fields are more interested in engaging with industry partners and other stakeholders in the broader society than their peers in basic disciplines. However, scholars like Hughes & Kitson (2012) have argued that engagement with industry is not practised by only academic researchers in so-called 'hard' disciplinary fields.

Using the UK context, studies have provided evidence that just like their counterparts from the engineering field, academic researchers from the business and media departments have also proved to be highly competent in consulting (Abreu & Grinevich, 2013). To provide more clarity, studies have confirmed that academic researchers who are into basic research and are more motivated to pursue basic research for fundamental research knowledge are primarily unwilling to get too embedded in academic engagement, unlike their counterparts who are into applied research or user-oriented basic research (Lawson et al., 2019). Recent studies by D'Este & Robinson-García (2023) have also provided evidence which supports that academic scientists in interdisciplinary research are more active in external engagement, and this explains why they can produce breakthroughs in research and as well as offer valuable solutions to address complex, real-life problems. Based on the existing studies, our understanding of the effect of disciplinary affiliation on the interaction with other wider stakeholders is limited, as most previous studies have focused on interactions with industry (Pekşen et al., 2021).

Public policy and Regulation: Across the world, to achieve regional growth and competitiveness, governments have intensified their efforts to induce academic engagement by designing and implementing policies and initiatives that aim to promote inter-organisational collaboration, including tax incentives for research, funding support for joint research, and the creation of science parks and innovation hubs (Bastos et al., 2021). The role of the institutional context in shaping academic

researchers' determination to embrace academic engagement activities as been well documented in extant literature. There is evidence of how some institutional practices of government may have a complimentary or a detrimental effect on university collaborative research (Duiveman, 2020). Earlier studies have shown how government policies could significantly impact the extent and nature of engagement between academic researchers and external partners (Amaral et al., 2011; Caloghirou et al., 2001). Munari & Toschi (2021) use the European Research Council's Proof-of-concept program to assess how government policy on public funding for the valorisation of science towards achieving commercial and societal gains can impact some academic engagement activities such as licensing, formation of spinoffs, and consulting research, and joint research in R&D between academic researcher and other external partners. Their findings suggest that such policy measures positively impact research as they have led to increases in scientific breakthroughs and practical application of knowledge considered beneficial for improving societal challenges.

Davey et al. (2016) state that the success countries can achieve through academic engagement is largely influenced by the existence and effectiveness of its higher educational institutions and innovation systems at national and regional levels. Countries strategically implement these systems to promote economic development and facilitate technological development. Taking a European perspective, Protogerou et al. (2013) have attributed the involvement of its higher educational institutions in interactions with external stakeholders to be a reactive measure of its political landscape and general decline in accessibility to public funding. Flander (2021) argues that a country's contextual factors (strength of innovation systems) and the quality of higher education research and development (HERD) funding are strong determinants of the viability of its academic external engagement. Most studies on international comparison of the effectiveness of academic engagement have focused majorly on North America and Europe with little evidence from the global south (Perkmann et al., 2021).

2.3 Academic Freedom

University managers and policymakers have actively encouraged academic researchers to engage in collaborative initiatives with external partners, utilizing channels such as joint research with industry and academic patenting, among other forms of informal knowledge interaction (Grimpe & Hussinger, 2013; Tseng et al., 2020). However, some researchers may resist engaging with industry partners due to concerns about their academic freedom (Niemczyk & Rónay, 2022; Tartari & Breschi, 2012). In such external engagements, issues of academic freedom must be carefully considered as they can either hinder or facilitate individual researchers' interactions with industry partners (Rossoni et al., 2023).

In this thesis, academic freedom is defined as the autonomy for individual academic researchers to choose their "research topics, methods, and disseminate their research findings" without undue influences that may alter their choices (Berggren & Bjørnskov, 2022: 6; Gläser et al., 2022). Academic freedom is crucial for researchers as it allows them to pursue fundamental research (Salter & Martin, 2001), advance knowledge, and promote innovative behaviour (Rostan, 2010). Furthermore, empirical evidence suggests that universities which uphold the academic freedom of their staff achieve higher positions in world rankings (Karran & Mallinson, 2019). Academic freedom may also have detrimental implications on researchers as it could also affect their research integrity if unduly infringed upon (Davis et al., 2011; Redman, 2023), and such ethical misconduct resulting from this could lead to academic researchers reporting biased research results (Fink et al., 2023). Consequently, this issue has raised significant concerns among academic scholars regarding “who should be able to influence research and how influence can be exercised without damaging the productivity and integrity of research” (Gläser et al., 2022: 106).

Recognising the centrality of academic freedom to higher education, a group of renowned American professors made a significant move in 1915 when they formed the American Association of University Professors (AAUP), where academic freedom was one of their underlying goals (Cain, 2023). This development later birthed other reform instruments to guide their operations, such as the Declaration of Principles on Academic Freedom and Academic Tenure. Twenty-five later, the 1940 Statement of Principles of Academic Freedom and Tenure, which expressly affirms academic freedom to cover teaching, research, and extramural expression, was released (Appiagyei-Atua et al., 2016). In most countries, academic freedom is institutionalised as it is protected by laws and rules, which brings a common understanding between political and academic leaders that academic freedom is valuable and, thus, must be protected (Aberbach & Christensen, 2018). In European Union countries, higher education institutions have undergone various reforms to enhance their efficiency and quality of delivery (Leisyte et al., 2008). Taking the case of the Republic of Ireland into context, the Higher Education Authority (HEA) Act 2022 was proposed to reform third-level institutions. The HEA Act 2022 introduces a new form of funding tied to compliance rules set by the HEA. However, this reform is perceived as a “threat to academic freedom by academics, students, and institutional leaderships” (Maassen et al., 2023: p.103) in the country.

To ensure academic freedom is well entrenched globally, the need to regularly measure it has become imperative. A recent report on the Academic Freedom Index (AFI) based on an extensive study conducted in 2022, which cuts across 179 countries of the world, provided an overview of the academic freedom landscape in these countries as findings suggested a general decline in academic freedom in most countries particularly the developing countries, unlike the EU countries and the US

(Kinzelbach et al., 2023). This thesis aims to examine how the academic freedom of individual academic researchers plays a role in their pursuit of external activity and, more importantly, how researchers manage this freedom. Hence, the sub-section hereafter will provide perspectives from existing literature on how academic freedom is characterised.

2.3.1 Conceptualising Academic Freedom

Academic freedom is complex to conceptualise (Abdel Latif, 2014; Maassen, Martinsen, Elken, Jungblut, & Lackner, 2023), so scholars find it challenging to reach a consensus on its scope and how it should be measured (Kronfeldner, 2021). In line with this argument, it could be perceived as either "freedom to" research teach or as "freedom from" internal or external conditions that could pose a threat to a researcher or its activities (Gibbs, 2016). In their study, Aǩerlind & Kayrooz (2003) conceptualised academic freedom based on two dimensions – the type of constraints (which could serve as impediments to academic freedom) and the role of internal and external factors. Based on this, Aǩerlind & Kayrooz (2003) suggested five qualitative ways that academic freedom can be understood, and these categories include:

- *An absence of constraints on academic researchers' activities:* in this category, researchers' academic freedom is protected when it is not *subjected to no controls or reprisals* because of the activities they choose to engage in (Callaert et al., 2015; Santosuosso et al., 2007; Smith & Walsh, 2023). In this case, researchers should be free to speak freely without fearing being punished by their university managers. Researchers should be able to freely decide on which research they want to undertake and publish their research outcome without control from the university management or government (Stachowiak-Kudła, 2022).
- *An absence of constraints within some self-regulated limits:* In this category, there is an absence of constraint on researchers' academic freedom, but researchers have to carry out their activities within certain limits (Kwestel & Milano, 2021; Ren & Li, 2013). Here, the emphasis is on self-regulation (Aberbach & Christensen, 2018; Luukkonen & Thomas, 2016).
- *An absence of constraints within some externally regulated limits:* In this category, the emphasis is the absence of interference in academic activities and the setting of certain limits on non-interference areas(Rostan, 2010). This also comes with some form of externally regulated criteria and constraints (Golhasany & Harvey, 2022).
- *An absence of constraints, combined with active institutional support:* There is no interference in the academic activity researchers engage in (Nokkala & Bladh, 2014; Tierney & Corwin, 2007). In

this category, academic freedom requires not only the absence of external interference but also that it should come external support to enable researchers to exercise their academic freedom (Fulda & Missal, 2022).

- *An absence of constraints, combined with responsibilities on the part of an academic researcher:* In this category, academic freedom is based on the need for academic researchers also to perform internal responsibilities (O'Neill et al., 2003). In this case, it includes the need for researchers to carefully carry out their responsibilities and operate within the limits of their freedom, such as participating in social debates and engaging in research and teaching activities (Berdahl, 1990; Hunt, 2010; Kwestel & Milano, 2021).

Further to the above five categorisations of academic freedom, this study considers it valuable also to draw perspectives from recent extant literature to facilitate understanding of the phenomenon. While relying on a report by Maassen et al. (2023) conducted to study the state of play of academic freedom in EU member states, this thesis seeks to explore the role of academic freedom within the context of academic engagement. This report was selected because of its relevance to the locale of this thesis (the Republic of Ireland), which is among the countries at the EU level under the legal protection of the European Parliament's panel for the Future of Science and Technology. Moreover, it focuses on interpreting academic freedom within the European Union member state context based on two fundamental principles: The Bonn Declaration on Freedom of Scientific Research (adopted on 20 October 2020) and the Rome Ministerial Communique of the European Higher Education Area. In essence, the interpretation of Maassen et al. (2023) is that academic freedom is made up of three central dimensions which operate under four sets of conditions, as shown in Figure 2.2.

The three core dimensions of academic freedom

Essentially, the central focus of the three core academic freedom dimensions is the "individual academic researcher".

Freedom to research: This centres on the freedom of individual academic researchers, which empowers them to decide on their research agenda without any "undue" constraint from internal and external authorities such as government, university managers, industry practitioners, civil communities (Lee, 2009; Leisyte et al., 2008; Thaldar & Steytler, 2021). The word "undue" in this earlier statement was emphasised because the individual researchers should note that this freedom is not absolute but must be exercised within the boundary conditions set by either/both the internal/external authorities. Section 2.3.2 of this thesis discusses these limits in detail.

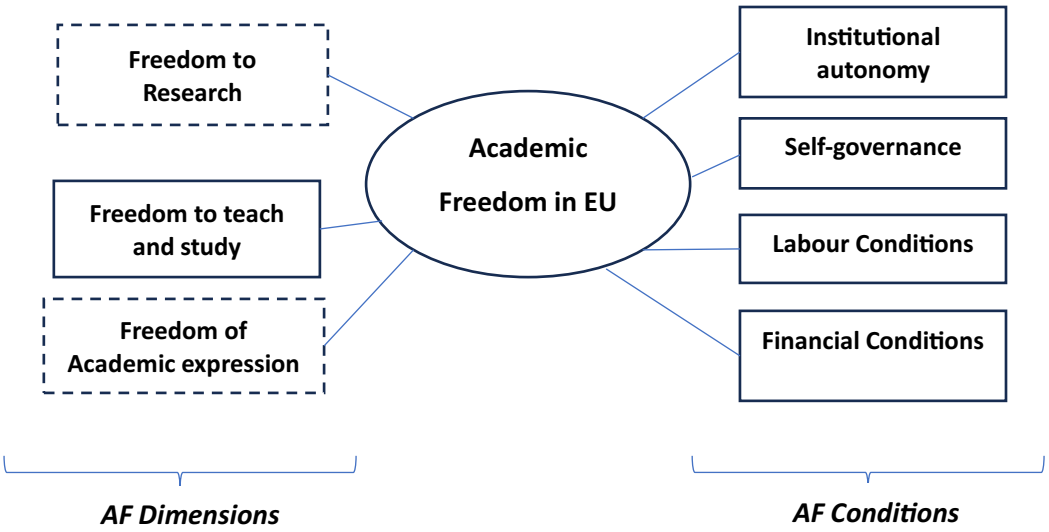

Figure 2.2: Conceptualisation of Academic Freedom in the EU

(Adapted from Maassen et al., 2023)
*Note: Broken lines represent academic freedom dimensions of interest in this thesis.

Freedom to teach and freedom to study: Unlike the freedom to research, this dimension centres on individual researchers' freedom, which empowers them to decide on their teaching agenda and other teaching-related ambitions (Berry, 1994; Nelson, 2003). In contrast, the freedom to study is mainly about the freedom of the students to determine their study preferences (Jackson, 2020; Macfarlane, 2012, 2016). In both dimensions of freedom (to teach and study), the individual researchers and students must bear in mind that this freedom is not absolute but must be exercised within the boundary conditions set by either internal or external authorities (e.g. government, university managers, industry practitioners, civil communities).

Freedom of academic expression: This dimension is essentially about the freedom of communication, which empowers individual academic researchers (or students) to freely express their views based on their area of academic expertise or academic discipline on issues within their institutions or public issues outside the academia without being punished for doing so (Karran et al., 2017). Further to this dimension is also the freedom which specifically empowers the individual researcher to disseminate their research findings through publications in academic journals, conferences, and seminars without any constraints in the form of pressure, threat, or any form of infringements from internal or external authorities (Coker, 1954; Simpson, 2020; Slater, 2016).

The four conditions for academic freedom

Here, the four conditions for academic freedom focus on the "University," which is the institutional environment within which individual academic researchers operate. Scholars have argued that "it is impossible to talk about researchers' freedom without recognizing its connection to institutional autonomy"(Niemczyk & Rónay, 2022: 4).

Institutional autonomy: This refers to the freedom universities enjoy in managing their internal activities without interference from the government or other external actors. In principle, institutional autonomy is about "the state of self-governance of the institution" (Nokkala & Bladh, 2014: 27).

Self-governance: Self-governance concerns institutional governance and decision-making within the university community. Maassen et al. (2023: 14) explain that self-governance is the "right of academic staff and students to co-determine academic affairs".

Labour conditions: This has to do with the conditions under which the academic researchers are protected when they exercise their academic freedom while still working for the university without fearing losing their jobs or having issues renewing their employment contracts, either as tenured or untenured staff (Karran et al., 2022; Ren & Li, 2013).

Financial conditions: This aspect encompasses the degree to which external funding conditions for teaching or research can influence the academic researcher's freedom to decide about the research agenda or teaching activities beyond their legitimate/statutory work condition(Carvalho & Diogo, 2018; Hayden & Thiep, 2007).

The review of the literature has revealed the level of complexity in its conceptualisation (Abdel Latif, 2014; Karran et al., 2022). Furthermore, even though it is within the right of academic researchers to carry out their statutory roles and responsibilities as academic staff of the university wherein their right is protected, they are also expected to exercise this freedom within institutional and organisational boundaries (Singh, 2009). With the above points stated, this thesis will explore academic freedom from two dimensions – "freedom to research" and "freedom of academic expression" (dissemination of research outcomes), as indicated with dotted lines in Figure 2.2. These two were selected because they fall in line with the scope of the academic freedom defined in this thesis. Also, it will guide this study to understand the intricacies individual researchers face when working with other external non-academic partners.

2.3.2 The limits of academic freedom

Individual researchers' academic freedom has been described as a philosophical issue as it is not, in reality, free from external influences but instead placed within a set of boundaries and limits that these external authorities set (Golhasany & Harvey, 2022; Kidd, 1963). It is thus pertinent to say that a researcher's academic freedom is somewhat subject to the control of the state: as a result, academics or faculty members should know that as much as they desire to have academic freedom, it also comes with understanding boundaries, rights, and responsibilities (Beaud, 2020). This is because the university is seen as a "public good"(Glenna et al., 2007); therefore, one cannot completely overlook the government's involvement in how it is being run since it is one of the primary sources through which the university derives its funding (Singh, 2009).

Beyond the argument above, recent studies have shown that internal and external actors can restrict the academic freedom of individual researchers. According to Berggren & Bjørnskov (2022), the "external actors" are those actors who operate outside the university, such as the state, religious organisations, and business firms. Meanwhile, the "internal actors" refer to researchers and other academic structures within academia. Similarly, as shown in Figure 2.3, Gläser et al. (2022) also identified actors that influence researchers' academic freedom, including industry, state (government), military, civil society actors, scientific communities, and university managers. Berggren and Bjørnskov (2022) emphasise that the level of influence that the external actors can exhibit on researchers is subject to the degree of academic freedom. They argued that the degree of academic freedom is "strong" if external actors are constrained in using their rules and practices to influence researchers' activities. While internal actors apply intra-scientific and professional norms to regulate what a researcher can and cannot do, they ensure that such regulations do not constrain researchers' academic freedom (Williams, 2016). Further discussion hereafter includes various studies on how external actors influence individual researchers' academic freedom, particularly regarding the channels and ways they do this.

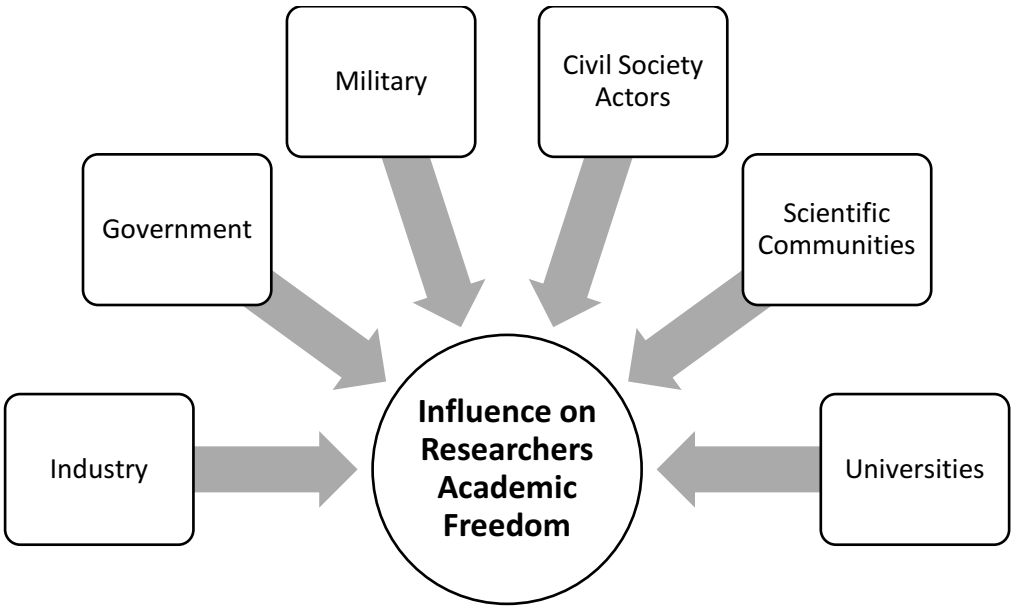

Figure 2.3: External actors Influencing Researchers' Academic Freedom

(Adapted from Gläser et al. (2022)

Influence of Industry

Besides its benefit of being a funding source, industry sponsorship has been found to harm individual research(Goduscheit, 2022). Industry partners tend to influence researchers' academic freedom as they can effect changes in research themes and quality, cause a bias towards the publication of research findings, secrecy and also in the diffusion of knowledge (Czarnitzki, Grimpe, & Toole, 2015; Gläser et al., 2022; Haeussler et al., 2014). In some cases, contractual agreements with industry-sponsored projects contain clauses that restrain and withhold sensitive information classified as confidential (Gans & Murray, 2011). There is also the argument (Kladakis et al., 2022) that industry funding may also inhibit radical scientific research breakthroughs as funders tend to favour research areas and topics of strategic interest to them. However, recent studies (Zacharewicz et al., 2023) have challenged the claim that industry funding will promote lower-risk research with little groundbreaking knowledge.

Influence of the State (Government)

As noted by Gläser et al. (2022), government can impact research when they set boundaries to the practice of conducting research in terms of the thematic areas and their research agenda that are considered biased towards the interest of the political powers in the country. To govern science, governments design and implement policies and regulations on science and technology to shape the

direction and contents of research in their countries (Gläser & Laudel, 2016). The impact of government on research governance in their country reflects their vested interest in research activities (Kosmützky & Krücken, 2023), which could shape the research landscape in such an environment. The book “Politics of Innovation” examines the rationale behind the national interest in research-driven projects as a means to addressing its “Creative insecurity” (Taylor, 2016).

However, some scholars have divergent opinions on this concept, perceiving it as a dangerous way of utilising science and technology for national development (Robbins, 2018). Researchers who participated in national scientific research projects of dictatorial governments in countries like Spain, Italy, and Argentina were reported to have been limited in investigating a research problem (Gómez et al., 2016). A recent study also shows that authoritarian political institutions influence a country's economy to innovate, negatively affecting fields like artificial intelligence (Klarl et al., 2023). Varma and Sabharwal (2018) have stated that the government can also impose travel restrictions on academic researchers against attending conferences to prevent communication of their research to wider academic communities. In the US, the government restricts research into reproduction and genetics/genomics research (Legro, 2011). Similarly, stem cell research, cloning and other genetic modification research within the field of life sciences and biotechnology have also been under the scrutiny of government (Smith et al., 2023).

Influence of the military

The military has also been identified as a threat to researchers’ academic freedom (Savabieasfahani, 2014). Gläser et al. (2022) identified some ways the military influences research: they define research topics for researchers, restrict communication of research outcomes severely, and, to some extent, can exclude its researchers from engaging with other members of the scientific communities. Literature records how military research and development has funded research activities they consider strategic to its missions. As reported from Air Force History, 1945 and 1960 witnessed an era when the United States Air Force intensified funding support to research and development initiatives on ballistic missiles (Neufeld, 1990). The report also mentioned that this decision was advocated by the then Air Force Chief of Staff, General Hoyt S Vandenberg, based on account of two studies his team undertook then, where one of its recommendations was that R&D within the US Air Force be accorded more representation through strategic funding. The Soviet atomic bomb tests of August 1949 and another one for the Korean War in July 1950 were prominent cases where funding for R&D, mainly for missiles, was promoted (Neufeld, 1990).

Only weapon researchers benefitted from such initiative as they were adequately funded and given freedom, to an extent, to choose the best approaches that would enable them to solve the problem while restricting their communication with others outside the military operations (Sutton, 1984). This is why some scholars within the field of Science and Technology Studies (STS) have raised concerns concerning military-related research funding, as most come with strings attached (such as restrictions about publication and research topics), thereby jeopardising practices like open science and scepticism which are needed for productive science (Rappert et al., 2008). To support the higher education environment, calls have been made for the government to balance its strategic interest in national security matters and academic freedom in its academia (Streitwieser et al., 2019). Likewise, university managers must ensure that while engaging with issues of critical priorities of government and societal concerns such as national security, they carefully manage security-sensitive research and prioritise research integrity and academic freedom (Smith & Walsh, 2023).

Influence of Civil Society Actors

Civil Society actors, such as social movements or patient organisations, exercise influence on the direction and approaches of research (Gläser et al., 2022). In STS, social movements are considered important external actors that can influence research due to their intentional efforts to promote or resist social change (Hess et al., 2008). This is because of their capacity to drive public participation from the citizen and non-governmental organisations to ensure that public perspectives are also considered in the decision-making process regarding science and technology and other specialised fields. Unlike other activist groups or advocacy groups, social movements represent a diverse group of people who are most socially or economically disenfranchised and thus champion specific causes, for instance, breast cancer patients or open-source programmers (Hess et al., 2008). Considering social movements' influences, social science scholars have tagged them as the “intelligent public” who played a significant role in shaping the government's approach towards policy making and how researchers conduct their activities as exemplified during the COVID-19 pandemic (Heinsch et al., 2023).

Studies have shown the role of social movements in influencing research practices. Social movements supporting open-source programming advocated for the emergence of Linux, a free/open-source operating system, breaking the dominance of other operating systems such as Unix and Windows NT (Jain et al., 2023). In climate change interventions and governance, social actors, as crucial stakeholders, also significantly shaped efforts towards carbon removal and geo-engineering towards achieving the Net Zero target (Frickel et al., 2010; Low et al., 2022). In the medical field, in contrast to

age-long practices, a recent study has reported how patient organisations or “expert patients” representing social actors, have been invited to serve as members of several committees along with other biomedical specialists in the decision-making towards the production of knowledge and governance of health (Akrich & Rabeharisoa, 2023). Environmental justice movements such as the Global South grassroots movement, a civil social actor group representing the interest of Indigenous and Black communities, have shaped discourse in fat research studies as it considers obesity as a social problem (Chalit Hernandez & Luzbetak, 2023).

Influence of Scientific Communities

Gläser et al. (2022) states that scientific communities are internal actors who impact researchers’ academic freedom through institutionalising a peer review system within academia or emphasising particular forms of collaboration by researchers as a precondition for accessing research funding. According to Gläser et al. (2022), the peer review system can mainstream research and encourage risk avoidance. Additionally, collaborations between developed and developing countries often impose research topics on scholars from developing countries, frequently against their interests. These collaborations may also offer less recognition to researchers from developing countries and may exclude them from significant discussions in the scientific community, which is predominantly led by scholars from developed countries.

Peer review, as a procedure which was developed to promote quality in scientific research, has also been judged to be detrimental to research practices (Barlösius et al., 2023; Breuning et al., 2015), and this has led scholars to call for a universal approach towards improving it (Brezis & Birukou, 2020; Krummel et al., 2019; Shibayama & Baba, 2015). For instance, it has been alleged that peer review is too conservative, as “gatekeepers” within academia give very little chance of success to research proposals perceived as daring or confrontational (Luukkonen, 2012). It has also been alleged that, in some instances, the structural complexity of the peer review process could disadvantage certain groups of researchers, particularly women and junior researchers (Sato et al., 2021). There have also been reports of reviewers favouring research proposals submitted by groups within their own research network (Jang et al., 2017). Therefore, to guide against unfair practices in selecting research proposals for funding during the peer review process, some scholars have called for a “lottery” approach(Horbach et al., 2022; Roumbanis, 2023).

Existing literature has also pointed out that Scientific communities could impact researchers’ academic freedom due to unfriendly conditions attached to research funding involving collaboration between researchers from the global North and South. A recent study has revealed that researchers' behaviour

towards collaboration in research projects is sometimes driven by “self-interestedness” (Ngwenya & Boshoff, 2023). However, scarce local funding for research has pushed researchers from developing countries (particularly in Africa) to seek international funding, provided mainly by countries in developed countries. Researchers may have to trade off their freedom of self-interest when selecting research collaboration partners in line with the requirements of the international funding agency (Confraria et al., 2020; Owusu-Nimo & Boshoff, 2017).

Also, it has been reported that within the North-South collaboration, local priorities of participating researchers from the global South in research projects of particular interest area to scientific communities, such as HIV/AIDS research, is downplayed when setting research agenda (González-Alcaide et al., 2020; Moyi Okwaro & Geissler, 2015). However, despite this constraint on the academic freedom of researchers from developing countries to contribute their input in setting research agenda in such initiatives, they have continued engaging in international collaborative research because such projects offer global visibility to their research (Chankseliani, 2023).

Influence of University Managers

University managers are another internal actor influencing individual researchers’ academic freedom, thereby changing researchers’ collaboration patterns and publication behaviours (Gläser et al., 2022). Some scholars believe that university managers can indirectly threaten researchers' academic freedom through their efforts to comply with government policy reforms, particularly those related to funding (Bonnell, 2021). This situation can be attributed to the evaluation systems and the structure of ethical committees that university management establishes to promote research integrity and quality within academia, thereby reinforcing its legitimacy as a centre of knowledge production. Similarly, an earlier study by Kidd (1963) has explained that university rules that regulate research activities and set obligations to researchers on their conduct may also restrict researchers’ freedom. Such is the case when a university, through its research policy, regulates the nature of consulting activity that a researcher can engage in, the time they can spend engaging in consulting, or the amount of income a researcher can generate through such activity.

Literature has also discussed the implications of performance evaluation on the individual researcher’s behaviour in the academic community (Aagaard et al., 2015; Cadez et al., 2017; Müller & Rijcke, 2017; Sandström & Besselaar, 2018; Woelert & McKenzie, 2018). This is because university managers' introduction of evaluation systems using a set of defined metrics such as publication counts, number of citations recorded, and number of grants received has made researchers engage in adaptive behaviour termed as the “Evaluation Game” (Kulczycki, 2023). The "Evaluation Game" focuses on how

university managers' use of publication metrics has shaped scholarly communication within academia, leading researchers to alter their professional communication practices due to the evaluation metrics adopted in the university system (Kulczycki, 2023). Kulczycki (2023) explained that researchers caught in this evaluation game, where emphasis is placed on quantity over quality, may opt to publish more research articles in low-quality journals rather than one paper in a highly reputable journal.

Extant literature has also investigated the impact of research ethics committees on academic researchers' behaviour (George, 2003; Hedgecoe, 2016; Resnik, 1998; Shannon & Eden, 2018; Sikes & Piper, 2013). Take, for instance, cases where the human research ethics committee may decide not to approve a research application because it feels that the proposed research methodology is unfit to achieve its aims, hence request the researcher(s) to review it, and if not the research project will not be approved for implementation (Shannon & Eden, 2018). When such a situation arises, researchers (particularly those in the social sciences field) get frustrated as they feel their work is being constrained by the ethics committee whose suggestions may conflict with research practices and norms in the social science field (Sikes & Piper, 2013).

A recent study that sampled the perception of researchers concerning the impact of research ethics committees on research conduct within academia revealed ten prominent issues that researchers face, such as research integrity, conflict of interest, social injustice, distributive justices, epistemic justices, ethic distress (Drolet et al., 2023). Using global data collected on 1031 researchers at business schools, Fink et al. (2023) found out that researchers possessing strong deontological ethical orientation (as against those with consequentialist ethical orientation) are less likely to engage in research misconduct as they enjoy to some extent, freedom in decision-making concerning their research. As Fink et al. (2023) explain, "deontological ethical orientation" refers to researchers who act based on their autonomous moral reasoning and not because of the presence of external constraints universities put in place to guide against misconduct (such as ethics regulations and guidelines). Meanwhile, "consequentialist ethical orientation" refers to those researchers whose moral reasoning is guided by the consequence of their research misconduct. Consequent upon these developments, scholars like Akerlind (2007) have urged university managers to align their policy within a coherent framework such that it can effectively accommodate academic freedom through promoting a friendly research culture, intellectual property, fostering commercialisation of its R&D, and other entrepreneurial activities within the university. Based on the explanation above, academic freedom is crucial for individual academic researchers as it empowers them to create and share novel and potentially valuable knowledge by granting autonomy to internal actors while constraining the influence of external actors (Aghion et al., 2008).

2.3.3 Academic Freedom issues within external engagement

Since collaboration between academic researchers and industry partners is becoming a common practice today, it then becomes imperative to also pay attention to how academic freedom is being manifested (Woelert et al., 2021) and managed (Zalewska-Kurek & Harms, 2020) in such initiatives. Researchers value their academic freedom (Lacetera, 2009; Roach & Sauermann, 2010; Stern, 2004) both intrinsically and as a source of influence (Gagné & Deci, 2005). To this end, the perceived need for academic freedom can support the nonpecuniary motives (reputation, knowledge challenges, career advancement and visibility of researchers' activity) that drive academic researchers to engage with external partners (Giuri et al., 2019; Shalley et al., 2004). Scholars have investigated how researchers' academic freedom is affected by their engagement with various non-academic partners (Jasny et al., 2017; Tartari & Breschi, 2012). For instance, Tartari & Breschi (2012) believe that the decision of academics to collaborate with external partners (industry, for example) is a discretionary behaviour of academics themselves, which is often shaped by two factors - their perception of the potential benefits and costs of such engagement to their research productivity; and the institutional environment within which such interactions exist.

Gambardella et al. (2020) have stated that in industrial research collaborative projects, the academic freedom of researchers is ensured to achieve efficiency – that is, to enable researchers to make more competent decisions about a specific problem and for the sake of motivational reasons – to motivate researchers to engage more with the project. Similarly, Zalewska-Kurek and Harms (2020) explore how academic researchers strategically manage academic freedom during interaction with industry partners. Academic researchers' need for academic freedom can be categorized into operational academic freedom, which involves researchers' freedom to be involved in the planning, setting, and execution of projects, and scientific academic freedom, which relates to the freedom to decide on their methodology, theory, and how results will be used (Fink et al., 2020). Their findings also show that academic researchers are willing to sacrifice their operational academic freedom to collaborate with industry. However, they are unwilling to let go of their scientific academic freedom when setting the research direction and execution because they strongly need this type of freedom. Within the context of education-driven university-business cooperation, Orazbayeva et al. (2021) found perceived academic freedom to influence academic engagement positively. This is because academic freedom gives academic members the freedom to decide on external partners, they want to engage with rather than have their decisions imposed on them by their university leadership. A recent study conducted on 250 professors in the engineering departments at United States universities claims that academic freedom positively influences a professor's willingness to engage in university-industry interaction (Clauss et al., 2022).

2.4 Conclusion

In this chapter, the existing literature is reviewed to understand the current state of research on academic engagement and identify research gaps. Two major research gaps are identified based on this review.

Firstly, recent studies highlight that our understanding of academic researchers' behaviour towards academic engagement is still limited, particularly regarding their motivations for and modes of engagement with non-academic external partners. Regarding motivations, insights from previous studies present mixed evidence. Some scholars argue that researchers collaborate externally to acquire knowledge (non-commercial benefits) to enhance their research, while others believe that the primary motivation is the pursuit of commercial benefits associated with such interactions. Therefore, it remains unclear why academic researchers are motivated to engage with non-academic external collaborators. Additionally, in terms of engagement modes, existing studies indicate that academics prefer different channels—such as joint research, contracts, consulting, or informal activities. However, the literature shows that individual researchers' preferences for these modes of engagement vary, leaving it unclear how academic researchers decide on which interaction mode to use when collaborating with external partners.

Secondly, previous studies on academic engagement have predominantly focused on a limited group of external stakeholders, particularly industry partners, making it difficult to generalize findings across a broader range of external stakeholders, such as business firms, charity organizations, non-governmental organizations, and government agencies. It is assumed that commercially driven researchers, such as those aiming to patent their inventions, are more likely to engage with industry partners, while those interested in contributing to policymaking or making a societal impact may prefer to collaborate with other external partners, such as charity organizations, non-governmental organizations, or government agencies. Consequently, academic scholars have called for more investigation into this aspect to broaden our understanding of researchers' experiences and rationale for choosing specific external partners in collaborations.

Having identified these research gaps, the next chapter of this thesis will review existing research on applicable theories of academic engagement and select the most suitable theory for application in this study.

CHAPTER THREE: THEORETICAL BACKGROUND

3.1 Introduction

This chapter identifies and discusses, the theoretical lens, Self Determination Theory, to be used in this thesis to analyse academic researchers' behaviour towards engagement with non-academic external partners and provides a justification for this choice. In essence, this chapter aims to lay a solid theoretical foundation for investigating the 'why' and 'how' of academic researchers' engagement with external partners, which is the central research question of this thesis.

The existing literature has pointed at motivation as a strong predictor of individual academic researchers' behaviour towards academic engagement, i.e., knowledge-related collaboration between academics and stakeholders from non-academic organisations (Ankrah & AL-Tabbaa, 2015; Atta-Owusu & Fitjar, 2022; Rijnsoever & Hessels, 2021; Taxt, 2023; Perkmann et al., 2013). Motivation refers to the reasons someone decides to carry out an activity, how long they sustain that activity, and the extent to which they are determined to pursue the activity (Gagné & Deci, 2005). This points to the fact that motivation of individual academic researchers is the overarching process that enables researchers to initiate, sustain and regulate their goal-directed behaviours (Holding et al., 2020).

Extant literature has established a relationship between individual researchers' motivation and their willingness to be involved in academic engagement based on the multidimensional components of motivations - "gold", ribbon", and "puzzle"(Lam, 2011) where gold refers to motivation based on financial benefits, ribbon refers to motivation based on reputational or career rewards, and puzzle refers to motivation based on problem-solving and competency building. Similarly, recent studies have also ascribed motivational drivers for academic engagement to involve three significant factors – financial rewards, career/reputational rewards (both extrinsically driven), and intrinsic rewards (Atta-Owusu & Fitjar, 2022; Rossoni et al., 2023). However, some other studies have suggested a fourth motivational drivers, "prosocial motivation" (Iorio et al., 2017; Orazbayeva & Plewa, 2022; Sormani & Uude, 2022). Prosocial motivation is a motivational driver emerging from the researchers' desire to pursue external engagement solely to benefit society (Grant, 2008).

Since it has been established in the previous paragraph that individual academic researchers need for motivation will shape their behaviour towards academic engagement, theory on motivation will be most appropriate to investigate this phenomenon. Based on the extant literature reviewed, self-determination theory (SDT) is considered as "one of the most widely cited theories of human motivation" (Cerasoli et al., 2016: 781) due to its "eudaemonic approach" (Tang et al., 2020) in

exploring the relationship between human needs and their behaviour. Furthermore, many scholars who have conducted studies on academic engagement have used SDT to explain academic researchers' engagement behaviour (Clauss et al., 2022; Orazbayeva et al., 2020, 2021; Orazbayeva & Plewa, 2022). Some scholars have referred to SDT as "a whale in a sea of countless psychological theories of human motivation" due to its broad applicability in studies on behaviours, circumstances, and conduct, and more importantly, also because of its "dependable predictiveness that few theories can rival" (Patall, 2021: 117). Consequently, this thesis draws on the theoretical lens of SDT to study the behaviour of academics towards engaging with industry or other non-academic partners (such as government agencies, charity organisations, donor agencies e.g. the EU) within the context of the Republic of Ireland.

3.2 Self-Determination Theory (SDT)

Self-determination theory (SDT) is a theory of human motivation that emerged from research on intrinsic and extrinsic motivations (Deci & Ryan, 1985). SDT is a macro-theory (Tang et al., 2020) which consists of six other mini theories. Firstly, Cognition evaluation theory (CET) focuses on the impact of external actions such as incentives, competitions, in supporting or thwarting individuals intrinsics motivation (Ryan & Deci, 2019; Vallerand & Reid, 1984). Secondly, Organismic integration theory (OIT) is said to be more centred on the various types of motivation including their effects on the quality of human behaviour and well-being (Ryan & Deci, 2000). Thirdly, Causality orientations theory (COT) focuses on how individuals' motivation styles differ with respect to how individuals align towards external environment or goal attainment (Deci & Ryan, 1985). Fourthly, Basic psychological needs theory (BPNT) focuses on how the three basic psychological needs – autonomy, competence, and relatedness relate to individuals' satisfaction and state of well-being (Ryan & Deci, 2020; Vansteenkiste et al., 2020). Fifthly, Goal contents theory (GCT) focuses on how the attainment of goals (extrinsic and intrinsic) informs individuals' behaviour and wellness (Deci & Ryan, 2000). Finally, Relationship motivation theory (RMT) focuses on the qualities of close relationships and the attendant consequences that come with it (Ryan & Deci, 2019). However, BPNT is seen to be central to SDT (Tang et al., 2020).

Describing SDT as a broad and widely applied theory of motivation, personality development and wellness, Ryan & Deci (2019) explained that at the inception stage of this theory, the narrow focus was on intrinsic motivation, but over time, its scope was later expanded to cover both intrinsic and extrinsic motivation. Further reasoning for the wide application of this theory is due to its approach to studying human motivation, its practical value which encompasses several disciplinary domains, and the

trajectory of the theory towards deployment and development. Therefore, the rationale behind SDT is to understand what motivates individuals' behaviour and actions, including how their behaviour is "regulated in the various domains of their lives" (Deci & Ryan, 2015: 486). This is why Ryan & Deci (2020) describe SDT as a broad theoretical framework that can be used to understand factors that either facilitate or constrain an individual's motivation (intrinsic or extrinsic) for their psychological well-being.

SDT postulates that individuals are optimally motivated and experience a state of well-being when their three basic psychological needs (Autonomy, Competence, and Relatedness) are satisfied (Deci & Ryan, 2000; Ryan, 2023)**.** In this context, autonomy pertains to the feeling of having willingness and volition. When individuals' need for autonomy is satisfied or fulfilled, it leads to a sense of wholeness, evident when our actions, thoughts, and emotions are self-endorsed and genuine. In contrast, when autonomy is thwarted, it brings about feelings of coercion or pressure and often internal conflict, like being compelled towards an undesired direction. Competence involves the sensation of being capable and proficient. This is achieved when one can capably engage in activities and has chances to utilize and expand their abilities and know-how. However, when competence is thwarted or hindered, it leads to feelings of inefficacy, or even defeat and helplessness. Relatedness is about the experience of closeness, emotional connection, and caring, which is nourished through interpersonal bonds and feeling valued by others. A lack of relatedness results in feelings of social isolation, exclusion, and loneliness. These three psychological needs were derived both inductively and deductively (Ryan & Deci, 2017).

As described by Vansteenkiste et al., (2020), the three psychological needs first emerged inductively following studies which revealed that experiences of competence and autonomy were vital for individuals to develop and sustain intrinsic motivation. For instance, studies have revealed that receiving positive feedback promotes higher interest and enjoyment of an activity which is because of the satisfaction of individuals need for competence (Muynck et al., 2017). Contrary to this, it has been argued that intrinsic motivation is undermined when individuals are offered external rewards to partake in an activity (Ryan & Deci, 2020). The explanation for this is that such external rewards have controlling effect capable of shifting individuals perceived locus of causality (Charms, 1968; Hagger & Chatzisarantis, 2011; Ryan & Connell, 1989), from internal to external which then diminishes their sense of autonomy (Houlfort et al., 2022). Gagné & Deci (2005) argue that while individuals need to feel competent and autonomous to maintain their intrinsic motivation, satisfying their need for relatedness is vital for them to internalise extrinsic motivation, and that this brings satisfaction and enables individuals to operate optimally.

Beyond the inductive evidence supporting the needs for autonomy, competence, and relatedness which are considered as basic psychological needs, deductive arguments emphasizing their significance were also presented (Ryan & Deci, 2017). Evidence on the basis for the argument on the organismic perspective which they considered to be central to SDT, were discussed in earlier research works (Deci & Ryan, 1985; Ryan, 1995). Their rationale is that humans naturally evolve towards greater adaptability, integration, and coherence when possible. These developmental processes are both facilitated by individuals' experiences of autonomy, competence, and relatedness. From this organismic standpoint on human development, these needs are essential components of what constitutes a fully actualized individual.

In essence, the humans' psychological needs have been described to be a nutrient which is critical for them to adjust, integrate, and grow (Ryan, 1995). According to Gagné & Deci (2005: 336) the satisfaction of the three basic psychological needs offers individuals the required "nutrients" to be intrinsically motivated and to internalise extrinsic motivation to function optimally. Several meta-analyses conducted by scholars (Deci et al., 1999; Ng et al., 2012; Slemp et al., 2018; Yu et al., 2018; Van den Broeck et al., 2021; Ryan et al., 2023) have confirmed that the three basic psychological needs are indeed prominent for human development, adjustment, and wellness which in fact has strong implications for studies in motivational science, applied research practices, as well as in social policy studies (Vansteenkiste et al., 2020).

3.2.1 SDT: The Motivation continuum

SDT suggests that humans experience autonomous motivation if their reasons for engaging in behaviours are based on their own volition (self-determined), otherwise humans experience controlled motivation if their reasons for engaging in the behaviours are due to internal or external pressure (Deci & Ryan, 2000, 2015; Ryan & Deci, 2020; Ryan, 2023). According to Kalgin et al. (2019), self-determination is the state of being independent of both internal powers and external influences. On the premise of this, individual's motivation can be placed on a continuum of either autonomous motivation, controlled motivation and amotivation (see Table 3.1) and they fall within two broad categorisations of motivation into intrinsic and extrinsic (Deci et al., 2017; Deci & Ryan, 2015). Intrinsic motivation refers to individuals' self-determined behaviour, often resulting from their desire to fulfil their wish or urge (Ryan & Deci, 2020). On the other hand, Extrinsic motivation is when individuals' behaviour is externally regulated, which influences their choices, and is characterised by individuals with less self-determination (Ryan, 2023).

Amotivation	"Refers to people having no intentionality or motivation. This occurs when people do not feel competent to perform a task or do not attach value to the outcome of such a task. Hence, this type of motivation brings no effect".
Autonomous motivation	"Infers that people tend to act with a full sense of willingness and volition and embrace such activity they do because they find it interesting, enjoyable, or consistent with their deeply held value. This kind of motivation has a positive effect, flexibility, and choice."
Controlled motivation	"Refers to when people act out of coercion, seduction, or obligation. Unlike autonomous motivation, controlled motivation makes a person act due to external pressure or compulsion to engage in a task."

Table 3.1: The continuum of work motivation (Deci & Ryan, 2015)

Shown in Figure 3.1 is the classification of the different types of motivation that exist on the motivation continuum (Van den Broeck et al., 2021) and this motivation continuum has been tested in several studies using a quantitative research approach (Garn et al., 2019; Howard et al., 2018; Litalien et al., 2017).

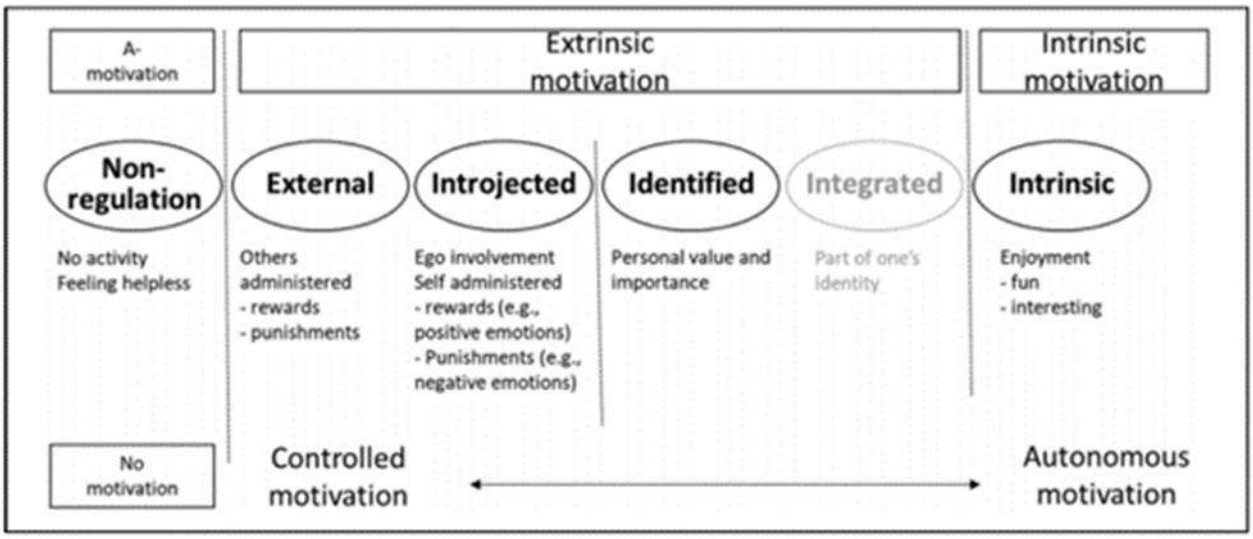

Figure 3.1: The Motivation Continuum*:* (Van den Broeck et al., 2021)

On one side of the SDT continuum is autonomous motivation, which is an intrinsic motivation ascribed to be an inherently autonomous behaviour exhibited by individuals (Alsuwailem, 2023; Gagné & Deci,

2005). On the other side of the continuum is controlled motivation, which is an extrinsic motivation that is further sub-divided into four types – external, introjected regulation, identified and integrated regulation which are often considered to result in autonomous motivation after they have been internalised by individuals (Vansteenkiste et al., 2020). External regulation is controlled motivation behaviour that individuals exhibit due to external reward and punishment contingencies (Xia et al., 2023). Introjected regulation refers to moderately controlled motivations and behaviour exhibited by individuals' contingent upon their self-esteem and ego involvement (Quirin et al., 2022). Identified regulation is moderately autonomous motivation exhibited by individuals because they identify with their values or significance; as a result, they will engage in such activity as if it were their own motivation (Howard et al., 2018). Lastly, integrated regulation refers to autonomous motivation behaviour exhibited when individuals have fully internalised extrinsic motivation coherent with their personal values and goals (Quirin et al., 2022; Ryan, 2023).

According to extant literature, initial studies that were conducted using the theoretical lens of SDT were mainly centred on examining intrinsic motivation, however recent studies subsequently focused more on how individuals internalise extrinsically motivated activities (Deci et al., 2017; Patall, 2021). Internalization is the process through which individuals genuinely adopt and integrate surrounding practices or values (Chirkov et al., 2003; Vansteenkiste et al., 2018). Studies have also suggested that to thoroughly internalize an activity that isn't inherently interesting, individuals need to find personal value and feel a sense of ownership over the behaviour (Ryan & Deci, 2017; Xia et al., 2023). These studies further argued that like intrinsic motivation, internalization demands a feeling of competence satisfaction (self-efficacy) and autonomy satisfaction (willingness/volition). However, understanding variations in internalization also involves considering the need for relatedness (Collie, 2022). Activities are more effectively internalized when individuals feel a real connection with those who promote these goals and activities. Ideally, the fulfilment of all three psychological needs—autonomy, relatedness, and competence—is crucial to facilitate internalization (Kluwer et al., 2019; Martela & Riekki, 2018).

Contrary to this, the internalisation process is frustrated if any of these needs is unmet. For example, internalization processes could be initiated if individuals feel a strong connection (relatedness) with a socialising agent (e.g., a one's research group) and as well consider themselves to be competent (competence) to engage in an uninteresting activity, the internalisation process will remain incomplete if the need for autonomy is not met (Bagheri & Milyavskaya, 2020; Milyasvkaya et al., 2014). The rationale behind this argument is that without the satisfaction of the need for autonomy, engaging in such activity might be driven by controlled forms of motivations such individuals desire to please others, seek approval, or avoid feeling guilty (Alsuwailem, 2023; Haerens et al., 2015).

3.2.2 Limitations of SDT

SDT has been successfully applied to a wide range of phenomena across different several domains such as gender, parenting, culture, education, age, sport, healthcare, and other socioeconomic areas of life which has resulted in emergence of better practices to foster higher quality of individuals' motivation, engagement, and satisfaction (Ryan, 2023). For instance, there is documentary evidence of SDT application in studies on gender (Egmond et al., 2020; Hofer & Bush, 2019; Xia et al., 2023), parenting (Petegem et al., 2019; Vasquez et al., 2016; Wüttke, 2020), culture (Marbell-Pierre et al., 2019), sport (Curran et al., 2013; Hermanson et al., 2021), marketing and sales (Good et al., 2022), artificial intelligence (Xia et al., 2023), age (Opdenakker, 2022), healthcare and social life (Chiu, 2022; Meilani et al., 2022).

This thesis has however noted that despite the volume of research that has been conducted on the SDT continuum aimed at facilitating our understanding on the underlying structure of academic motivation, scholars are yet to arrive at consensus on how this underlying structure of the motivation continuum should be characterised (Howard et al., 2017, 2018; Litalien et al., 2017), and more research on SDT application across more regions has been suggested (Ryan et al., 2023). Bearing this gap in literature in mind, while applying SDT, this thesis attempts to provide more insight into how researchers derive their motivation to engage in interaction with non-academic external partners within the research context.

3.2.3 Application of SDT

SDT is applied in this thesis by building on the existing work of Clauss et al. (2022), as this thesis examines the influence of not just individual factors but also that of institutional, organisational factors which were not considered in Clauss et al (2022). The Clauss et al (2022) framework is of interest to this thesis as it studied the motivational factors that influence engineering professors to engage in joint projects with industry partners using the theoretical lens of SDT. Their findings reveal that motivational factors (such as research funding, access to in-kind resources, reputation, academic freedom, congruence of researchers own agenda with that of industry) have a positive effect on the relationship between researchers' engagement with industry. Furthermore, their findings also revealed that individual factors (researchers' short-term orientation towards industry projects) have a negative moderating influence on researchers' intrinsic motivation and their willingness to engage with industry. However, their study reveals that research performance of researchers in terms of patents

have a positive moderating influence on researchers' intrinsic motivation, while it negatively moderates the influence of extrinsic motivation on researchers' willingness to engage with industry.

Literature has established that academic researchers will engage with industry if they consider that doing so will offer them attractive benefits (D'Este & Perkmann, 2011d; Perkmann & Walsh, 2008). Conditions that can facilitate or hinder academic researchers' willingness to engage with external partners are categorised as either intrinsic or extrinsic (Rossoni et al., 2023). In a choice experiment conducted with 3,145 researchers from Western Europe and North America, on how academic researchers select collaborative research projects, findings reveal that expected publication of research in scientific journals is the main reason for engaging in collaborative research with industry (Rijnsoever & Hessels, 2021). This then supports the argument that the motivation of individual academic researchers enables researchers to initiate, sustain and regulate these goal-directed behaviours (Holding et al., 2020). Lam (2011) suggests that individual researchers are susceptible to being extrinsically motivated to various degrees when they pursue an activity, and that this is subject to how they have internalised the values and regulatory structures that are connected to it. Further to this, Lam (2011) also stated further that the self-determination that an individual researcher possess is a vital factor that separates their intrinsically motivated behaviour (autonomous motivation) from that of extrinsic motivational behaviour (controlled motivation).

SDT suggests that different types of motivation exist and that understanding the quality or type of motivation of individuals and how it aligns with different aspects of the task is essential for predicting the outcome of their actions (Deci & Ryan, 2008). SDT delineates individual motivation into two main types – autonomous motivation and controlled motivation (Ryan & Deci, 2020). Studies have shown that autonomous motivation is positively associated with physical activity and engagement (Ryan et al., 2023). Following this position and relying on SDT, the theoretical framework for this thesis as presented in Figure 3.2, considers that a combination of individual factors, organisational and institutional factors predict academic researchers' engagement with industry (Perkmann et al., 2021). Also, individual researchers may engage with industry or non-academic external partners based on how their individual characteristics align with extrinsic motivation factors (driven by externally controlled motivation) or intrinsic motivation factors (driven based on autonomous motivation). The framework as well shows that organisational and institutional factors through the offer of supportive structures and incentives, will shape how researchers will engage with industry. These three elements are discussed in the subsequent section.

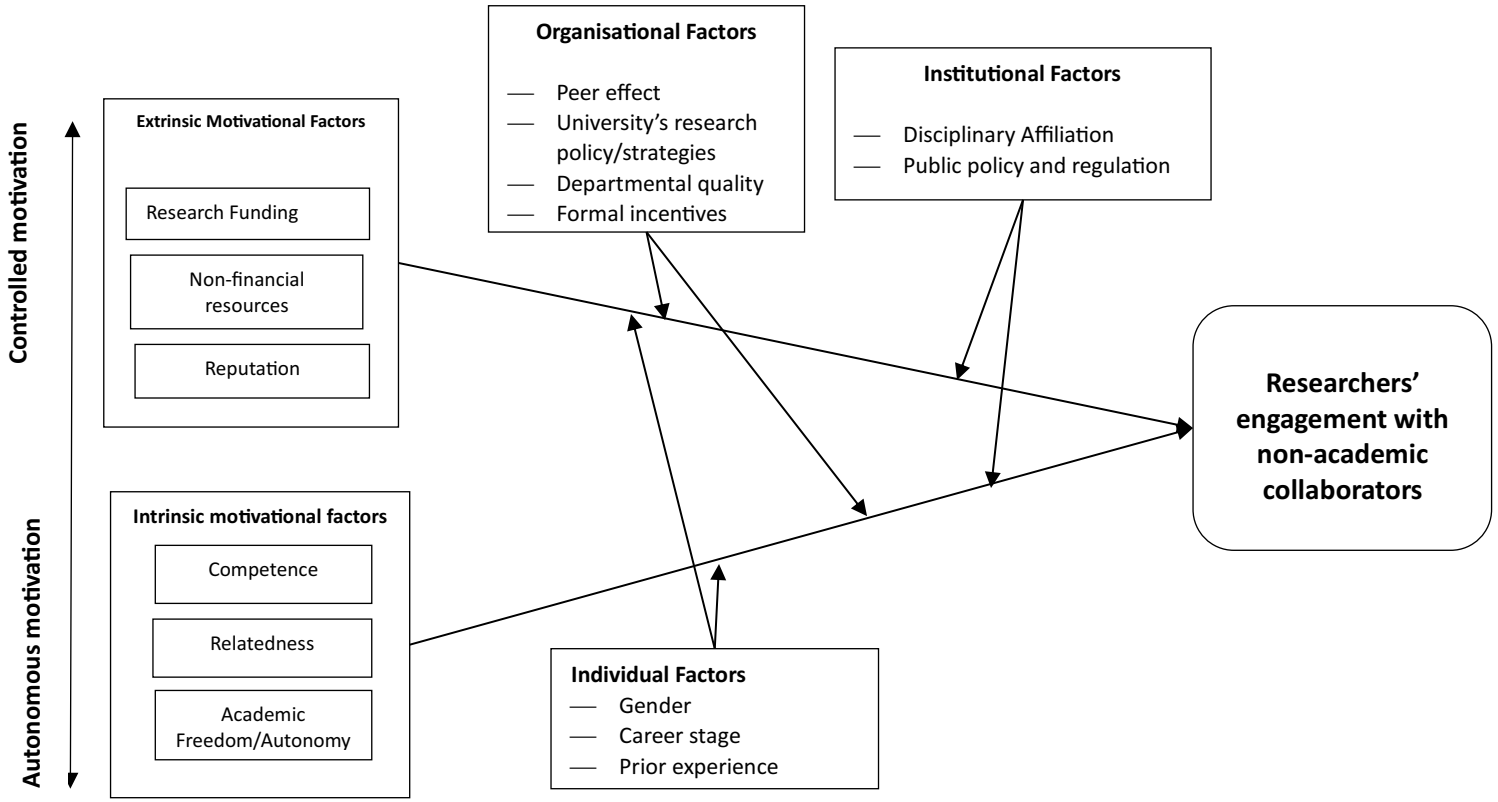

Figure 3.2: Theoretical Framework for the study

Adapted from (Clauss et al., 2022)

Extrinsic motivational factors

Research funding and academic engagement

Research funding is identified as a vital extrinsic motivational factor that drives individual researchers to involve in academic engagement (Hooi & Wang, 2020). Studies have shown that the opportunity to access external funding for research is one of the motives why researchers engage in research collaboration with external partners (D'Este et al., 2013; Hooi & Wang, 2020; Lee, 2021; Ubfal & Maffioli, 2011). The reason is that academic engagement provides researchers with additional funding to hire research support staff (e.g., graduate students) and purchase equipment and consumables for their research (Atta-Owusu & Fitjar, 2022; D'Este & Perkmann, 2011; Wang et al., 2023). Similarly, Iorio et al. (2017), in their study of the pro-social behaviour tendencies of Italian academic scientists, found out that the potential availability of funding predicts the intensity to which researchers will participate in external collaboration with a non-academic partner.

There is evidence that academic researchers motivated by monetary incentives (pecuniary benefit) are more eager to engage with external partners because such engagement will enable them to acquire more financial resources to supplement their income (Clauss et al., 2022; Lam, 2011; Orazbayeva et al., 2020). Such a case was found to be common with academic researchers motivated by the need for more research funding (Sormani et al., 2022). Also, studies reveal that researcher's motivation for academic engagement was not driven due the monetary rewards that comes with it, but rather because it will provide them means to disseminate their research result to the wider society (Taxt, 2023). In a study conducted by D'Este & Patel (2007) on researchers who received external funding, their findings suggest that the amount of funding for research sourced from industry will positively influence researchers to collaborate in the applied fields of disciplines. It is then likely that researchers' desirous of additional funding are likely to engage in external collaboration with industry. SDT posits that a researcher will be motivated to engage in an activity if they feel satisfied with the benefits that comes with such an activity (Ryan & Deci, 2020).

Non-financial resources and academic engagement

Literature argues that academic engagement offers researchers with access to non-monetary resources such as data, research facilities or equipment and new research projects (Carattoli et al., 2017; Perkmann et al., 2011) to advance their research and teaching roles. This is because more technical research may require researchers to possess matching equipment and skills which may not

be accessible at the home university. Academic engagement provides researchers with inspiration for novel research ideas (Garcia et al., 2019) that can advance their career. It could also enable researchers to improve their teaching and enhance learning experience for their students, and improve course contents, enable researchers to secure internships opportunities for their students (Wang et al., 2016). Therefore, due to the above reasons, researchers may be driven to engage with external partners where they perceive that doing such will offer them benefits and that such an opportunity will inspire extrinsically motivated researchers to pursue academic engagement. However, some studies have argued that monetary incentives often crowd out researchers to be more financially motivated (Atta-Owusu & Fitjar, 2022; Zheng et al., 2023).

Reputation and academic engagement

According to Merton (1957, 1973), the goal of researchers and scientists is to be seen as the pioneer of knowledge discovery and dissemination and consider recognition by the academic community, their peers, as a form of reward. In this form, peer recognition could be the number of publications recorded, or citations and prizes received. This peer recognition is described as a basic form of extrinsic reward in the science community, out of which other forms of extrinsic reward types are drawn, such as career advancement, salary increase and increased access to research-related resources. Lam (2011) argues that the ambition to gain recognition from peers fits best with the traditional model of meeting standards of academic excellence to advance one's career and explains why researchers may pursue academic engagement. Hence, researchers motivated based on the need for reputational gain will most likely be orientated strongly towards academic engagement because of its potential for career advancement (van Rijnsoever & Hessels, 2021). Such motivations fall under extrinsic motivation, according to the SDT. In an experiment to study how industry projects can stimulate academic engagement among engineering professors from selected US universities, Clauss et al. (2022) found that high reputational-based incentives positively influence a professor's willingness to engage in university-industry interaction. On the contrary, some studies have argued that incentivising academic engagement may have both direct and indirect effect on researchers' motivation to engage with other non-academic external partners (Atta-Owusu & Fitjar, 2023).

Intrinsic Motivational factors

SDT argues that human function depends on the satisfaction of three basic psychological needs (need for autonomy, competence, and relatedness) and predicts their behavioural tendencies (Deci & Ryan,

2000; Ryan & Deci, 2020) according to these bases**.** Recent works from scholars have shown that the desire for autonomy, fulfilment of purpose and deriving a sense of meaning from the work they participate in are factors that intrinsically motivate a researcher to collaborate (Broeck et al., 2016; Fink et al., 2023; Kohtamäki, 2022; Litalien et al., 2017; Orazbayeva et al., 2021). Going by these identified desires means that satisfaction of these basic psychological needs of researchers, to an extent, will help predict their behaviour towards engaging with industry or other non-academic external partners. Wen-ting & Xin-hui (2013) applied SDT in their study of a selected group of researchers in China who were already engaging in collaboration activity. Their findings indicate that only autonomous motivation enhances the three positive outcomes out of the four types of autonomous-to-controlled motivation. Controlled motives do not positively relate to these outcomes. Therefore, extrinsically motivated individuals are easily stimulated by incentives, unlike in the case of intrinsic motivation. However, extant literature has shown a contradictory position to this claim. Some studies have shown that motivation to pursue academic engagement is determined mainly by individuals' basic psychological needs rather than extrinsic motivations such as incentives or financial rewards (Lam, 2011; Orazbayeva & Plewa, 2022). This thesis establishes the link between the three basic psychological needs within the SDT to understand why researcher may behave differently towards academic engagement. This is premised on the assumption that researchers who are more intrinsically motivated may interact with industry provided such engagement will facilitate satisfaction of their three basic psychological needs.

Need for competence

Evidence holds that perceived competence in university-business collaboration directly affects how much an individual is willing to pursue academic engagement (Orazbayeva et al., 2021). Researchers with high competence in their disciplinary field are more skilled, knowledgeable, and productive. However, evidence shows that about half of researchers in academia do not possess the technical and managerial skillsets needed to succeed in an engagement activity (Hayter, 2015). Also, a researcher's years of experience in the career is positively related to how successful they will perform in an academic engagement (Korff et al., 2019). Having established this fact, one can understand why the need for competence (self-efficacy) is considered one of the significant predictors of individual motivation for involving in academic engagement (Sormani & Rossano-Rivero, 2023).

Need for relatedness

Existing studies have shown that perceived relatedness is one of the factors that drives researchers towards academic engagement (Obschonka et al., 2012; Tartari et al., 2014). Relatedness has also been described to facilitate networking opportunities for researchers that could lead to future engagements (Taxt, 2023). There is also evidence that attempts by authorities that govern the conduct of individuals (for instance, government or universities or other non-state actors) to enforce a controls on them to engage in a task may result in a reduction in the level to which such an individual will perform in such task (Moss & St-Laurent, 2001; Porath & Erez, 2007, 2009). Perceived relatedness in university-business collaboration (UBC) has also been found to positively affect how an individual embraces academic engagement, especially in the case of education-driven UBC (Orazbayeva et al., 2021). Another study has found that researchers are unwilling to engage in knowledge exchange with industry due feeling of disinterestedness and organized scepticism (Queirós et al., 2022).

Need for autonomy (academic freedom)

Perceived autonomy has been found to positively influence researchers' willingness to engaging in collaborative projects with industry partners (Clauss et al., 2022). Within the context of education-driven university-business cooperation, Orazbayeva et al. (2021) found perceived autonomy to influence academic engagement positively. This is because autonomy gives academic members the freedom to decide in selecting external partners they want to engage with rather than being imposed on them by their university leadership. This supports the claim by Cerasoli et al. (2016) that if an individual feels that they are granted freedom of choice as to engage or not to engage in a task, their level of participation in such task should increase. Contrary to this, there also the argument that perceived autonomy may lead to research misconduct depending on the ethical orientation of academic researchers (Fink et al., 2023). The authors explains that decision-making ability of academic researchers to effectively engage in research activity is underlined by their ethical orientation, organisational and institutional environment that they are embedded. Deci et al. (1999) argues that researchers are more intrinsically motivated to engage in an activity if they operate within an environment supporting their autonomy. However, that if engaging in such activity would thwart researchers' autonomy, they may lack the intrinsic motivation to engage in such activity.

Influence of Individual factors

Extant literature has shown that how academic researchers engage with industry or other non-academic partners reflects the relationship between their motivation type (extrinsic or intrinsic) and individual characteristics such as gender, age, discipline, and academic rank. For instance, studies have confirmed the relevance of individual characteristics (gender, discipline, and seniority) in explaining how researchers interact in different forms of academic engagement (Queirós et al., 2022). Women researchers have been found to participate less than men in formal engagement, but in informal engagement, both women and men researchers participate equally (Ramos-Vielba & D'Este, 2023). The reasoning for this gender disparity was ascribed to higher personal cost such as time and attentional resources that engaging in project with industry demands and inadequate social support mechanisms for women researcher (Tartari & Salter, 2015).

Studies also supported that researchers' participation in academic engagement is mostly associated with individual level factors particularly age and academic discipline (Karlsdottir et al., 2023). Contrary to this claim, some studies argue that researchers are more motivated to engage with external partner when they perceive that their research outcome will influence public policymaking and practices, however in this case individual characteristics (gender, research productivity, career length, race and rank) tend to be of less significance (Bozeman et al., 2023; Nelson, 2024; Nelson et al., 2024). In terms of relationship between academic career cycle and their involvement in academic engagement, studies reveal that older generations of academic researchers are more engaged in patenting and licensing activities, while younger researchers engage in spin-off/start-up creation, and that for intermediate generation researchers, they participate more in giving public lectures/speeches and publications aimed towards the general public (Pekşen et al., 2021).

Influence of organisational factors

Extant literature has also linked organisational factors such as organisational culture and climate to how researchers engage with industry. In terms of university support structures, researchers engage in projects with industry when they satisfied with the support structures enabling academic engagement and with support structures for research commercialisation for example the TTO (Taxt, 2023). There is a perception that TTOs are more productive when staff working are a team of professionals and enjoy the needed autonomy to operate (Zhang et al., 2018). Another study reveals that researchers may involve themselves less in academic engagement because of their feelings of low safety and other structural-level barriers both individual and organisational, and this tends to drive

their extrinsic or intrinsic motivation (Kuchumova et al., 2023). University culture, scientific prestige and peer effects have been found to influence academic engagement especially in creation of university spin-offs (Houweling & Wolff, 2020). Universities that have academic peers working in industry can facilitate other researchers within their institution to engage with industry via their established contacts (Huyghe & Knockaert, 2015). Similarly, studies have further confirmed peer effects to be the most influencing factor that informs researchers decision to engage with industry (Moog et al., 2015). The argument is that researchers who have colleagues with experience in academic engagement serve as a positive role models. Studies have found that universities with departments having an entrepreneurial orientation facilitate the intentions of researchers towards academic engagement (Athreye et al., 2023). These findings emphasise that universities having strong institutional support motivates researchers to build intentions in engaging with external partners.

Influence of institutional factors

The role of policymakers is vital for strengthening knowledge capacity and the legitimisation of higher education institutions. Public policy has been found to foster interaction between innovation actors such as academia and industry within an innovation ecosystem (Zheng & Cai, 2022). Scholars have also argued that local contexts and the universities capacity are major determinants of the rate at which universities in Europe transform towards sustainable entrepreneurial universities (Cai & Ahmad, 2023). Studies have identified that governments provision of supportive mechanisms such as relational social capital and tax incentives facilitates academic engagement as the need for pursuit of innovative-driven outputs induces collaboration between academia and industry (Rossoni et al., 2023). This supports the argument that lack of information about academic engagement opportunities and lack of financial supports are the major barriers that prevents industry to collaborate with academic researchers (Kleiner-Schaefer & Schaefer, 2022). Government's provision of such incentives has been found to promote researchers' engagement in knowledge exchange with external actors (Atta-Owusu & Fitjar, 2023). Government provision of subsidies, for example, encourages academic engagement because actors involve in these interactions that have received these subsidies are able to generate profits and produce research that are of social-economic benefits (Song et al., 2022). Therefore, insufficient incentive mechanism that will foster sustainable participation and partners commitment may hinder academic engagement (Zhuang & Shi, 2022).

In terms of disciplinary affiliation, some researchers are concerned that academic involvement with industry is pushing scientists to focus more on applied research, potentially neglecting fundamental, long-term basic research (Perkmann et al., 2013). D'Este et al. (2019) found no evidence of a significant

difference between researchers oriented towards interdisciplinary research and their propensity to engage with industry. However, another study finds a positive relationship between interdisciplinary research and societal visibility which is strongest among researchers who collaborate with non-academic external partners (D'Este & Robinson-García, 2023). Academic engagement has been found to differ between Higher Education subsystems as researchers from private institutions engage less in informal interactions with industry (Queirós et al., 2022). Researchers in research-intensive universities were found to engage more with industry than their peers from teaching-oriented universities. Studies reveals that researchers from STEM disciplines or technical universities are found to engage more with industry than their peers from social sciences or comprehensive universities (Schneijderberg et al., 2022). The explanation for this is that hard disciplines, and applied research fields in particular, offer opportunities for research that has industrial applications, and this type of research tends to have more needs for resources from external sources (Perkmann et al., 2011).

3.3 Conclusion

In summary, this chapter outlines the theoretical framework that will guide this thesis. It identifies and justifies the selection of Self-Determination Theory (SDT) as the most relevant theoretical lens for analysing academic researchers' motivations to engage with non-academic external partners. This thesis adopts SDT with two primary objectives: first, to understand why researchers engage in such activities by examining the alignment of their extrinsic and intrinsic motivations; and second, to explore how individual, organizational, and institutional factors influence researchers' behaviour toward academic engagement. By integrating SDT into the study of academic engagement, this thesis aims to provide insights into the motivational dynamics of academic researchers in Irish universities which informs their decision to engage with external collaborators.

CHAPTER FOUR: RESEARCH METHODOLOGY

4.1 Introduction

In this chapter, I explain the research methodology used to address the research question for this study. Addressing this will provide an insight into how academic researchers working in higher education institutions in Ireland derive their motivation for engaging with non-academic partners, and to understand their mode of interaction with these external partners. The research methodology used in this study follows the seven steps involved in a research process suggested by Onwuegbuzie & Leech (2005) which include (1) Research problem formulation, (2) Research aim/purpose, research question(s) and hypothesis development, (3) selection of a research design/method, (4) Data collection, (5) Data analysis, (6) Data interpretation and validation, and (7) Communication of findings.

4.2 Research problem

As discussed in chapter one, this study identifies a research problem and the need to address it considering its attendant benefits to all key stakeholders, became imperative. The research problem is motivated by the fact that in recent years, there has been an increasing interest by government and research funding bodies on the need for societal impact of research, hence demanding more engagement between academic researchers and non-academic external partners (Marzocchi et al., 2023). However, such demand may put more pressure on academic researchers considering that such interactions are an additional responsibility, alongside their research and teaching roles in the university (Atta-Owusu & Fitjar, 2022). This pressure for more economic and societal impact has seen academics engaging more with non-academic external partners, which often comes with benefits and costs. Based on this research problem, my thesis thus seeks to explore the motivations for and modes of academic engagement among academic researchers working in higher education institutions in the republic of Ireland.

4.3 Research Question

In this thesis, an overarching research question is: *"Why and how do academics engage with non-academic collaborators?"* and are further sub-divided into four specific research questions which include:

1. Why are academic researchers motivated to engage with non-academic partners?
2. How do academic researchers engage with non-academic partners?
3. How do individual, organizational, and institutional factors influence academic researchers' engagement with non-academic partners?
4. How does academic freedom influence academic researchers' engagement with non-academic partners?

These research questions consider the research problems, and the research gaps as identified in the extant literature discussed in this thesis. Based on review of literature, this study identifies two major research gaps. Firstly, recent studies highlight that our understanding of academic researchers' behaviour towards academic engagement is still limited, particularly regarding their motivations for and modes of engagement with non-academic external partners. Secondly, previous studies on academic engagement have predominantly focused on a limited group of external stakeholders, particularly industry partners, making it difficult to generalize findings across a broader range of external stakeholders, such as business firms, charity organizations, non-governmental organizations, and government agencies. Consequently, this study explores why academic researchers are motivated to collaborate with a diverse range of non-academic external partners and examines how these collaborations are conducted through various modes of engagement. Furthermore, it investigates how individual, organizational, and institutional factors influence these interactions and how academic freedom shapes researchers' engagement with non-academic external partners. By addressing these issues, the study contributes to filling the research gaps by expanding beyond the traditionally emphasized industry collaborations, offering new insights into a broader spectrum of non-academic external partners, and contributing to a more comprehensive understanding of researchers' behaviour in academic engagement.

Therefore, considering the intent of this study as discussed above, it is the expectation of this study that this broad research question, and its sub-questions, is thus, useful in exploring experiences of academic researchers affiliated with various academic institutions in Ireland who have engaged with wide range of external stakeholders at different stages of the career lifecycle.

4.4 Selection of research methodology and research design

There are three main research methodologies: qualitative, quantitative, and mixed methods (Creswell, 2018; Dawson, 2019). In this thesis, qualitative research methodology was used in line with suggestions from previous studies on academic engagement. For instance, as suggested by a recent

study on academic engagement (Noke et al., 2024), this methodology will enable me to gain more insight into understanding behaviour towards academic engagement as a phenomenon. Furthermore, a qualitative research methodology "supports theorising, problematisation of rigid or engrained ways of thinking, questioning of taken-for-granted knowledge, exploration of little-known phenomena or context" (Köhler et al., 2022: 184), which is appropriate for a study on academic engagement where we seek to question taken-for-granted knowledge and also explore the phenomenon of how academic freedom influences academic engagement. Using a qualitative research methodology in this study will help provide an in-depth exploration of the research topic and phenomenon in context. Also, qualitative research is considered exploratory in approach, which has the primary goal of enabling researchers to gain deeper insight into people's behaviours, perceptions, experiences, and opinions, which are difficult to explore using a quantitative research approach (Techo, 2016), or mixed method approach that can be more complex to use (Åkerblad et al., 2021; Dawadi et al., 2021; Onwuegbuzie & Johnson, 2004).

4.5 Data Collection

According to Onwuegbuzie & Leech (2005: 280), "the two central issues routinely presented in research texts that pertain to data collection issues are sampling and instrumentation". Using this structure, I discuss the data collection method employed in this study.

4.5.1 Sampling

Snowball sampling was used to identify and recruit potential interviewees who participated in the study. Researchers use snowball sampling technique when it is challenging to locate participants through other traditional sampling methods or when the population of interest is hard to access or difficult to enumerate (Etikan, 2016). Therefore, as it relates to my study which is exploratory in nature with the intent to gather deep insight rather than generalizable information, snowball sampling is the best fit. Also, considering that not all academic researchers in Ireland are involved in engaging with industry, adopting this technique becomes imperative. To start this sampling for participants, my supervisors sent out an introductory email to some researchers within their network who have engaged externally. I later followed up with these participants by sending them an email. This follow-up email contains a brief information on the purpose of the study and why the researcher is being contacted for an interview. Other relevant documents concerning the study such as interview guide,

consent form, and information sheet (see Appendix I, V, VI respectively) and a booking link for interview sessions, were attached to the follow-up emails to participants.

Subsequent participants were later recruited via referral from those interviewees who participated in different interview sessions. I asked each participant interviewed to refer their colleagues who they know have similar experience and meet the selection criteria for recruiting participants. At the inception of the recruitment, an estimated sample size of 20 participants was the target of this study. However, participants recruitment for the interview in this study stopped upon saturation in the data collection process when no new data to add to insights to the research question was found. In all, nineteen interviews were conducted.

The criteria for inclusion or exclusion of participants for interview in this qualitative research study include:

i. All selected participants must have engaged with non-academic partners (industry, public sector, charity organisations) or have ongoing engagements with non-academic partners.

ii. All participants must be permanent staff of an Irish university.

iii. All participants must be based in Ireland.

iv. There must be fair representation of participants across gender, disciplines, and career stage.

Despite the advantages of using snowball sampling technique which was one of the reasons for its selection for use in this study as discussed earlier, this sampling technique is not without its limitations. Some of these limitations as identified in literature on qualitative research methods (Etikan, 2016; Saldana, 2014) are that (i) the sample might not be representative of the broader population due to the non-random selection process. The technique tends to connect individuals who share similarities, potentially leading to bias. (ii) The researcher has limited control over the sample diversity and the sample's representativeness of the entire population; and (iii) The success of this method depends heavily on the willingness and ability of initial participants to recruit others. All these limitations were addressed during the data collection stage in my study. For instance, bias in sampling was avoided as researchers recruited were specifically asked to suggest other researchers within discipline, gender or university type that were under-represented. Also, I ensured that all interview sessions were handled professionally, including good time management of the interview sessions and communications with participants before, during and after the interview. Using this approach, every participant was satisfied and were very willing to recruit other potential researchers for consideration to be interviewed.

The participants for this study are individual academic researchers who are faculty members from higher education institutions in the Republic of Ireland, who either have or currently are engaged with non-academic partners. The choice of engaging these researchers in the research study was in line with the focus of this study which is to obtain their personal experiences engaging with industry, to collect data to address the research question. Table 4.1 presents information on academic researchers who participated in the interview. In terms of university type, interviewees are affiliated with either traditional or technological university in Ireland within the disciplinary fields of social sciences, physical sciences, life sciences, engineering, medicine, and humanities. Also, both male and female researchers who are at different stage of their career – early career, mid-career and late career stages were represented in the study. A more comprehensive description of the participants is presented in Appendix II.

Participant	University type	Discipline	Gender	Career Stage
P1	Traditional	Social Sciences	F	Mid-Career
P2	Traditional	Social Sciences	M	Early-Career
P3	Traditional	Social Sciences	F	Early-Career
P4	Traditional	Physical Sciences	M	Late-Career
P5	Technological	Physical Sciences	M	Late-Career
P6	Traditional	Social Sciences	M	Early-Career
P7	Technological	Engineering	M	Mid-Career
P8	Traditional	Medicine	M	Late-Career
P9	Technological	Social Sciences	M	Mid-Career
P10	Traditional	Social Sciences	F	Early-Career
P11	Traditional	Physical Sciences	M	Early-Career
P12	Traditional	Medicine	F	Mid-Career
P13	Traditional	Physical Sciences	M	Mid-Career
P14	Traditional	Social Sciences	F	Mid-Career
P15	Traditional	Life Sciences	M	Late-Career
P16	Technological	Social Sciences	M	Late-Career
P17	Traditional	Social Sciences	F	Late-Career
P18	Technological	Life Sciences	F	Early-Career
P19	Traditional	Humanities	F	Late-Career

Table 4.1: Profile of Interview participants

In line with the ethics approval guiding this study, detailed information of participants interviewed in this study were excluded to maintain anonymity and confidentiality. This study ensured a wide representation of participants so that data collected will be rich enough to provide experiences from various categories of research. Ensuring careful representation of participants for the study is important because the interest of this study is to explore why and how the motivation and mode of

interaction varies across researchers in Ireland when they engage with non-academic external partners. Further information of selection criteria for participants is discussed under sampling technique hereafter.

4.5.2 Instrument and data collection procedure

Data used for this study was collected using a semi-structured interview guide with open-ended questions. In a qualitative research study, a semi-structured interview is used in many studies across a variety of disciplines and research areas (Polit & Beck, 2016) because it allows for in-depth exploration. Besides, a recent study suggested the need to conduct interview-based studies to gain richer insights into individual researchers' motivation choices in academic engagement (Noke et al., 2024). A total of nineteen (19) interviews were conducted with only one individual participants at every interview session between 19th January – 26th February 2024, each lasting an average of 42 minutes. Eighteen (18) of these interviews were conducted virtually via video conferencing on Microsoft Teams, while only one interview with participant 8 (P8) was conducted via audio Phone call based on the preference of the participant. Each interview session was recorded to provide data for analysis in the study. Conducting interview via this medium conforms with the approval received from the MU Ethics committee (see Appendix IV). Table 4.2 shows information on the interviews conducted.

Participant ID	Interview Date/Time	Interview Duration	Medium used
P1	19-01-2024/ 12noon	45mins	MS Teams
P2	22-01-2024/ 11am	39mins	MS Teams
P3	22-01-2024/ 12noon	46mins	MS Teams
P4	25-01-2024/ 2pm	38mins	MS Teams
P5	29-01-2024/3:30pm	51mins	MS Teams
P6	01-02-2024/ 1pm	57mins	MS Teams
P7	06-02-2024/10am	40mins	MS Teams
P8	07-02-2024/8:20am	29mins	Mobile Phone Call
P9	07-02-2024/ 10:30am	57mins	MS Teams
P10	09-02-2024/10am	42mins	MS Teams
P11	12-02-2024/11am	30mins	MS Teams
P12	12-02-2024/2pm	40mins	MS Teams
P13	13-02-2024/10am	45mins	MS Teams
P14	19-02-2024/9am	27mins	MS Teams
P15	20-02-2024/11am	43mins	MS Teams
P16	20-02-2024/12:30pm	44mins	MS Teams
P17	21-02-2024/11am	45mins	MS Teams
P18	23-02-2024/4pm	39mins	MS Teams
P19	26-02-2024/4:30pm	44mins	MS Teams

Table 4.2: The study Interview details on duration and medium used

The semi-structured interview guide used for data collection in this study (see Appendix I) consists of six open-ended questions. These questions focus on exploring participants' experience of engaging with industry in the past; what motivates them to engage with industry and why these motivational factors matter to them; how organisational and institutional factors influence their engagement with non-academic external partners; problems participants encountered in their past engagement; their level of satisfaction in past engagement and suggestions of aspect of academic engagement that requires improvement going-forward. These open-ended questions were crafted such that I can get participants to share their experiences of their previous academic engagement, so that it can provide this thesis with useful data to address the study underlying research questions. In this study, a well organised and systematic procedure was used for conducting the interviews. Before contacting participants to solicit their interest in the study, approval was obtained from Maynooth University's Ethics Review Committee - the Social Research Ethics sub-committee - responsible for reviewing research projects involving the participation of humans. The documents submitted and approved include:

i. Completed application form – Maynooth University protocol for tier 2-3 ethical review of a research project involving participants of humans.
ii. Interviewee consent form (Appendix V)
iii. Interviewee information sheet (Appendix VI)
iv. Interview guide (Appendix I)

4.6 Data Analysis

Analysis of interview data started immediately after the first two interviews were concluded. Researchers are advised to commence data analysis and preparation of field reports immediately after the first interview are concluded because "what emerges from the data analysis may shape subsequent sampling decisions" (Moser & Korstjens, 2018: 15). Indeed, adopting this analysis approach was helpful to this study considering that I was able to identify a better approach to asking interviewees questions based on the interview guide.

Qualitative data analysis is a process that requires sequential steps. As a result, Creswell (2018) suggested seven steps researchers can adopt when analysing interview data in qualitative research. As shown in Figure 4.1, these five steps include (i) Collect raw data (e.g., transcripts, fieldnotes, images), (ii) organise and prepare data for analysis, (iii) read through all data, (iv) coding of data

(manually or software use), (v) interrelate themes, (vi) interpretation of themes, (vii) validate data for accuracy of information (compare raw data with interpreted themes and quotes).

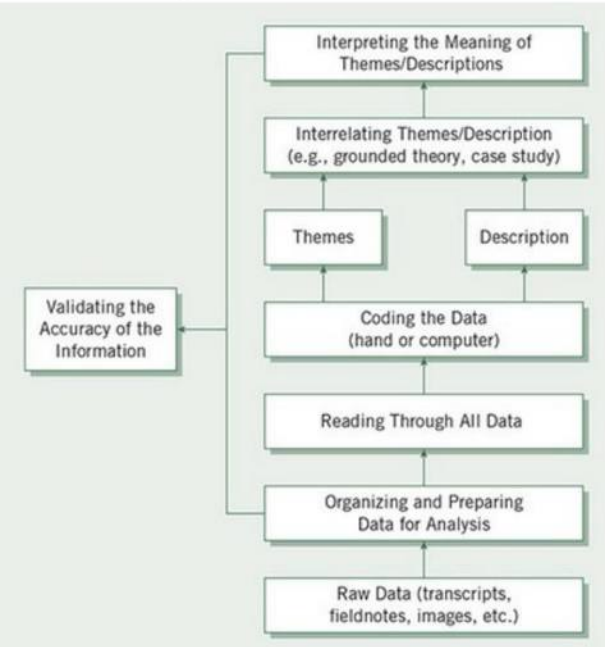

Figure 4.1: Data Analysis in Qualitative Research

Source: (Creswell, 2018: 269)

These seven steps guided analysis of interview data in my study. The initial raw data were from transcripts of the interviews conducted. These data were generated from video recordings from MS Teams for each session and were converted to audio files (MP3 format) and tagged with pre-defined labels (PI, P2, P3…P19) to ensure anonymity and to protect identity of participants in line with the MU Ethics guidelines as approved. Where interview was conducted via mobile call (voice call), the call was recorded, and the audio recording was also converted to MP3 format so that all data are in same format and for easy processing. These video and audio files were stored in cloud storage provided by Maynooth University. This storage choice of storage was to protect the integrity and privacy of data. Besides, this was the expected standard for storing data for all MU postgraduate students according to the university policy. To generate transcripts for these interview data (already in MP3 formats), I used “Dictate” button on the menu bar, on Microsoft Word. I did try to use MS Teams to transcribe, but the transcripts produced from the initial two interviews transcribed via MS Teams were not as accurate as those generated via Microsoft Word.

Upon transcribing the interview data, each transcripts file (docx format) was labelled as (PI, P2, P3…. P19) to ensure anonymity. Also, as part of the process to prepare data for analysis, I replaced all

personal information in each transcript that could reveal the identity of participants. For instance, where a respondent's name was included in the transcript because of transcribing process, a pseudo-code (Participant 1, 2,3...19) was used to replace the name. Also, other information in the text of the transcript that could reveal identity of the participants (e.g. where participants mentioned name of their university) were also replaced in each transcript. To complete this phase of the transcript process, I read through each transcript meticulously to ensure accuracy of all information against the original recording obtained. This was done to prevent misrepresentation of fact or assumption of my own ideas. Given the semi-structured nature of the data, Microsoft Excel was used as an aid for manual coding. Codes are assigned to the data based on themes identified from the interview transcripts. The coding process is essential because it allows me to identify and group themes based on their similarities, making it possible to interpret the data and provide evidence to answer the research questions. A codebook was created to facilitate the systematic analysis of data, detailing each identified theme and its description (see Appendix III).

4.7 Validation of data

The validity of the interview findings was ensured throughout the data handling phase of this study. To achieve this, I meticulously conducted all interview recordings and used a consistent process to collect and analyse participant data. I continuously verified all data before and after analysis. I maintained reliability by applying the same themes and codes to the data from all participants. Additionally, interview transcripts were created verbatim, without reflecting my own opinions. When the transcript text was unclear, I replayed the recordings to capture the original statements of the participants accurately.

4.8 Communication of findings

Upon analysis of data, to communicate the findings of this study, themes were grouped based on the two parts of the core research question ("why" and "how"). In the first group are those themes that falls under motivations (the "why") for research to engage with non-academic external partners which I tagged "rationale for engaging with non-academic external partners". The second group tagged "pattern used in engaging with non-academic external partners" are those themes which provides insights into "the how" aspect academic researchers engage with non-academic external partners. Such themes that were grouped under "rationale for engaging" were those attributes earlier identified in extant literature as the three determinants of academic engagement being individual characteristics,

organisational characteristics, and institutional characteristics. Detailed explanation on the inter-relation and interpretation of these themes are presented and discussed in the next chapter (Chapter Four: Results and Discussion) of this thesis.

4.9 Conclusion

This thesis aims to explore the motivations for and modes of academic engagement among academic researchers working in higher education institutions in the Republic of Ireland. Based on this purpose, this thesis developed four main research questions: (i) Why are academic researchers motivated to engage with non-academic partners? (ii) How do academic researchers engage with non-academic partners? (iii) How do individual, organizational, and institutional factors influence academic researchers' engagement with non-academic partners? (iv) How does academic freedom influence academic researchers' engagement with non-academic partners?

To answer these research questions, a qualitative research method was adopted to enable the study to gain more insight into understanding behaviour towards academic engagement as a phenomenon. Concerning research design, this thesis adopted the phenomenological approach as it will enable the study to gain insight into Irish academic researchers' "lived experiences".

The snowball sampling technique is used to identify and recruit potential interviewees who participated in the study. Snowball sampling is the best fit for this study as it is exploratory and intends to gather deep insight rather than generalisable information. This study's participants are academic researchers who are faculty members from higher education institutions in the Republic of Ireland who either have or are currently engaged with non-academic partners. Interviewees were selected based on a careful representation of male and female researchers at different career stages in various disciplines.

A semi-structured interview guide consisting of six open-ended questions, this study conducted nineteen qualitative interviews with academic researchers from diverse fields—social sciences, physical sciences, life sciences, engineering, medicine, and humanities—across several public universities in Ireland. Data analysis was done manually using Microsoft Excel, which was used to code data from all the interview transcripts. Before the data collection process commenced, ethical approval was obtained from Maynooth University's ethical committee. The interviews were conducted strictly according to this ethical guideline, while the confidentiality and anonymity of participants were strictly maintained. In conclusion, the research methodology used in this study effectively addressed the research questions, facilitating a thorough exploration and generating valuable findings that contribute to the field.

CHAPTER FIVE: RESULTS AND DISCUSSION

5.1 Introduction

This chapter presents and discusses results from the thematic analysis of interview data for the study wherein Microsoft Excel was used mainly for coding interview data collected in the study (see Appendix III for the "code book" describing the codes and themes used in this study). In this chapter, I unpack the thesis's theoretical framework to guide analysis and discussion. For this purpose, Figure 5.1 links the theoretical framework presented in Chapter 3.2 to the analysis of the interview data presented in this Chapter 5.

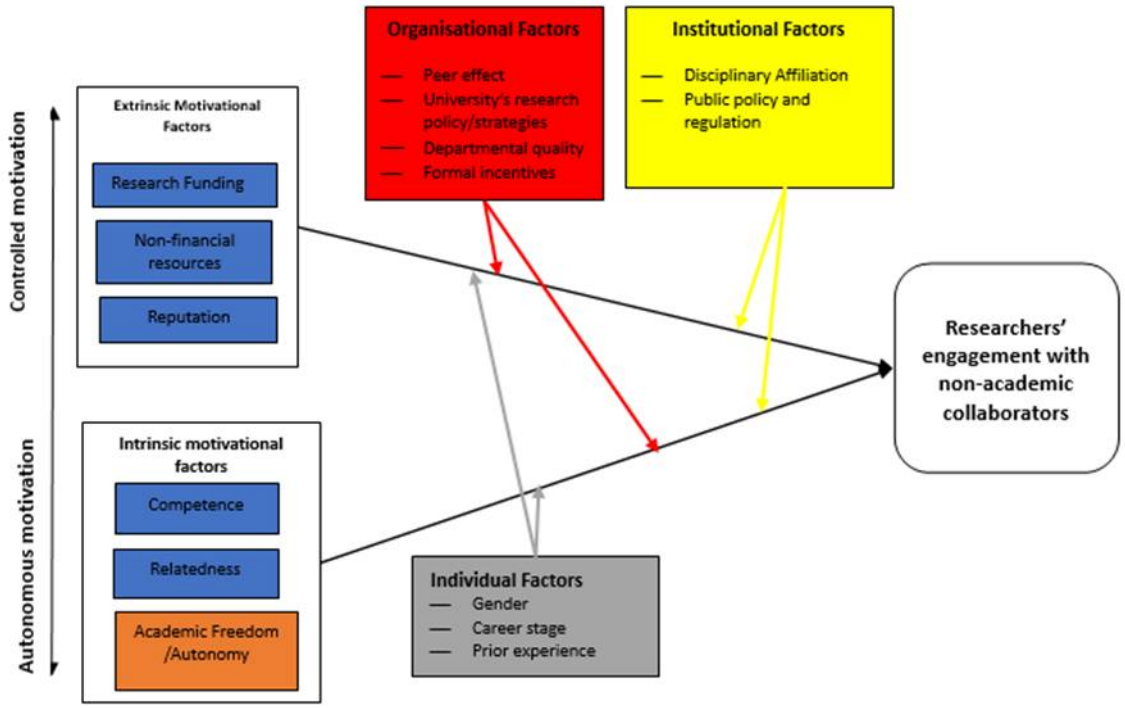

Figure 5.1: The thesis's theoretical framework showing and its application in data analysis

Interpretation	
	Chapters 5.2.1 -5.2.5 (Research Funding - Relatedness)
	Chapter 5.2.6 (Academic Freedom/Autonomy)
	Chapter 5.3.1 (Individual Factors)
	Chapter 5.3.2 (Organisational Characteristics)
	Chapter 5.3.3 (Institutional Characteristics)

The primary focus of this chapter is to draw insights from results analysed with a view to providing answers to the overarching research question for this study *"why and how do academics engage with non-academic collaborators?"* and by extension, for the four sub-questions which are as follows:

1. Why are academic researchers motivated to engage with non-academic partners?
2. How do academic researchers engage with non-academic partners?
3. How do individual, organizational, and institutional factors influence academic researchers' engagement with non-academic partners?
4. How does academic freedom influence academic researchers' engagement with non-academic partners?

This chapter is organised into two main sections, each with associated sub-sections, where I present and discuss the study results. The two main sections are as follows:

I. Rationale for non-academic collaboration ("Why").

II. Pattern of engagement ("How")

It is noteworthy that the above organisation corresponds to research sub-questions 1 and then 2,3 and 4. The purpose of structuring the chapter in this way is to maintain a clear link between the study's research questions, theoretical framework, and the analysis of the results obtained.

5.2 Rationale for non-academic collaboration – The "Why"

There are numerous reasons why academics engage with non-academic collaborators that were identified from the interview data. Based on the analysis of the interview data, I identified the following themes as being most relevant: competence-building activities; access to funding; career benefits and reputation; networking; access to in-kind resources; contribution to society; affective duty; and academic freedom. Extant literature argues that "engaging with industry constitutes discretionary behaviour for academics" (D'Este & Perkmann, 2011: 320). Therefore, going by the findings of this study under the "rationale" for engagement, one could as well infer that such "discretionary behaviour" may likely be shaped by individual researchers motive for engaging with non-academic external partners, an attribute which differs from one researcher to another. Therefore, the focus of this section is to answer the following part of the research question *"why do researchers engage with non-academic external partners?*

5.2.1 Access to funding

The need to access external funding plays a major role as to why researchers engage with non-academic external collaborators, however not all interviewees consider this as a major motivational factor. Interviewees show two ways in which funding drives researchers' engagement: (i) researchers' self-perception of the need for fund; and (ii) pressure from external funders. This insight gathered from interviewees who participated in my study thus agrees that one of the major concerns of individual researchers is accessibility to research funding (Aagaard et al., 2021; Fink et al., 2020; Taxt, 2023). One interviewee stated " *Yes, so attraction of funding is also a reason why I do it [engage externally]*" (P7). This aligns with the claim that researchers explore interaction with industry as an alternative means of sourcing for funding (Perkmann et al., 2021). Similarly, another interviewee noted that "*often it enables you to access research funding in a way that you couldn't if you weren't engaging externally, and the funders weren't able to see the kind of the real-life value of the research*" (P1). This supports findings from earlier studies that indeed, opportunity to access external funding for research is one of the motivations for researchers to engage with external collaboration (D'Este et al., 2013; Hooi & Wang, 2020; Ubfal & Maffioli, 2011). Researchers who have succeeded in securing funding previously are more motivated to seek more funding. According to an interviewee "*I suppose one of the motivations behind me doing that was because certainly the first time I did it, I saw that this was a funding scheme that was available, that could provide a small amount of funding*" (P19). This statement is consistent with the finding that availability of funding predicts the intensity to which researchers will engage with external collaborators (Iorio et al., 2017). This finding also supports the claim that industry-funded projects motivate academic researchers to collaborate with industry partners (D'Este & Patel, 2007).

My study reveals that academic engagement significantly enhances researchers' success with their grant applications. For instance, one interviewee said, "*the primary motivator of putting together a consortium and a solid consortium is to get that application for grant through*". (P3). This finding thus extends the reasoning given by existing studies as to why researchers engage with external collaborators such as to secure additional funding to hire research support staff (e.g., graduate students) and purchase equipment and consumables for their research (Atta-Owusu & Fitjar, 2022; D'Este & Perkmann, 2011d; Wang et al., 2023).

Researchers seeking funding are often pressured by funding agencies to engage with external collaborators as a precondition for accessing funds. My study supports the claim that conditions that need to be met in grant applications influence academics behaviour in favour of academic engagement (Hooi & Wang, 2020). For instance, one interviewee said, *"Some of the European projects we've been*

involved in, it wasn't that we actively wanted an industry partner, but it was a requirement of the funding that there would be a minimum number of industry partners on the projects". (P16). Also, another interviewee said *"it's a requirement from Funding Agency basically. So, you have to have someone from non-academics like industries as this is directly the call requirement. But I would say every call has its own requirement".* (P18). *"So for some funding, they would say that, OK, this funding is only available if you have an industrial partner…., so funding is one of the reasons as well, besides a direct impact…"* (P2). These findings support that claim that the source of funding affects researchers' behaviour, as external funders impose various selection and evaluation criteria that often require researchers to adjust their collaboration partners to meet these criteria (Gulbrandsen & Smeby, 2005).

Also, this finding shows support that source of funding could impact on researchers' academic freedom. Previous studies have argued that restrictive funding sources constitute some form of pressure for researchers and could harm research (Gläser et al., 2022; Goduscheit, 2022; Kladakis et al., 2022; Zacharewicz et al., 2023). Further to the influence of industry preconditioning researchers to engage, interviewees also mentioned that their reason for engagement is because their employment contracts as provided by their university manager asked them to do so. Like one interviewee said, *"I had to collaborate with industry due to my [employment] contract" (P14).* This finding suggests that the choice of performance evaluation metrics in use by university managers influences researchers to engage in adaptive behaviour termed "the Evaluation Game" (Kulczycki, 2023). Use of such metrics may also infringe on researchers' academic freedom.

5.2.2 Access to in-kind resources

Access to in-kind resources refers to those non-monetary resources which includes access to materials, research expertise and equipment. These resources are categorised as non-financial resources in my study. One interviewee gave account of how they were able to access materials for their research because of their collaboration with external partner. This position was stated as "*so if you're doing research which requires let's say some kind of a soil sample, so and that's something that you know the industry partner that you're engaging with can provide. So, they're providing you the raw material for your research or they're helping you with some data that that can help facilitate an analysis and coming up with impactful findings from the research*" (P3). This finding aligns with the position that researchers explore academic engagement to access non-monetary resources (Carattoli et al., 2017; D'Este & Perkmann, 2011).

Another finding which is worth mentioning is that interviewees mentioned that their engagement with external partners has enabled them to access participants for their research study and that these

participants are experts in the research area under study. "*So, the first reason is that from a pragmatic point of view, access to participants. You cannot really get access easily to specific kinds of people, certainly from my experience, without going through this kind of official channels" (P17)*. Considering this insight, my finding however does not support the claim that researchers are more motivated to engage with external collaborators solely because it offers them access to monetary benefits (Atta-Owusu & Fitjar, 2022; Zheng et al., 2023), rather non-monetary resources shape the behaviour towards extrinsic motivational factors.

5.2.3 Career Benefits & Reputation

Findings from data analysed in my study have also revealed that individual researchers engage with external collaborators to benefit their career and to increase their reputation as researchers. In terms of career benefit, interviewees share their various reasons why they are motivated to engage in interaction with industry. There are those researchers whose reason for involvement in academic engagement was to achieve recognition. For instance, according to an interviewee "*I would say is not just academic publication, because that's obviously very important for our career. But I think in any kind of reports you write, or any kind of practitioner focused publications, any kinds of blogs, any kinds of posts, any kind of media contribution, and their name is associated with the work shows impact. It shows that you're doing something real for real people, and you're helping these agencies to do their work better. So that's going to get you higher level impact recognition*" (P17). Another interviewee stated that engaging with external partners was motived on the premise that it can enhance their career development in terms of academic promotion. "*Having policy impact can be a factor that shows your esteem within an academy, and that's one of the factors that is taken into account for example in academic promotions. Umm, so you know, that's another area within which it has benefited my career because being able to show the depth and breadth of my research I think has been helpful in terms of my own career development*" (P19). This supports the claim that the ambition to gain recognition and have an impact outside academia is an extrinsic motivational factor why researchers pursue academic engagement (Lam, 2011).

Another interesting quote from an interviewee shows that the need to attain status or raise their profile for themselves motivates them to engage with external partners. In support of this position an interviewee affirms that "*….it is the need to also you know gain status from your side or to develop, you know, your profile or your ranking because you need to get published and to get published you need the industry experience*" (P6). This finding coincides with cited motivators in the literature (Dietz & Bozeman, 2005; Siegel et al., 2004). Aside from attaining personal status, there are researchers who

engage for the sake of raising the profile of their universities as claimed by another interviewee "*I'm doing that … to kind of raise the profile of the [department name]. It gives us more opportunities and it gives our students more opportunities*" (P13). This finding seems to agree with an earlier study which also found that researchers engage with industry because they want to further outreach missions of their universities (Zhang et al., 2017).

Furthermore, on career benefits of academic engagement, my study also revealed that interaction with external partners is beneficial to attaining promotion. In this regard two interviewees' insights become relevant. According to an interviewee *"So, I've recently been promoted ... a number of the promotion criteria are about research engagement or engaged research"* (P1). Similarly, another interviewee also said "*I suppose from a promotion perspective it's key driver of promotion within the academic sector. So, from a personal perspective, a lot of the driver I suppose is career drivers. So, I suppose that's the personal motivation to engage because you would not achieve, you know, really in all aspects now, you need to have stakeholder engagement*" (P12). This finding supports the idea that incentivising academic engagement can have a direct or indirect effect on researchers' motivation to engage with non-academic external partners (Atta-Owusu & Fitjar, 2023). Further to this finding, one could note that this direct or indirect effect of engagement may be more felt in relation to a researchers need for career advancement. In such a case, researchers who are still at an earlier stage of their career will be more interested to engage in external interaction to achieve promotion. Furthermore, universities that mandate researchers to engage with external partner will extrinsically motivate such researchers to pursue academic engagement. The need to attain academic reputation was another extrinsic motivation factor that my study found. Insight given by an interviewee is that *"there are multiple reasons for engaging with external partner, obviously personal reputation is one of them"* (P15). My finding agrees with the claim that researchers who are motivated based on the need for reputational gain will most likely be orientated strongly towards academic engagement because of its potential for career advancement (Rijnsoever & Hessels, 2021).

Researchers are often motivated to engage with external collaborators when their research outcomes have the potential to contribute to evidence-based policymaking. An interviewee highlighted this motivation, stating, *"You're doing your research or something that can inform policy"* (P3). This reflects findings in recent literature, such as those by Clauss et al. (2022), which suggest that enhancing their reputation and being seen as contributors to impactful policy decisions can significantly drive researchers' willingness to interact with industry and other external entities. There is the perception that beyond publication metrics, the impact on policymaking serves as another valuable indicator of researchers' level of productivity. For instance, there are researchers who may be publishing less papers but then may make contributions to policymaking which does not only reflect performance but

also, this is earn them a positive reputation among their peers in the academic community. Researchers with such extrinsic desire will thus, be more willing to engage with industry or other non-academic partners.

5.2.4 Competence-building activities

Thematic analysis conducted on interview data collected in this study reveals a broad theme of competence-building activities which explains part of the motivation as to why Irish academic researchers engage with non-academic external partners. These sub-themes include knowledge generation and enhancing; problem solving, knowledge application, and technology development. These competence-building activities are considered as an important intrinsic motivation driver for individual academic researchers who are more inclined towards building their research capacity or satisfying their intellectual curiosity. So, to achieve this knowledge-building capacity, they tend to explore potential opportunities in academic engagement. I found these themes to align with insight from previous literature which shows that these competence-building related activities associated with collaborative research projects between academic researchers and industry can be categorised into four groups — knowledge generation, idea testing, technology development and problem solving (Perkmann & Walsh, 2009). Also, all these items in the sub-theme fit into the description of "need for competence", which is a major component of intrinsic motivation factor in the SDT theoretical framework of this study (see Figure 5.1).

Insight gathered from the interview data analysed indicates that researchers whose motive is to achieve more competency in their research engage with non-academic external partners in those activities that will enhance their knowledge and as well facilitate learning. According to an interviewee, "*the reason to collaborate with industry is to be able to kind of build your own knowledge, you know around the domain and to build your knowledge[…]you need to hear from the people that have experience in the domain that one is researching or in the particular area that one needs to find knowledge or develop knowledge around*" (P6). This aligns with findings from previous studies that found that where academic researchers whose interest is to advance knowledge are motivated to be involved in academic engagement (Bhullar et al., 2019; D'Este & Perkmann, 2011).

Further insights gathered from interviewees relate to knowledge generation because interaction with industry enables them to explore new lines of research and generate interesting research questions. *"So, I think you get much better research questions when you engage with industry or external because their questions are usually based in the lived reality. You know, whereas mine are probably more stemming from the kind of theoretical puzzles and challenges […] I think you get really, really*

interesting and relevant research questions that serve both the academic community and the real-life practitioners" (P1). This finding supports literature arguing that collaboration with industry benefits academic researchers because they can generate new ideas and research lines for their research through the engagement with non-academic partners (Tartari & Breschi, 2012). Moreover, the ability to create new lines of research enables researchers develop new skills and be more competent (Orazbayeva et al., 2020; Orazbayeva & Plewa, 2022).

There are also some researchers whose interest is to solve industry problems. In this regard, researchers with such motives are more willing to engage with industry as this engagement will offer them opportunity to address their own interests. This study finds support for this assertion based on interviewees' responses to what motivates them to engage with non-academic collaborators. For instance, an interviewee explains that "*You're doing your research [with an industry partner] on something which can solve a problem that a particular industry is facing, or a consumer group is facing*…." (P3). Similarly, another interviewee reveals that "*I'm interested in addressing challenges, problems and things like that … So I'm interested not necessarily in contributing to academic knowledge, but I'm interested in contributing to improving systems and getting better outcomes*" (P16). These perceptions are congruent with the idea that engagement between academic researchers and industry depends on individual researchers' intrinsic motivations and their goal to solve industry problems (Bodas Freitas et al., 2013; D'Este et al., 2018; Figueiredo & Ferreira, 2022; Perkmann et al., 2013). By implication, the desire to solve industry problems is a major motivation why academic researchers engage with industry partners.

Also, before industry problems can be solved, researchers need to be well-informed and develop in-depth understandings about the nature of these problems. Therefore, to get a deeper understanding of a problem that the industry partner is facing, academic researchers tend to engage with industry. Perceptions gathered from an interviewee provide insights related to this argument; " *So and when we collaborate with industry, it provides the platform or the opportunity to understand what is actually going on rather than what we know from the literature*" (P6). This study's findings thus support the claim that the need to gain knowledge about industry problems motivates academic researchers to interact with non-academic external partners (Zhang et al., 2017).

Regarding the application of knowledge or idea testing, one of the interviewees from an applied research discipline stated that "…*personally I've always had an interest in the application side of the research so that that also drew me to that kind of collaborations*" (P4). Similarly, another interviewee also cited the need to explore the application-side of research within a real-world context. According to one of the interviewees " *So if industry is involved in my research, it means there is a real-world quick application*" (P11). Considering both instances, this research thus supports the claim that

academic researchers are motivated to engage externally with non-academic partners, because of the desire to apply the knowledge of test their research ideas within an industry (Austin et al., 2021; D'Este & Perkmann, 2011; Zhang et al., 2017).

Findings from the interviews also revealed that researchers engaged in collaborative projects with industry to gain insight into industry partners' technological needs. There was a case where an interviewee revealed that " *So I just wanted to know about the technology, that's only my aim to know about technology and what is the perspectives in the future of that particular technology*" (P18). This study thus supports that indeed, researchers' involvement in external collaborative projects will be dependent on whether they are more interested in basic research projects or applied projects aimed at problem solving (McKelvey et al., 2015).

Another interviewee reveals that collaboration with non-academic partners makes him more innovative and this satisfies his intrinsic personal desire "*If I was to say which has the most enjoyment, it's where I get to invent things. So, I would have several patents and licences. Be looking at developing new technologies for new applications*" (P5). Findings from the interviews are consistent with the claim that satisfaction of researchers' intrinsic motivation rather than extrinsic motivations is the rationale driving researchers to pursue academic engagement with industry (Lam, 2011; Orazbayeva & Plewa, 2022; Sormani & Rossano-Rivero, 2023). Likewise, another interviewee stated that engaging with industry has assisted him in developing technologies and innovation solutions. "*I really like working with people outside of academia, I think they bring an innovation, they bring a new way of thinking to a project that you wouldn't get from an academic group just writing on their own*". (P12). My finding thus disagrees the criticism that academic engagement could hinder research and innovation (Collyer, 2015), but instead it is advantageous to research and academic researchers (Bhullar et al., 2019; D'Este & Perkmann, 2011; O'Dwyer et al., 2023).

5.2.5 Networking

Researchers desire to build and expand their personal or professional network and exploring academic engagement can enable them to achieve this purpose. Interviewees in my study emphasized that their need to form or build new networks enhances their connections with external collaborators. Taking this reasoning into account, networking thus represents the need for "relatedness" which is one of the intrinsic motivational factors included in the theoretical framework for this study. According to an interviewee, "*there are multiple reasons why I engage externally, obviously […] to build my own network is one [of the reasons]*" (P15). In this instance, my study thus establishes that indeed,

researchers would be driven towards academic engagement because of their perceived relatedness as an intrinsic motivational factor (Obschonka et al., 2012; Tartari et al., 2014) congruent with SDT.

Another interviewee also shared a similar motive for engaging with industry. *"I'm doing that for public engagement and for networking and to try to make contacts that you know might be useful for future projects* "(P13). This finding supports the idea that researchers build their networks to attract future projects with external partners (Taxt, 2023). An interviewee stated that the reason for building connections with industry is to maintain close contact, especially since they had worked there before joining the university. "*Prior to becoming a university lecturer, I was involved in industry and uh when I became a lecturer. I was very, very conscious that I wanted to maintain that industry connection, not just to be a lecturer"* (P7). While this finding supports the claim that relatedness positively influences researchers' involvement in academic engagement (Orazbayeva et al., 2021), however, it does not agree with the argument that researchers are not interested in building networks with industry (Queirós et al., 2022). Another interesting observation which my study found was that researchers are eager to build their network with various non-academic external partners including charity partners. This suggests that various researchers despite their choice of external engagement partners, do have in common the need to relatedness as an intrinsic motivation factor for academic engagement. It also shows the benefit of adopting a wide sampling frame for the interviewees.

5.2.6 Academic Freedom

Academic freedom, which implies researchers' autonomy to make decisions about their own research agenda, was found to be another important rationale that informs why researchers interact with non-academic external partners. Based on experiences shared by a number of interviewees (P8, P15, P19, P13, P14, P10, P12, P16) who participated in my study, they agree that the academic freedom landscape in Ireland is supportive. "*So in Ireland, under the Universities Act, which is a university government instrument, we have protected academic freedom, so as an academic with tenure in Ireland, one is able to work with whom one wants and in whatever topic they wish"* (P8). This finding agrees with extant studies that have rated Ireland's country score for Academic Freedom Index (AFI) as indeed conducive, particularly for its higher education institutions (Berggren & Bjørnskov, 2022a; Kinzelbach, Saliba, & Spannagel, 2021; Kinzelbach et al., 2021; Maassen et al., 2023; Sandström & Besselaar, 2018).

Another interviewee noted that academic freedom in Ireland may not be absolute. This is contrary to the generally perceived opinion about the academic freedom landscape in Ireland. An account of this was given by an interviewee that *"In Ireland, we don't try to, or we don't interact in any the research*

that could be harmful for human being or for the society. So, we try to avoid such research" (P11). This finding shows evidence for worries by some scholars that the Higher Education Authority Act 2022 may affect academic freedom in practice, particularly freedom to research, teach and study, within the context of Ireland (Maassen et al., 2023). In essence, it is because of such worries that scholars have called for the need that Ireland's policy on higher education institutions in the future must endeavour to provide a conducive structure that will encourage knowledge exchange among researchers in Irish higher educational institutions (Zhang et al., 2017). My findings also support the extent to which researchers perceive the need for academic freedom which can as well inform their behaviour towards academic engagement. For instance, an interviewee stated that "*In my own capacity as researcher now, I do have autonomy over who I want to partner with. It's important to have that autonomy because that allows you to keep ownership of your own research agenda and not be working on other people's research agenda*" (P16). With this finding, my study found support for the claim that perceived autonomy has a positive influence on researchers' willingness to engage with non-academic external collaborators (Clauss et al., 2022). Another interviewee has also described how important academic freedom is to their research activities and motivation for engaging in collaborative projects with non-academic external partners. An account of this claim was substantiated by a particular interviewee who stated that *"I would guard jealously that academic freedom you know and so for example when I talk about those reports when I send those reports to my external partners for review, I always promised the external partners that they will have an opportunity to review the reports before they're made publicly available and that they'll be free to comment on those and suggest edits but they don't have editorial control over the reports [...] So I will always decide what the end report looks like"* (P1). This finding also supports the positive relationships between perceived autonomy and academic engagement as earlier claimed in extant literature (Orazbayeva et al., 2021).

It is thus important to say that such autonomy does not only enable researchers to be actively motivated to pursue academic engagement, but it can as well make them more innovative and perform better in such collaborative projects. The reasoning for this claim is because researchers who are intrinsically motivated are more likely to be strategic in the kind of engagement projects they get involved in or the partners they select (Deci et al., 1999). There is the likelihood that such researchers would be less interested in academic engagement projects that will thwart their academic freedom. For instance, an interviewee mentioned that "*It's my choice if I want to get involved in research that's going to have a dissemination issue*" (P16), which agrees with the position that individual researchers have the volition to choose which engagement activity they want to participate in and also the level to which they may want to partake in such task (Cerasoli et al., 2016). Interviews from my study also revealed the role of the Irish government in restricting research in certain areas to prevent unethical

practices among researchers involved in collaborative projects with industry. An interviewee shared with me, "*the most significant example for me is the tobacco industry. In the field of Medicine and Health Sciences, there are certain groups we prefer not to collaborate with due to their unethical and questionable scientific practices in the past*" (P8). This finding underscores the importance of stringent ethical guidelines and oversight in research collaborations. Fink et al. (2023) argue that without adequate regulation and proper checks and balances from government or university managers, there is a risk that researchers might engage with industries known for unethical practices, such as the tobacco industry. Also, this reinforces the need for careful selection of partners, particularly for researchers in the fields of Medicine and Health Sciences, to maintain ethical integrity.

According to a different interviewee, *"There are ethical concerns regarding the direction of our research. For example, government legislation restricts our development of technology or collaboration with industries when the results might have dual uses. A technology might be intended for medical purposes but could also be applied to military weapons. Therefore, we must be cautious about the end user and the potential applications of the technology. While commercial regulations may exist to some extent, they definitely impact our work."* (P8). Such regulations could negatively impact on the researcher's independence to pursue fundamental research (Rijnsoever & Hessels, 2021), which makes some scholars to also call for concerns as to the attendant negative implications of such regulations on individual researchers academic freedom (Tartari & Breschi, 2012), and their ability to promote research reproducibility and integrity (Davis et al., 2011; Jasny et al., 2017). On account of this finding, academic freedom does, at least in part, determine individual researchers' behaviour towards academic engagement (Moraes et al., 2023), a relationship that the theoretical framework for my study also considers necessary for informing researchers, and in particular those with intrinsic motivation, self-determination to willingly participate in collaborative projects with external partners.

5.2.7 Contribute to Society

Researchers interviewed mentioned that the desire to contribute to society through engaging in research activities that will benefit other people in society motivates them to engage in interactions with non-academic external collaborators. Although this theme was not directly included in the theoretical framework for my study, however, my broad analysis of motivation factors for engagement had identified this as "prosocial" motivation. According to insight given by an interviewee, the need to contribute to society by engaging in research projects that seek to address societal problems drives their motivation towards academic engagement. This interviewee stated that *"a lot of my research is around trying to have a societal benefit"...."I really wanted to do research that was benefit to society.*

I saw charity partners as also having a similar challenge as wanting to do that work" (P19). This finding is consistent with the findings from existing research which suggested prosocial motivation as the fourth motivational factors geared towards engaging in research for the sole purpose of benefitting the society (Grant, 2008; Iorio et al., 2017; Orazbayeva & Plewa, 2022; Sormani & Uude, 2022).

Also, further insight from interviewees shows that such researchers with prosocial motivation are mostly driven by such academic engagement projects that will enable them to have real-life impacts. Following this line of thought, an interviewee said *"they (external partners) are looking for such research outputs that can help solve a problem, or that can help improve the lives of people at some stage, in some shape or form...So that's essentially the motivator for not just doing research for the sake of publishing papers or having theses, but also having a real-life impact"* (P3). This finding further supports the assertion of the findings from other studies which identified prosocial motivation behaviour of researchers towards external engagement (Atta-Owusu & Fitjar, 2022). Therefore, the need to contribute to society is considered as an important intrinsic motivational factor that could drive researchers to engage with non-academic collaborators.

5.2.8 Affective duty

Findings from my study has revealed that researchers engage with external partners based on their desire to fulfil their affective duty. In this regard, affective duty entails researchers who derive motivation towards academic engagement to teach their students better, secure jobs and training for students, invite talks from industry experts, or co-supervise student projects. This finding is another interesting motivational factor which was not envisaged in my theoretical framework but was identified in chapter two where I discussed academic engagement in the literature. An interviewee said, "*So I did interact with industry to get some partial links for my PhD students and also just then in the future to give them a route to have placement or internship in the industry, so they have multiple experiences, not just sitting on one desk and doing PhD*". (P11). This supports the position that academic engagement offers students a placement opportunity in industry (Lee & Miozzo, 2015), as such this could as well inform researchers rationale to engage with external collaborators.

The need to enable researchers to deliver their teaching programmes as an affective duty motivated researchers to engage with industry. An account attributed to an interviewee shows that "*From an education perspective, we have a requirement to engage with industry partners in order to deliver our programmes and to facilitate competency for healthcare practitioners*" (P12). My study thus supports the claim that interaction with industry enables university researchers to draw on those activities that

could help them deliver their academic (teaching) programmes to their students more effectively (Butcher & Jeffrey, 2007; Wang et al., 2016).

Similarly, another interviewee revealed the desire to co-supervise graduate students was a major motivation for their engagement with industry. This interviewee said "*So in the case of our university, actually the way that Master's degree was structured like every project was supposed to have this industry engagement of one sort or another, including in some cases like a government department engagement. So, it was just part of my normal job to co-supervise those projects*" (P13). My findings support the claim that there is a significant positive relationship between knowledge interaction with external partners and supervision of students (Reymert & Thune, 2022). However, while their findings claim that such engagement is more prominent with partners from public sector organisations as against industry partner, my finding shows that such engagement is the other way round in that industry partners are more preferred for interactions.

5.3 Pattern of engagement – The "How"

In this section, I present and discuss findings of the interview data analysed. Hence, the focus of this section is to answer the part of the research question around *"how do researchers engage with non-academic external partners?* To aid the interpretation and discussion of results from this study, data collected from participants who were interviewed (see Appendix II) and this was compared with findings from extant literature reviewed earlier in sections 2.2 and 2.4.4 of chapter 2 of this thesis.

5.3.1. Individual Characteristics

Individual characteristics that shape or determine how academic researchers in Irish higher education institutions engage with industry or other non-academic have been identified. These characteristics discussed under this sub-section include gender, career stage, and prior experience in academic engagement.

Gender

Gender of academic researchers interviewed also provided insight as to how researchers engage with non-academic external collaborators. A study conducted on Italian professors found male academic researchers to engage more with industry (Abramo & D'Angelo, 2022). Finding from my study on Irish

researchers found support for this claim however unlike their male counterparts who engage with industry, female participants (P1, P3, P10, P12, P14, P17, P18, & P19) engage more with NGOs, charity organisations, and civil society organisations (see Appendix II). My observation for this pattern of engagement in terms of choice of engagement partner type for female researchers is because they seem to be more interested in research around children and youth, and evidence for this statement was clear from the interview transcripts. For example, a female interviewee provided more evidence on this reasoning. "*So, some of the work I would do would be around children's Rights. So, I would do some outreach work, you know, going to schools, talking to them about their Rights. Other ones that I've worked with is with LGBT youth and I do some work around relationships and sexuality education*" (P10). My finding also supported an earlier study conducted on researchers in the United Kingdom which claims male academic researchers to engage more with industry (Abreu & Grinevich, 2017).

Further insight shows that the desire to influence policy making and practices explains why female researchers prefers to engage with NGOs. A female interviewee who prefers engaging with NGOs said *"a very high level international organisation might be looking at particular scientific policy issues and would invite in academics as key speakers or you know experts ... mostly as a voluntary roles whereby we would give or I would give an invited presentation to that body about my own research and then that sometimes has been cited in a follow on report by them and that feeds into how they translate policy findings in a field*" (P19). While this finding supports the idea that the opportunity to influence public policy making and practices motivates researchers to engage with external partners, my research finding contradicts the claim in previous studies that gender plays no significant role (Bozeman et al., 2023; Nelson et al., 2024). My study reveals that researchers aiming to influence policy are predominantly female, whereas male researchers, at least in my sample, show less interest in such engagement. This indicates that gender may significantly affects how Irish researchers collaborate with non-academic external partners, particularly NGOs and charitable organizations. My study, therefore, contributes important new insights into the impact of gender on academic engagement.

In terms of the type/mode of academic engagement mostly preferred across gender, data analysed shows male researchers engage more in joint research. For instance, a male interviewee said "*My engagement externally is probably more like joint research. So that means that we talk to employees in the company to understand what they're working on and to understand their data sets. And at the same time, we do set joint goals for the project*" (P13). While my finding does not support the claim that male researchers engage more in contract research and consultancy services (Abreu & Grinevich, 2017), however, based on a female researchers' account "*I do some advisory work with them (NGOs and Charity organisations) as well*" (P10), I found support that female researchers prefer to engage with non-academic partners through channels such as public engagement, meetings, and informal

advice. While this pattern of engagement aligns with submission of previous studies where female academic researchers have been found to participate less in than the male researchers in formal engagement (Ramos-Vielba & D'Este, 2023) my study did not find support for equal participation in informal engagement as claimed in the literature.

Reasons for disparity in gender participation in formal academic engagement has been attributed to barriers associated with time and resources (Tartari & Salter, 2015). Findings from my study also supports this, according to a female academic researcher who I interviewed "*I think the problem sometimes engaging with industry projects is in terms of time and resources*" (P17). Another female interviewee said industry projects have strict timelines and are too demanding in report "*It's very, very tough to work with industries, they are very restricted with the time, you have to deliver on time, you have to give updates every week. You have to communicate very nicely, and you don't break the communication. So, communication should be very good. You have to meet the deadline*" (P18). Issues of "unrealistic expectations" and "conflicting timelines" have been reported in previous studies as barriers limiting academic researchers from collaborating with industry (Austin et al., 2021). It is possible that university managers can help bridge this gender gap if female researchers are provided with adequate social support structures.

Career stage

Insight gathered from my interview data shows that researchers' career stage determines their behaviour towards academic engagement. An interviewee in his early career stage who has engaged with industry and government agencies through joint research and consulting said "*So with industry I am working from the last 7 to 8 years in different form or in different roles […] I started working as a postdoctoral researcher in a research work with the industry. Being a project manager of one of the Horizon 2020 project, I did interact with the government agencies*" (P11). Another interviewee in her mid-career stage engages via joint research mainly "*I've also collaborated with outside partners, but maybe not so much industry but NGO*" (P14). However, my study observed that Irish researchers at their late stage of their career have more intensity of engagement working with industry. An interviewee in his late stage of career who has engaged extensively with industry through joint research, contract research and consulting said "*I suppose you would define me as a late-stage career person. I've been working in industry and in academia I think now for a combination of over 30 years. I've been in XYZ university now for about 26 years and over that time, I've collaborated a lot with industry in all sorts of collaboration projects* " (P15). This finding supports the claim by a previous study conducted among Italian researchers where researchers in their late career stage have been associated

to have higher intensity of engagement with industry partners via several engagement channels (Abramo & D'Angelo, 2022).

Further exploration into why researchers engage in particular patterns of activity reveals that the creation of spinoff companies can often be linked to the career stage of the researchers. Contrary to some existing literature, my findings from the interview data present a different perspective to the extant view from the literature. One researcher, in his late career at a technological university who has successfully launched spinoff companies and secured patents and licenses, shared, *'I'm not driven by publication because publications are only important if you want an academic career to strengthen your case for tenure. That's not my interest. I'm more focused on developing technologies where patents, licenses, or spinoff companies are more appealing. New papers are of less interest, although I still publish frequently*' (P5). This contradicts earlier studies suggesting that researchers in their late career stages are less successful or interested in creating spinoffs, unlike their peers at the early or mid-career stages (Hayter et al., 2017). Thus, my findings support the idea that researchers at this stage can indeed successfully create spinoffs (Pekşen et al., 2021; Shane, 2004). Another researcher in his late career stage said *"I worked with industry partners while in the university. Yes, I have done it in a number of ways. I have done it on a consultancy basis. I have done it where they have been funded through Enterprise Ireland through something like an innovation. I've also done it where we have had Joint projects, at least one of which has led to commercialization"* (P8). Therefore, the reasoning that researchers in their later stage of career, in contrast to those in the early or mid-career stages, would have more commercialisation experience accumulated over the years of their career (Bercovitz & Feldman, 2008) and also field specific experience in that time (Mõttus & Lukason, 2021) and this is relevant for this pattern of engagement.

Prior experience in academic engagement

When discussing their satisfaction with previous academic engagements, interviewees expressed positive feelings. All the nineteen Interviewees who participated in the study expressed their satisfaction with the past engagements and are more interested to work with external partners in the future. Previous studies have shown that researchers' prior experiences in engaging with industry are linked to their future behaviour towards industry engagements. An interviewee shares his experiences as, *"Overall, I would say I'm very satisfied. You know, I'd say it's 8 out of 10*" (P13). This finding supports the claim that positive past engagements can influence continued interest and involvement in industry collaborations (D'Este & Patel, 2007; Scandura & Iammarino, 2022).

Researchers who have achieved commercialisation of their innovations during their past engagement with industry are often more likely to develop interest in working industry subsequently. According to an interviewee, "*I would say the one thing that probably drives me to collaborate with industry is the fact that I worked in industry initially and I can always see how knowledge can benefit commercialization or innovation*" (P15). Similarly, previous studies identify academic researchers' *previous experiences in patenting and other commercialisation activities* as a predictor of their participation in academic engagement in the future (Bekkers & Bodas Freitas, 2008; Scandura & Iammarino, 2022). Therefore, prior experience in academic engagement is an important individual characteristic which can inform researchers behaviour towards academic engagement, especially in terms of working with other external partners aside industry.

5.3.2. Organisational Characteristics

In terms of those characteristics that determine how academic researchers working or associated with Irish higher educational institutions engage externally are discussed in this sub-section. Such organisational characteristics include university type, peer effect, departmental quality, university research policy and strategy, support structure, and formal incentives.

University type

Researchers who participated in my interviews were drawn from two university type: traditional universities and technological universities in Ireland. Analysis of the data has also shown that university type that a researcher belongs to shapes their behaviour towards collaborating with non-academic external partners. An interviewee from technological university gave reason for this behaviour. "*So, we are a technological university which has come from the old institutes of technology. Typically, our teaching loads are very high. We are required to teach about between 16 and 18 hours per week. So, this is quite a large amount of teaching. If you compare ourselves to some of the traditional universities, the traditional universities have much lower teaching requirement, which is why they can do more engagement with industry. However, for us in technological universities, we are expected to teach our students and at the same time engage in research with industry. This puts more pressure on us [technological universities] making us have less time for external engagement* " (P7). My finding seems to differ from claim research-intensive universities such as technological universities were more active in academic engagement than their peers in traditional universities who are teaching-oriented (Perkmann et al., 2011; Schneijderberg et al., 2022) though this is most likely due to the differing

definitions of these types of universities across the world, and the peculiarities of the Irish system. My study could not clarify if researchers from private institutions engage less with industry (Queirós et al., 2022), because all interviewees who participated in my study were all affiliated with publicly funded universities in Ireland. There are no fully fledged private universities in Ireland thus this type of researcher was not available for interview in the Irish context. Private institutions have a predominantly teaching remit in Ireland and are mainly focussed on the social sciences and then mainly in business education. Thus, future studies in other jurisdictions may want to fill-in this research gap to provide more evidence.

Peer effect

Peer effect is another organisational characteristic that extant literature has identified that informs researchers behaviours and patterns of collaboration with non-academic external partners. On the one hand this is the case where researchers were influenced to engage externally because they have mentorship assistance from more experienced senior peers in their university research group or department. According to interviewees, "*My supervisor for my PhD, were very, very externally engaged. So, you know, I suppose the environment in which I grew up as a as a researcher was very externally engaged*" (P1). Another interviewee shares a similar experience in this regard. "*My mentor at that stage was the Centre Manager and he had worked in industry, done his PhD through industry and worked continually on industrial problems. So, he would like to generate new knowledge, but his primary goal was always to work with industry. So, as a result. It was very easy for me to join there because I had worked with industry. Therefore, working in that environment, the mentorship I received from my supervisor, my first boss was very important, and it was for maybe eight years*" (P5). My finding is consistent with previous studies that peer effect, particularly from senior colleagues informs younger researchers' behaviour towards academic engagement (Houweling & Wolff, 2020; Huyghe & Knockaert, 2015; Moog et al., 2015). Although while some of these previous studies also claim that peer effect may influence younger researchers to create more spinoffs (Houweling & Wolff, 2020), because senior colleagues will provide them mentorship (Moog et al., 2015), my study could not substantiate this claim given the small number of participants with spinoff experience.

On the other hand, insights from the interviews indicate that in the absence of senior colleagues with substantial experience in industry engagement, younger colleagues within the same department or university often step in to provide peer support. An interviewee described this dynamic, stating, *"there was no kind of senior mentorship in terms of senior professors supporting that. It's really been colleagues and frequently colleagues at the same level as me, you know, so assistant professors who*

have connections or at a conference having conversations with people or just people working in the same area or with the same interests as you, and building up connections that way" (P10). This highlights how peer effect, particularly among early-career academics, compensates for the lack of traditional mentorship and may foster professional development through shared experiences and interests.

Another interview provided more insights into this kind of scenario "*What influences me is often the people I work with, who have similar, you know, agendas and particular interests and we often stimulate each other. So you're often swayed, shaped by the people you work with, and this is very important*" (P17). Considering the importance of peer influence, researchers were seen to seek inspiration and social approval from their peers, which could shape their pattern of engagement and choices they make in their in the research group they belong to in the department (Tartari et al., 2014). Therefore, my findings on peer effect thus provide more insight that researchers could as well seek mentorship from colleagues on the same career level as themselves provided such colleagues have the requisite experience.

Departmental quality

Departmental quality has been found to have a positive effect on engagement with industry because department with high-quality researchers may likely facilitate interest in academic engagement for other researchers in that department (Scheulke-Leech, 2013). Experiences gathered from interviewees provided more support and explanation for this claim. An interview would recount; "*it's (academic engagement) quite strong due to the fact that we have a lot of associate faculties and they often come directly from industry to teach. So, let's say you have a programme, let's say half of the lecturers would be, you know, associate faculty which have a lot of industry experience*" (P14). Another interviewee gave insight into how network effect within their department plays a vital role in external collaboration. "*so connections from colleagues filters through my network and the other way around...There is a network effect that supports individuals like myself in getting those connections*" (P4). Previous studies argues that academic researchers in high-quality department may be willing to engage in joint research with industry if such interaction will enable them to pursue novel research, source for ideas and generate research outputs that are considered publishable in top-rated academic journals (D'Este & Perkmann, 2011).

Existing research emphasizes the significance of a research group's size for academic researchers (Olmos-Peñuela et al., 2014). Insights from another interview further elucidate this point, highlighting the pivotal role of a robust research network over the individual quality of research for effective

academic engagement. The interviewee explained: "*So individuals who are within my groups have had a huge impact on my research, because the opportunities that you get for research engagement with industry or funding are quite a lot dependent on the network that you have. Especially in large scale funding, even getting into a good consortium is merely dependent on your research network rather than the quality of your research*" (P2). This observation aligns with the theory that the broader and more connected a researcher's network, the better their chances of securing industry engagement and funding. However, it also introduces a nuanced perspective against previous findings suggesting that higher overall university quality may decrease the likelihood of individual academic industry engagement (Ponomariov, 2008). My findings suggest a re-evaluation of this perspective. It appears that the size and connectivity of a network, rather than the inherent quality of individual researchers, are more decisive for successful academic engagement. This interpretation aligns with recent findings from a study on UK researchers in the applied sciences, which indicates that while network size is crucial, this correlation might not extend uniformly across all scientific disciplines, particularly outside the applied sciences (Scandura & Iammarino, 2022).

University research policy and strategy

My study also explores the role of university research policy and strategy to gain an understanding of how this potentially shapes the engagement behaviour of Irish academic researchers. "*My university has an intellectual property policy in place to specifically encourage researchers to engage with industry practitioners, so that is certainly an underpinning relevance to the universities policies*" (P8). Previous studies have emphasised the need for university managers to implement effective policy framework that will encourage academic engagement, for example in the distribution of income generated from commissioned research projects between academic researchers and the university (Link et al., 2007; Ponomariov & Craig Boardman, 2008). Researchers are entertaining fears of engaging with industry due to perceived disadvantage they may be exposed to. An interviewee's account reveals that "*A lot of researchers maybe overwhelmed to engage with industry, because we don't want them stealing our IP*" (P9). Through far-reaching policies on issues relating to royalties and equity of commercial outputs such as patents, university managers can enable broader participation in academic engagement among their academic researchers (Haeussler et al., 2014; Thursby & Thursby, 2011). Knowing that such perceptions have also been raised in previous studies, this piece of evidence as gathered from my interviews with some Irish academic researchers becomes noteworthy.

The need for university managers to ensure fairness in their policy towards encouraging academic engagement is also imperative. Irish researchers have displayed more interest in seeing that research

policies and strategies entrenched in their higher educational institutions are more flexible and accommodating. Insight shared from one of the interviewees support my position on this, "*Our academic contracts don't have that much built in time for research. So that that can be a difficulty as well, there remain barriers*" (P7), though it should be noted that this interviewee was located in a technological university which has a predominantly teaching responsibility. This finding aligns with the position from a recent study where academic researchers consider fairness in university policy over a policy oriented towards providing pecuniary incentives as a way of inducing external engagement (Atta-Owusu & Fitjar, 2022). It is worth noting that due to differences in the motivation alignment of researchers, these policies may not work for all researchers but will depend on whether they are intrinsically or extrinsically motivated.

Support structures

Extant literature suggested that establishment of technology parks, business incubators and industry liaison offices are supportive structures that university managers provide can stimulate their academic researchers to interact with industry (Moraes et al., 2023; Ribeiro & Nagano, 2021; Tootell et al., 2021). Findings from my study also support this, considering the experience of one interviewee who noted that "*Yes, we have a knowledge transfer office, and we have industry liaisons and we do have all of those structures in place […]they certainly do help"* (P7). Another interviewee also affirms the benefit of having a knowledge transfer office in place "*KTO [Knowledge Transfer Office] Is crucial for knowledge generation. It is crucial that your knowledge transfer office staff know what you do, know what interests you and know what is required by the company. So, they are a liaison and a vital part of the research system"* (P5). Similar opinion was reflected in a recent study which suggested that TTOs serve as a strategic intermediary for knowledge interaction and can also effectively link academic researchers and engineers in the industry by organising sensitization workshops and seminars (Shen et al., 2022). On the claim that TTOs are helpful to organise workshops and seminars for researchers in university, my study also finds provide support for this considering an interviewee's insight that "*there is a bit of support from the consultancy manager in my university. He is very helpful in terms of networking, you know, some sort of backing up if I need some help to sit in meetings with industries [...] he can say to me, ok, we can talk to this person, he/she might be helpful for your research*"(P18). These findings are consistent with extant literature.

Extant literature has also pointed out the need for university managers to ensure that TTOs and KTOs must be constituted by competent staff who can support researchers adequately. Analysis of interviewee's perception on this testify to this. For instance, an interviewee said "*there are excellent*

supports for research and for funding proposals in our TTO. For example, there are finance people, HR people, business development, people who like. I talked to them regularly and they help me to solve kind of administrative problems within the project, which I could not do by myself...So that is part of the support of the university" (P13). This finding thus supports the claim that TTOs are more productive when staff working there is constituted by a team of professionals and enjoys autonomy to operate (Zhang et al., 2018).

My study also took note of researchers working in universities without adequate structural support and how this affects their academic engagement behaviour. Experiences shared by interviewees is as follows: "*They (our university management) encourage our engagement with industry, but they don't maybe support it or facilitate it particularly well at the moment because again primarily due to things like our contracts. So, they want you to do engage with industry, it is part of our key performance indicators, but some of the systems are not yet in place. I know the university is working on them in order to really make it easy for people to be engaged in industry projects or research. There are deficiencies in the system*" (P7). This supports findings from recent study which reveals that researchers involve less in academic engagement because of their feelings of low safety and other structural-level barriers, and this tends to impact their behaviour towards academic engagement (Kuchumova et al., 2023). Researchers who face such barriers, where for example organisational support structures are inadequate, may decide to pursue collaboration with external partners based on their extrinsic or intrinsic motivation. Findings from results gathered in my study also reflect n researchers' satisfaction with support structure provided by their university management where this is available: **"***there is a team of very capable experts within the university who provide administrative support and commercial advice when it comes to engaging with industry and all of that makes the pathway to working with people in the industry much smoother than it would be if those were not present*" (P8). This finding is consistent with extant studies which suggest that researchers have the propensity to engage in projects with industry when they satisfied with the support structures enabling academic engagement (Taxt, 2023).

Similarly, another Interviewee who participated said "*So the research office often will publicise research schemes which involve external partner or NGO partners and academics, that you can apply for. So, they're very good to publicise those types of funding schemes that might be available*" (P19). Lack of information about academic engagement opportunities and lack of financial supports are the major barriers that prevents industry to collaborate with academic researchers (Kleiner-Schaefer & Schaefer, 2022). Findings from my study thus support that provision of information on academic engagement opportunities will bridge the communication gap between researchers and industry or other non-academic external partners.

Formal incentives

To facilitate academic engagement among their academic researchers, higher education managers have introduced several incentives (Pinheiro et al., 2015) such as incentives relating to promotion or pay rises (Van de Burgwal et al., 2019). Such incentives provide researchers with opportunities that will promote researchers' willingness to participate in academic engagement. Findings from my study support this argument. For instance, according to an interviewee "*I believe that stakeholder engagement (collaboration with non-academic external partners) is a key driver of promotion within the academic sector. Personally, a major motivation for me is career advancement. Engaging with stakeholders (non-academic externally) is essential for achieving success in all aspects of my work*" (P12). However, scholars believe there are discrepancies between how the universities design these incentives and how academic researchers perceive them as helpful enough to motivate them to engage with external partners (Jong et al., 2015).

University managers foster researcher participation in external collaborations by implementing formal incentive systems within the institution. One such incentive is the flexibility to 'buy out' teaching hours using funds obtained from industry projects, as explained by an interviewee: "*there are systems and structures that allow us to participate in research. It's called "buying out our teaching hours" and it's directly related to the amount of funding available. So typically, if we do an industry project and it attracts an amount of funding, we can use that money to hire somebody else to do my teaching, basically. So that's the way the system works. It's a direct correlation between the amount of funding, sometimes it happens, sometimes it doesn't happen. Sometimes the funding just comes in and it can be used for equipment and different things. But, yes, you can use that funding to reduce your teaching hours basically*" (P7). This supports the notion that provision of incentives by university management will motivate researchers (Caldera & Debande, 2010; Lach & Schankerman, 2008; Van De Burgwal et al., 2019), as against incentives being counterproductive (Göktepe-Hulten & Mahagaonkar, 2010; Lahikainen et al., 2019). More importantly, my findings thus provide clarity on this ambiguity as it shows that indeed incentives are an extrinsic factor that will impact how researchers participate in academic engagement. This incentive structure not only supports researchers in dedicating more time to their external research projects but also underscores the direct benefits of securing industry funding, aligning financial resources with reduced teaching obligations to enhance research productivity and engagement.

5.3.3. Institutional Characteristics

Institutional characteristics constitute the deliberate actions taken by the government of Ireland to foster the promotion of knowledge interaction between academic researchers working in various higher educational institutions and other non-academic external partners. Hence, such institutional characteristics which my thesis will discuss in this sub-section based on interview data collected include disciplinary affiliation, public policy and regulations, and incentives from a system perspective.

Disciplinary Affiliation

Interviewees who participated in my study were affiliated to six disciplines including social sciences, physical sciences, life sciences, engineering, medicine, and humanities (see Appendix II). Extant literature suggests that researchers' disciplinary affiliation is another institutional characteristic that shapes how they collaborate with non-academic external partners (Perkmann et al., 2021; 2013). Some interviewees highlighted that their engagement is predominantly with NGOs and charity organizations, utilizing joint research as the primary method of collaboration. This preference stems from their disciplinary affiliations within the social sciences, which influence the nature of their external partnerships. One interviewee explained, *"I suppose that's because of my own discipline and being more social science oriented. I'm not working directly necessarily with commercial industry players*" (P19). This finding implies that researchers in the social sciences have a lower level of engagement with traditional industry partners than those in other fields. Consequently, the results of my study support previous research that asserts academic researchers in the social sciences engage less with traditional industry than their peers in the engineering field (Sigl & Leišytė, 2018).

My thesis also seeks to understand the reason behind variation in engagement across discipline. Previous studies have recorded that the way academic researchers interact with other non-academic external partners varies across countries, disciplines, and academic fields (De Jong & Balaban, 2022; Karlsdottir et al., 2023). Findings from my study thus show support that, indeed, variations in external engagement exist across disciplines and two reasons were found to be responsible for this. Firstly, my study found out the researchers in various disciplines engagement differently with external partners because of the need to gain societal visibility. According to an interviewee from social science field who engage predominantly with NGOs through advisory service channel said "*So when we're disseminating our research, sometimes it's hard to then disseminate to NGOs or policymakers or whoever it might be. So, if you're working in collaboration, that is quite beneficial because they're the people who've been involved in the research* "(P10). This supports the claim that academic researchers

from interdisciplinary research field engage with non-academic external partners to achieve societal visibility (D'Este & Robinson-García, 2023).

Secondly, the nature of research will also inform the pattern of engagement across discipline. For instance, an interviewee from social science field who engages mostly with NGOs and civil society organisations (CSOs) said "*I have less experience with industry per se and more with what we would call non-government bodies or CSOs only because that has been the nature of the research that I've engaged in, particularly in recent years*" (P17). This finding is in line with the claim that depending on the disciplinary affiliation of a researchers, the nature of research strongly influences their engagement with non-academic external partners (Perkmann et al., 2021), especially those in fields involved in fundamental research (Lawson et al., 2019). A similar insight was share by an interviewee from social science who said that her engagement with NGOs mostly was due to the nature of her research in the area of social inequalities. "*I've collaborated with outside partners, but maybe not so much industry but NGO. Recently I've started collaborating more with NGOs because I was doing a data collection on social inequality that are caused by AI artificial intelligence*" (P14). Interestingly, another interviewee from the disciplinary field of humanities stated that her reasons for engaging with NGOs mostly and not industry is because her research is within the area of evidence-based policymaking. "*So my work is around policy implications, so it's not developing technologies. It's more coming from trying to understand the impacts of various commercial factors and various laws, policies on access to technology. So for that reason, I suppose a lot of my work to date in terms of collaborations has been with charity partners. non-governmental organisations and also offering voluntary presentations*" (P19). Considering both instances, my study supports the claim based on a study on UK researchers that engagement with industry is not practised by academic researchers in hard disciplinary fields alone (Abreu & Grinevich, 2013; Hughes & Kitson, 2012).

Another interesting finding drawn from my study is how academic engagement has shifted the research agenda of researchers from basic sciences to the applied field although previous studies have argued on how this shift in research agenda is reflected across disciplinary boundaries (O'Dwyer et al., 2023; Olmos-Peñuela et al., 2014). Two interviewees shared their experiences on how their involvement academic engagement has shifted their research focus. "*my research, which might have been more theoretical at start, have become more applied now. So I would rather be at a place where I'm taking someone else's theory and applying on a problem rather than developing theory myself*" (P2). In another interview, a researchers express how her engagement activities has changed her research from knowledge-seeking to problem-solving for business consumers. "*I've evolved from someone who is very interested in understanding consumers and how businesses can do marketing better. My interest now is to know how can marketing help somehow in critical issues, address societal*

challenges, and enable and empower vulnerable people" (P17). These findings support the concern that involvement in academic engagement, particularly with industry partners, could shift the agendas of academic researchers towards applied research at the expense of long-term basic research (Perkmann et al., 2013). Based on these findings, my study contributes to knowledge by sharing the effect of disciplinary affiliation on the interaction with wider non-academic external partners such as NGOs, charity organisations. This contribution is significant as previous studies have been reported to focused on interaction with industry (Pekşen et al., 2021), hence potentially limiting our understanding of this phenomenon.

Public policy and regulation

In a bid to achieve economic growth, sustainable development and regional competitiveness, various governments have taken steps to strengthen its innovation actors within its innovation system. The realisation of such objective can become attainable when there is a concerted effort by government in implementing policies and regulatory initiatives that aim to promote inter-organisational collaboration, with provision of tax incentives for research, funding support for joint research, creation of science parks and innovation hubs as examples of such strategic measures (Bastos et al., 2021). Therefore, considering the importance of public policy and regulation in building and strengthening knowledge producers (university) and knowledge users (industry partners) in a country such as Ireland, my study therefore asked researchers to share their experiences about the influence of Irish government policy on their interaction with non-academic external partners. According to an interviewees experience, "*the Irish Government through Enterprise Ireland provides funding to the universities for creation of technology transfer offices and that funding directly impacts the services of their academic researchers to be more innovative and produce more intellectual property when they engage with industry*" (P8). This finding agrees with the suggestion that public policy plays a pivotal role for building interaction between innovation actors within an innovation ecosystem (Zheng & Cai, 2022).

Furthermore, information gathered from the interviews also points to the fact that Irish government have various schemes in place to encourage knowledge interaction. Such schemes which are backed by policies and regulations include the establishment of Enterprise Ireland and the introduction of Innovation vouchers which is a form of grant that the Irish government give to industry to support their research and development initiatives. An interviewee's experience in this regard is "*So I think there are some very good funding programmes in place in Ireland through Enterprise Ireland that actively encourage in industry engagement such as the innovation vouchers. I think the programmes*

are good, they're not overly bureaucratic, which is good. Also, the innovation vouchers are relatively easy for companies to get. They're not too onerous for academics and for the universities to access as well. So, they're a very good starting point for industry engagement, yeah" (P7). This finding supports the position that to transform universities in Europe towards attaining a status of sustainable entrepreneurial university, government needs to support its universities to build capacity (Cai & Ahmad, 2023). Therefore, I would say that initiatives that will promote inter-institutional partnerships are a step in the right direction for governments to take to achieve higher levels of performance within its innovation system.

My study also explores the negative implications of governments policies and regulation on engagement activities within Ireland. Gaining insight into this aspect is necessitated because previous studies have argued that government policies and regulations could significantly negatively impact the extent and nature of engagement between academic researchers and external partners (Amaral et al., 2011; Caloghirou et al., 2001). This study found out that some policies of Irish government restrict research into some areas considered to be harmful or insensitive to the wellbeing of the society. For instance, according to an interviewee, "*In Ireland, we don't interact in any research that could be harmful for human being or for the society. So, we try to avoid such research*" (P11). This finding provides insight into how institutional practices of government may have a complimentary or a detrimental effect on university collaborative research (Duiveman, 2020). While my study might have been able to provide some evidence for this claim, the extent and nature to which this impact on research needs further insight. For instance, previous knowledge of the literature has highlighted such areas of research mostly restricted to include genetically modified products, military/defence research, and tobacco research.

Incentives

My study also explores the kind of incentives provided by the policies of the Irish government which can support knowledge interaction between academic researchers and non-academic external partners. Previous studies have reported how governments incentives such as provision of research subsidies can informs researchers behaviour towards involving in knowledge interaction (Song et al., 2022; Zhuang & Shi, 2022). Interviewees provided various ways government of Ireland has supported research. An interview provided insight into how government has subsidized research in Ireland, "*there are Tax incentives, Capital gains tax, and other incentives to support start-up or spin out companies. All of those have an impact on engagement with industry*" (P8). This finding is consistent with the claim

that government's provision of social capital and tax incentives induces academic engagement (Rossoni et al., 2023).

Similarly, another interviewee gave account of how government has provided a conducive environment for research and also supported the establishment of Centres of Excellence in some Irish universities. "*Government attitude towards industry and multinational is very positive and I think that's reflected in research. The government wants universities to work with multinationals and industry and they promote it. The supporting structures would obviously be joint financing of collaborative projects with industry, so the state would partially and sometimes to a high percentage fund work carried out with companies. once state funding comes into a project, the company agrees that the technology is then owned by the university. Uh, which all companies are happy to do now but that was a problem originally. So funding is one area in terms of infrastructure. The state has certainly sought to establish centres of excellence in different areas, Life Sciences, Chemistry, Immunology, Quantum computing, ICT, and across a broad area. They've certainly sought to enhance centres of excellence in the country*" (P15). Government's provision of such incentives has been found to promote researchers' engagement in knowledge exchange with external actors (Atta-Owusu & Fitjar, 2023), however with this insight, my thesis contributes to existing knowledge by providing evidence on the impacts of Irish government incentives to support academic engagement.

5.4 Conclusion

The results from interviews conducted in this study provide insights into why and how academic researchers in various Irish universities engage with non-academic external collaborators. The study identifies several motivational factors for non-academic collaboration, including competence-building activities, access to funding, career benefits, reputation, networking, access to in-kind resources, contribution to society, affective duty, and academic freedom. Additionally, the mode of engagement is influenced by individual characteristics (such as gender, career stage, and prior experience), organizational factors (such as university type, peer effects, departmental quality, research policy and strategy, support structures, and formal incentives), and institutional factors (such as disciplinary affiliation, public policy and regulation, and incentives for inter-sectoral collaborations). Finally, the study reveals that individual Irish academic researchers' motivation types, be they intrinsic or extrinsic, influence choice of external partners by researchers and their collaboration channels with non-academic external partners.

CHAPTER SIX: CONCLUSION AND RECOMMENDATION

6.1 Introduction

This thesis seeks to answer the over-arching research question, "Why and how do academics engage with non-academic collaborators?" A fundamental research problem that inspires this study is that in recent years, there has been an increasing interest by government and research funding bodies on the need for increased societal impact of research, hence demanding more engagement between academic researchers and non-academic external partners. There is a perception that such demand could put more pressure on academic researchers, considering that such interactions are an additional responsibility, along with their research and teaching roles in the university. It is also assumed that academic engagement often comes with benefits and costs. Based on this research problem, this thesis explores the motivations for and modes of academic engagement among academic researchers working in higher education institutions in the Republic of Ireland. In this chapter, I present a summary of the key findings and contributions of this study, limitations, areas for further research, and recommendations. To provide structure and organization to this conclusion chapter, I will present the findings of this study based on the four research questions for the thesis, as interpreted in the thesis's theoretical framework (see Figure 3.2 in Chapter 3), which is built on Self-Determination Theory (SDT).

6.2 Summary of key findings and contributions

6.2.1 Motivation for engagement

This study reveals several factors that motivate Irish academic researchers to engage with non-academic external partners. These motivational factors reflect a combination of attributes that can be broadly categorised under extrinsic and intrinsic motivation (Deci & Ryan, 2008), showing whether the motivation is externally controlled or autonomously controlled (Ryan & Deci, 2020) respectively. This study reveals those extrinsic motivation to include access to funding, access to in-kind (non-financial) resources, career benefits & reputation. Competence-building, affective duty, networking, contribute to society, and desire for academic freedom were those intrinsic motivational factors revealed from the findings of this study.

Extrinsic motivation: This study reveals accessibility to research funding as one of the motivations Irish academic researchers engage with non-academic external partners, which is consistent with previous studies (Aagaard et al., 2021; Fink et al., 2020; Taxt, 2023). An interesting insight this study revealed is

that academic researchers' motivation for engaging in external activity is based on two factors – researchers' self-perception of the need for funding and pressure from external funders. In the first instance, Irish researchers' self-perception of the need for funding motivates them to willingly engage with non-academic external partners, as such interactions provide access to research funds. This finding is consistent with previous studies on collaboration (D'Este et al., 2013; Hooi & Wang, 2020; Ubfal & Maffioli, 2011; Perkmann et al., 2021). In the second instance, Irish academic researchers engage with non-academic external partners not perhaps willingly but due to pressure from external funders, though there was no evidence of unwillingness in the data from the interviewees. Further insights from this study reveal that funding agencies often require inclusion of external partners on projects as a precondition for researchers to succeed with grant applications. This study also reveals that employment contracts for Irish academic researchers require them to engage externally as part of their teaching responsibilities. Previous studies have shown such restrictive issues around research funding constitute pressure to researchers and a threat to their academic freedom (Gläser et al., 2022; Goduscheit, 2022; Kladakis et al., 2022; Zacharewicz et al., 2023), though this does not seem to be the case with the interviewees in this study.

Consistent with findings from previous research (Carattoli et al., 2017; D'Este & Perkmann, 2011), this thesis reveals that access to in-kind resources such as data, expertise, and equipment motivates Irish academic researchers to engage with non-academic external partners. This thesis contributes to the understanding of researcher motivations by challenging the claim that engagement with external collaborators is primarily driven by access to monetary benefits (Atta-Owusu & Fitjar, 2022; Zheng et al., 2023) Instead, my findings indicate that non-monetary resources play a significant role in this regard. This study reveals that the desire for career benefits and reputation is another motivation for engagement between Irish academics and non-academic external partners. Further exploration indicates that the desire to achieve recognition in their career motivates researchers to engage externally because such interaction offer researchers opportunity to contribute and make impact outside academia earning them more recognition. Previous studies have also indicated ambition to gain recognition and have an impact outside academia as a factor that motivates researchers to collaborate with non-academic external partners (Lam, 2011).

The desire to attain academic reputation was also another motive this study reveals: a factor identified to motivate researchers very strongly towards academic engagement because of its potential for career advancement (Rijnsoever & Hessels, 2021). This study also shows that the desire for promotion motivates Irish researchers to engage externally. Researchers involved in projects with non-academic partners often participate in research that leads to publications, which is a key metric for promotion in universities. This finding is consistent with previous studies (Dietz & Bozeman, 2005; Siegel et al.,

2004). This study reveals another motivational factor, the interest to contribute to evidence-based policing making, which is an indicator of productivity significant for career advancement and reputational benefits. Clauss et al. (2022) argues that ability to contribute to impactful policy decisions can significantly drive researchers' willingness to interact with non-academic external partners.

Intrinsic motivation: This study reveals several intrinsic factors that can facilitate competence-building as another motivator for Irish academic researchers to collaborate with external partners. The reasoning for this is that Irish researchers are motivated to engage with partners outside of academia with the expectation that doing so will build their research capacity to be more competent researchers. Previous studies also identify the desire for knowledge generation, idea testing, technology development, and problem-solving as intrinsic motivations for researchers' interest in academic engagement, as these activities build researchers' competence (Perkmann & Walsh, 2009). Findings from this study identify that Irish researchers who have the motive for knowledge generation show interest in academic engagement. Researchers gave the reason that such external interaction with their non-academic partners offers them the opportunity to explore new lines of research and generate interesting research questions. Previous studies have also shared this same argument which this thesis has found support for as well (Tartari & Breschi, 2012; Orazbayeva et al., 2020; Orazbayeva & Plewa, 2022).

This study's finding also shows that the desire to solve industry problem is another motive for Irish researchers' collaboration with non-academic partners. The reasoning given for this motive is that academic engagement offers the opportunity to get a deeper understanding of problems that the non-academic external partner is facing, which makes researcher better informed to solve such problems. Previous studies also suggests that the interest to solve industry problems motivates researchers to involve in academic engagement (Bodas Freitas et al., 2013; D'Este et al., 2018; Figueiredo & Ferreira, 2022; Perkmann et al., 2013). Furthermore, this study also reveals another motive which is the desire to apply knowledge or test an idea. Researchers interviewed explained that involving non-academic partner, such as industry, in research projects offers the opportunity to test the applicability of their research ideas within a real-world context. Previous studies also support this reasoning (Austin et al., 2021; D'Este & Perkmann, 2011; Zhang et al., 2017). The findings from this study also reveal that the desire to be more innovative is another motivation for Irish academic researchers' interaction with external partners. The reasoning given is that such interactions provide researchers with a platform for new ways of thinking allowing them to develop new technologies for various applications. This, in turn, leads to the creation of several patents and licenses. Previous studies also argues that satisfaction of researchers' intrinsic desire motivates them to engage with non-academic external partners (Lam, 2011; Orazbayeva & Plewa, 2022; Sormani & Rossano-Rivero, 2023) This thesis makes a significant

contribution by demonstrating that academic engagement does not hinder research and innovation (Collyer, 2015) but that instead, it is advantageous to research (Bhullar et al., 2019; D'Este & Perkmann, 2011; O'Dwyer et al., 2023).

This study reveals that the desire to build networks and public engagement which is same as "relatedness" in the theoretical framework for this thesis, is another motivation for Irish academics to engage with external collaborators. The reason given is that interaction with non-academic external partners offers researchers the opportunity to make new contacts or sustain existing ones, which might be useful for securing external collaborative projects in the future. This thesis makes a significant contribution by showing support to the claim that relatedness positively influences researchers' involvement in academic engagement (Orazbayeva et al., 2021), contrary to the perception in some studies (Queirós et al., 2022). Finding from this study identify interest for affective duty as another intrinsic motivator for researchers' engagement with non-academic external collaborators. As noted in this study, Irish academics motive for engaging with non-academic collaborators is partially because they want to secure placement or internship for their PhD students, a finding that is consistent with some earlier studies (Lee & Miozzo, 2015) Another motive identified was the intent to enhance teaching. Academic engagement offers Irish researchers the opportunity to invite external practitioners to share practical and recent knowledge from a real-world perspective with their students. In essence, over time, researchers have built strong relationships with external partners outside academia through their involvement in academic engagement, making it easier to secure invited talks from practitioners. This finding is supported by previous studies (Butcher & Jeffrey, 2007; Wang et al., 2016).

This study reveals that the desire to contribute to society is another motive for Irish researchers to engage with external collaborators. The reasoning behind this is that academic engagement provides opportunities to for researchers to collaborate with external partners particularly in areas that can solve societal problems, improve lives, and have a real-life impact. Previous studies suggest that researchers are motivated to engage with non-academic external partners due to their prosocial intent (Atta-Owusu & Fitjar, 2022). This study also reveals that the perceived need for autonomy, which can be partially equated to academic freedom, is another motive for researchers to engage externally. Previous studies have argued that perceived autonomy motivates researchers' willingness for (Clauss et al., 2022; Orazbayeva et al., 2021), or determines their behaviour towards (Moraes et al., 2023), academic engagement. More findings on academic freedom are discussed in section 6.2.4 of this thesis chapter.

6.2.2 Mode of engagement.

This study reveals several channels through which Irish academic researchers engage with non-academic external partners and these include Joint research, contract research, consultancy, patent, advisory services, Joint thesis supervision, Invited lectures/talks, and global citizenship education through public lectures. This finding is consistent with academic engagement channels identified in previous studies (D'Este et al., 2019; Dutrénit & Arza, 2010; Perkmann et al., 2021).

Exploring the type of external partners Irish researchers engage with, this study reveals them to industry partner, NGOs, charity organisations, government agencies, and civil society organisations. Berggren & Bjørnskov (2022) identifies these partners as "external actors" who operate outside the university. Gläser et al. (2022) and Berggren & Bjørnskov (2022) emphasise that the level of influence that these external actors exhibit on researchers' academic freedom can determine how they will be willing to pursue academic engagement. This thesis makes a significant contribution to knowledge by providing insights into researchers' interactions with a broader range of external partners, an area that previous studies have identified as underexplored and in need of further research (Marzocchi et al., 2023; Noke et al., 2024; Taxt, 2023) While previous studies have mostly focused on industry partners (Ankrah et al., 2013; Bekkers & Freitas, 2008), this research expands the scope to include other external stakeholders.

6.2.3 Impact of individual, organisational and institutional factors

Previous literature suggests a combination of factors - individual factors, organisational and institutional, that impact on how academic researchers engage with non-academic external partners (Perkmann et al., 2021) Consequently, this study explores these three factors based on experiences from Irish researchers within the sample.

Individual factors: This study reveals that researchers' gender influences the types of external partners they interact with and the modes of engagement they use. The finding from this study on Irish researchers found support for this claim as unlike their male counterparts who engage with industry, female participants engage more with NGOs, charity organisations, and civil society organisations, hence supporting the claim that male academic researchers to engage more with industry partners as found in among researchers in Italy (Abramo & D'Angelo, 2022), and in the UK (Abreu & Grinevich, 2017). Further analysis shows that the desire to influence policy making and practices explains why female researchers prefers to engage with these non-traditional industry partners. Concerning mode of engagement, this study reveals that male researchers engage more in joint research versus claims

in a previous study that male researchers engage more through contract research and consultancy services (Abreu & Grinevich, 2017). This study reveals that female researchers prefer to engage with non-academic partners through channels such as public engagement, meetings, and informal advice. Time and resource constraints are reasons given for this disparity in gender participation (Tartari & Salter, 2015). My study did not find support for equal participation in informal engagement as claimed in a recent study (Ramos-Vielba & D'Este, 2023).

This study explored how career stage of researchers influence type of partner and mode of engagement. The findings shows that Irish researchers at their late stage of their career have more intensity of engagement working with industry partners, which confirms findings from previous study conducted on Italian researchers. (Abramo & D'Angelo, 2022). Irish researchers with previous experiences in patenting and other commercialisation activities with industry partners develop more interest to engage with industry partner in future, a finding that is in line with previous studies (Bekkers & Bodas Freitas, 2008; Scandura & Iammarino, 2022).

By exploring organisational factors that influence academic engagement, this study records several insights. On the basis of the university type that a researcher is affiliated with, this study reveals that unlike researchers working in technological universities, researchers in traditional universities are involved more in academic engagement. The reasoning for this disparity is that researchers in technological universities are required to spend more time on teaching as part of their teaching contracts. This finding contradicts earlier studies that researchers in technical universities were more active in academic engagement than their peers in traditional universities who are teaching-oriented (Perkmann et al., 2011; Schneijderberg et al., 2022), though this result is perhaps an artefact of the way that the traditional and technological universities are set up in Ireland.

This study also reveals that peer effect impacts researcher engagement with non-academic external partners. I find that Irish researchers tend to get mentorship assistance from more experienced senior peers in their research group or department. Previous studies also assert the influence on peer effect on external engagement (Houweling & Wolff, 2020; Huyghe & Knockaert, 2015; Moog et al., 2015). The findings also reveal that Irish researchers in departments with researchers who have extensive industry experience engage more with external partners. A prior study asserts that departments with high-quality researchers may likely facilitate interest in academic engagement for other researchers in that department (Scheulke-Leech, 2013) and the data from this research supports this assertion. The reasoning behind this is that researchers of higher quality tend to attract more research funding and collaborative projects from external partners. This is because they have built extensive networks over the years through their engagement throughout their academic career.

The study also reveals the role of university research policy and strategy in determining the existence of academic engagement with non-academic partners. Insight from this study indicate that a university that has fair policy on intellectual property in place encourages researchers to engage with industry practitioners. The reasoning behind such policies is that they are equitable in addressing issues related to royalties and equity of commercial outputs, such as patents, which often become areas of conflict in external engagement as identified in previous studies (Atta-Owusu & Fitjar, 2022). Findings from this study indicate that Irish universities that provide supportive structures such as TTOs. Knowledge Transfer Offices and industry liaison offices stimulate Irish researchers to engage more with non-academic external partners and this is particularly the case for engagement with industry partners. The reasoning given is that these support structures are helpful to support researchers in preparing funding proposals and create awareness on open calls for grant submissions. Such supportive structures have been found to encourage participation in academic engagement (Taxt, 2023).

In terms of institutional factors, this study reveals that researchers in the social sciences have a lower level of engagement with industry partners than those in other fields. Researchers in social science field engage mostly with NGOs and civil society organisations. Consequently, the outcomes of my study support previous research that asserts academic researchers in the social sciences engage less with industry than their peers in the engineering field (Sigl & Leišytė, 2018). This study finds two reasons for these variations. Firstly, the need to gain societal visibility, consistent with previous studies (D'Este & Robinson-García, 2023), is important for these researchers and secondly, the nature of the research pursued (Perkmann et al., 2021) is more focussed on non-industry stakeholders.

Irish government policy and regulations provide a conducive innovation-oriented ecosystem that positively influences Irish academics researchers to engage with non-academic partners. Some of those policy-led supports and incentives include establishment of Enterprise Ireland which among other things provide access to innovation vouchers, establishment of centres of excellence in some Irish universities, provision of tax incentives, capital gains tax, and other incentives to support start-up/ spin out companies. Previous studies show that public policy plays a pivotal role in building interaction between innovation actors within an innovation ecosystem (Cai & Ahmad, 2023; Zheng & Cai, 2022) This thesis extends our knowledge of academic researchers' behaviour in engaging with non-academic external collaborators. The theoretical framework adapted from the previous works of Clauss et al., (2022), which relies on self-determination theory, was limited to individual factors only. This thesis includes all three factors - individual, organisational, and organisational- hence providing a more comprehensive understanding of how these three factors influence academic researchers' behaviour in engaging with non-academic external partners.

6.2.4 Role of academic freedom

Findings from this study indicate that Irish academic researchers are satisfied with the academic landscape in Ireland. This satisfaction stems from the supportive environment provided by the Universities Act and the HEA Act, which protect researchers' academic freedom. Previous studies have also rated Ireland's Academic Freedom Index (AFI) score as positive especially in relation to higher education (Berggren & Bjørnskov, 2022a; Kinzelbach, Saliba, & Spannagel, 2021; Kinzelbach et al., 2021; Maassen et al., 2023; Sandström & Besselaar, 2018).

In terms of freedom to decide on the choice of external partner to collaborate with, findings from this study reveals that Irish researchers have autonomy over the partner they engage with. Previous studies assert that researchers would be less interested in academic engagement projects that will thwart their academic freedom, especially for those researchers that are intrinsically motivated because they are more strategic in the kind of engagement projects they get involved in or partners they select (Deci et al., 1999) This thesis thus supports that perceived autonomy indeed has a positive influence on researchers' willingness to engage with external collaborators (Clauss et al., 2022).

In terms of freedom to decide on research topics, a key finding from this study is that Irish government policy places restrictions on certain areas, such as tobacco-related research and some aspects of medicine and health science. The reasoning behind such restrictive policies is to prevent unethical practices among researchers involved in collaborative projects with certain industry partners, such as the tobacco industry, which could pose harm or incentives detrimental to societal well-being. This finding is consistent with those of earlier studies (Duiveman, 2020; Fink et al. 2023). This study also reveals that Irish government legislation restricts development of technology or collaboration with industries when the results might have dual uses such as in the field of medicine. Previous studies have also argued such regulations could negatively impact on the researcher's independence to pursue fundamental research (Rijnsoever & Hessels, 2021), and academic researchers' ability to promote research reproducibility and integrity (Davis et al., 2011; Jasny et al., 2017).

Findings from this study show that Irish academic researchers have the freedom to disseminate research findings without restrictions from external partners. Researchers indicated that they could choose not to engage in projects with external partners if such interactions would hinder their academic freedom to share their research results with the wider public. Previous studies have also argued that individual researchers should have the volition to choose which engagement activities they want to participate in and the extent to which they wish to partake in such tasks (Cerasoli et al., 2016).

In conclusion, this thesis establishes that the motivation for and mode of engagement between academic researchers and non-academic external partners are influenced by a blend of intrinsic and extrinsic factors, deeply intertwined with individual, organisational and policy-related institutional elements. This thesis thus suggests the need for a tailored strategies that considers these diverse motivations and contextual dynamics to optimize the interaction between researchers and non-academic external partners within Ireland's innovation ecosystem. Lastly, this study is not without any limitations, and as a result, the next section suggests areas for consideration in further research studies. By addressing these limitations and exploring these areas for further research, future studies can deepen our understanding of academic engagement with non-academic partners and contribute to advancement of theory, more effective policies, and practices.

6.3 Limitations and Future Research

One of the limitations of this study is related to the type of university the Irish academic researchers who participated in this study are affiliated with. My study could not clarify if academic researchers from private institutions engage less with industry, as Queirós et al., (2022) suggested. All academic researchers that participated in my study were affiliated with publicly funded universities in Ireland. Future studies may want to fill this research gap to provide more comprehensive evidence. Private institutions in Ireland typically do not have a research mandate and focus mainly on teaching of social science subjects such as business. This is a marked contrast to the USA, for example, where full private universities exist.

Another limitation concerns the peer effect. While previous studies claim that peer influence may encourage younger researchers to create more spinoffs due to mentorship from senior colleagues (Houweling & Wolff, 2020; Moog et al., 2015), my study could not substantiate this claim due to the small number of participants with spinoff experience. Further research with a larger sample size and focusing on spinoff experiences could provide more insights into the peer effect on younger researchers.

The impact of public policy on the freedom to research is another area that warrants further investigation. This study found that specific Irish government policies restrict research in areas deemed harmful or insensitive to societal well-being. Such policies can have either a complementary or detrimental effect on university collaborative research (Duiveman, 2020). While my study provided some evidence for this claim, the extent and nature of this impact require further exploration. Previous literature has highlighted that restricted research areas often include genetically modified products, military/defence research, and tobacco research (Legro, 2011; Smith & Walsh, 2023; Varma &

Sabharwal, 2018). Future studies should investigate how such policies shape research directions and collaborations across broader external partners in those particular industries. Given Ireland's neutrality and lack of manufacturers of tobacco, there is perhaps a smaller likelihood of these industries being part of the range of organisations that Irish researchers may engage with.

Findings from this study are primarily based on experiences from a limited set of researchers from specific disciplinary fields, with engineering and medicine not well represented. Hence, the results from this thesis are not generalizable since researchers from all disciplinary fields or private universities were not covered. Additionally, only nineteen researchers participated in this study, limiting the sample size and diversity. Nineteen interviews did provide a set of rich data and theoretical saturation was reached. However more interviews with a more diverse set of researchers could have yielded other results.

Another limitation is that this study captures motivations at a particular point in time, but researchers' motivations for engaging with non-academic partners may evolve due to changing academic, industry, and policy environments, which is beyond the scope of this study. Consequent to this limitation, several potential areas are worth exploring in future research are based on these limitations. Future studies could investigate similar motivations in different cultural or national contexts to understand how a country's policies, academic practices, culture, or industry structures influence academic engagement. It would also be insightful for future studies to conduct longitudinal research into how motivations and engagement strategies evolve and respond to dynamics within research environments.

Additionally, larger-scale surveys could provide a more representative picture of the situation in Ireland and other European countries for comparison. Future research could explore how motivations vary across different academic disciplines, particularly engineering and medicine, which this study did not cover well. Following researchers over their career paths is very interesting to improve our understanding of factors influencing why and how researchers start with academic engagement in the first place and how their engagement develops over their careers.

6.4 Recommendations

Based on insight gathered from this study, some vital recommendations are suggested to the major stakeholders in external engagement in Ireland. These recommendations are:

6.4.1 Recommendations to University Managers

My study with academic researchers in Ireland highlighted several areas where university managers can make significant improvements to enhance academic engagement and collaboration with external partners. Addressing these issues will facilitate better research outcomes and strengthen the university's position as a collaborative and supportive institution.

Firstly, it is crucial to streamline the internal bureaucratic processes within the university. Participants indicated that delays and lack of responsiveness from the business development office significantly hindered their ability to secure and maintain trust with potential industry partners. An example cited involved a one-month delay in response from the business development office, which resulted in lost opportunities and diminished trust with a European company. Implementing more efficient communication channels and ensuring prompt responses to researchers' inquiries and potential collaborations can mitigate these issues.

Secondly, the study revealed substantial administrative burdens that complicate the execution of research projects. Researchers noted that excessive administration, often exacerbated by how the university interacts with funding programs, diverts time and energy away from the core research activities. Simplifying administrative procedures and providing dedicated administrative support for researchers involved in externally funded projects can alleviate these burdens and enable researchers to focus more on their primary research tasks.

Thirdly, there is a notable lack of adequate support from university managers despite encouraging industry engagement. While engagement with industry is part of key performance indicators, the necessary systems and support structures to facilitate this engagement seem not to be entirely in place. It is recommended that university managers invest in developing robust support systems and an infrastructure that can effectively facilitate industry collaborations. This includes addressing deficiencies in current systems and creating an environment where researchers feel adequately supported in their external engagements.

Furthermore, the issue of inadequate time allocation for research within academic contracts was frequently mentioned, though this was mainly noted in the interviews with those from the technological universities. Researchers face significant time constraints, balancing teaching, administration, and research responsibilities. Revisiting academic contracts to ensure sufficient time is allocated for research and external engagement activities can help alleviate this barrier, though it is acknowledged that government has a part of play in the writing and negotiation of contracts in public institutions. Providing flexible scheduling options or reducing non-research-related responsibilities during critical project phases could also be beneficial.

Additionally, concerns were raised regarding the fear of intellectual property (IP) loss and the implications of General Data Protection Regulation (GDPR) and ethics. Researchers are apprehensive about potential IP theft when engaging with industry and the stringent regulations around GDPR when working with specific demographics, such as minors. Developing clear guidelines and support for managing IP and navigating GDPR and ethical considerations can build researchers' confidence in engaging with external partners without fearing legal repercussions or IP loss.

Limited financial resources for travel and the difficulty in finding suitable industry partners were also highlighted. Providing more funding opportunities for travel and collaboration and establishing dedicated units or platforms to assist researchers in finding and connecting with potential industry partners can address these challenges. Facilitating networking events and partnerships can also expand researchers' international engagement opportunities.

Another issue was the difficulty in hiring research support staff due to the competitive job market. To attract talented researchers, universities could consider offering competitive salaries, benefits, and career development opportunities that make academic positions more appealing than industry roles. Power asymmetries between partners were identified as a potential source of collaboration conflict. Establishing clear partnership guidelines and fostering equitable relationships can help mitigate these issues, ensuring all parties feel valued and fairly treated.

Lastly, the study highlighted the need for the university to commit more resources, including funding and access to facilities and equipment, to support researchers' collaborative efforts. Ensuring that researchers have the necessary resources and institutional backing will significantly enhance their ability to engage effectively with external partners.

In summary, addressing these identified issues through strategic policy changes, enhanced support systems, streamlined administrative processes, and adequate resource allocation will foster a more supportive and efficient environment for academic engagement and collaboration with external partners.

6.4.2 Recommendations to Industry

Based on the findings from this study, several key recommendations can be made to industry practitioners to enhance collaboration and mutual benefits with academic researchers. A significant barrier identified is the reluctance of industry partners to genuinely engage unless there is a clear monetary or government-driven incentive. To foster more productive collaborations, industry practitioners should broaden their perspectives on the benefits of academic engagement. By

recognizing the long-term value of research, such as innovation, improved processes, and potential future profits, industry partners can appreciate the advantages beyond immediate financial returns. Creating joint initiatives with academic institutions that align with research goals and industry needs can also lead to more sustainable and mutually beneficial collaborations.

Researchers highlighted that strict collaboration requirements can be a significant obstacle, especially with larger multinational companies. Industry practitioners should consider adopting more flexible and open collaboration frameworks that allow more fluid interaction with academic researchers. This flexibility can help accommodate the varying needs and processes of academic research, enhancing collaborative projects' effectiveness and outcomes. The study revealed that the workload and time required for industry collaboration can negatively impact researchers' ability to publish and progress in their academic careers. Industry partners should be aware of these constraints and work towards creating collaborative frameworks that minimize administrative burdens and streamline processes. For instance, simplifying reporting requirements and being considerate of academic timelines can help alleviate some of the pressure on researchers.

Collaborations with industry often come with confidentiality agreements that can limit researchers' ability to publish their findings. Industry practitioners must balance protecting proprietary information and allowing academic researchers to publish their work. Establishing clear guidelines at the outset of the partnership regarding what can be published and when can help manage expectations and promote transparency. High expectations from industry partners regarding the speed and comprehensiveness of research results can strain collaborations. Industry practitioners need to set realistic timelines and expectations for research outcomes. Understanding the academic research process and its inherent complexities can lead to more reasonable demands and a more collaborative approach. Time delays and the busy schedules of industry partners can hinder effective collaboration. Industry practitioners should ensure timely communication and allocate dedicated resources to manage collaborative projects. This commitment can improve the responsiveness and overall efficiency of the partnership. Furthermore, limited financial resources and resource constraints can impede the success of collaborative projects. Industry practitioners must honour their financial commitments and allocate adequate resources to support the research. This support is crucial for maintaining trust and ensuring the smooth progression of the projects.

6.4.3 Recommendations to non-industry partners

This thesis reveals that one of the main challenges that researchers face is identifying which NGOs or charity organisations might be interested in collaborating. NGOs and charity organisations can address

this by being more proactive in their outreach to academic institutions. Creating clear, accessible information about their interests and research priorities on their websites and through networking events can help researchers easily identify potential partners. In summary, by implementing these recommendations, industry practitioners and NGOs/charity organisations can enhance their collaborations with academic researchers, leading to more successful and impactful research outcomes.

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Appendix I. Interview Guide

Interview Guide: Questions for academic researchers

M.Litt Thesis Research Question: *Why and how do academics engage with non-academic collaborators*?

Aim of the Interview: These interview questions are designed to elicit detailed responses, providing insights into the researchers' experiences, understanding of academic engagement channel/mode, motivations, barriers, and the contextual factors influencing their interaction with the industry partners.

1. Tell me about your experience in collaborating with industry.
    a. Please, share with me the different types of engagement (e.g *Academic Consulting, Contract Research, Joint Research,* etc) you have participated in.
    b. Aside from the Industry, could you tell me more about your engagement with other non-academic external partners (such as *government agencies, NGOs, charity organisations and donor agencies, e.g., EU*) you have previously worked with?

2. What motivates you to work with the industry or other external partners? why do this motivational factor matters to you?
    a. Could you tell me how *industry funding* and *access to other non-financial resources* shape your willingness to engage with industry?
    b. How has your engagement with industry impacted on your academic career (such as in teaching, research)?

3. How has your *university's research policy* and the *Irish government's public policy/ regulations* influence your engagement with industry partner (or other external partners)?

4. Please could you share with me, problems you had encountered during your engagement with the industry or other external partners in your past engagements?
    a. Whether you feel free to choose your own industry partners.
    b. How are decisions pertaining to the choice of project topic, methods, or the research output, made?
    c. How would you describe your freedom to disseminate your research results (e.g., publication in academic journals, presentation in conferences, seminars, policy-brief documents)?
    d. How did you manage conflict-of-interest issues, if they arose, with the industry arising from your work with them?
    e. Aside from the above (a-d) issues, what other problems did you encounter in your past engagement with industry partners and how did you manage them?

5. How would you describe your level of satisfaction working with Industry or other external partners? Could you tell me areas that should be improved upon in a collaboration to enable more participation from academic researchers in the future?

6. Is there anything else that you would like to tell me about collaborations with industry.

Thank you for your time.

Appendix II. Comprehensive information on participants' (interviewee) profile

ID	University type	Discipline	Gender	Career Stage	Partner Engaged with	Engagement mode
P1	Traditional	**Social Sciences**	F	Mid-Career	Nonprofits and charities.	Joint research
P2	Traditional	**Social Sciences**	M	Early-Career	Industry mainly: NGOs and Government Agencies	Invited lectures; Contract research;
P3	Traditional	**Social Sciences**	F	Early-Career	Industry; government agencies (Irish city councils, Irish Tourism Association)	Joint research
P4	Traditional	**Physical Sciences**	M	Late-Career	Industry	Contract research
P5	Technological	**Physical Sciences**	M	Late-Career	Industry	Consultancy mainly; Contract research, Spin-out, Patent, Licensing
P6	Traditional	**Social Sciences**	M	Early-Career	Industry	Joint research
P7	Technological	**Engineering**	M	Mid-Career	1. Industry mainly; 2. partially with charity organisations (student projects)	Joint research; Consultancy
P8	Traditional	**Medicine**	M	Late-Career	industry	Consultancy; Joint research
P9	Technological	**Social Sciences**	M	Mid-Career	Industry	Joint research
P10	Traditional	**Social Sciences**	F	Early-Career	NGOs	Global citizenship education; Advisory services
P11	Traditional	**Physical Sciences**	M	Early-Career	Industry; Government agencies	Joint research; Consulting
P12	Traditional	**Medicine**	F	Mid-Career	Industry; Charity Organisations	Joint research
P13	Traditional	**Physical Sciences**	M	Mid-Career	Industry	1. Joint research; 2. Invited talks 3. Joint thesis supervision
P14	Traditional	**Social Sciences**	F	Mid-Career	NGOs	Joint research
P15	Traditional	**Life Sciences**	M	Late-Career	Industry	Joint research; Contract research; Consulting
P16	Technological	**Social Sciences**	M	Late-Career	Industry; State Agencies	Contract research; Joint research
P17	Traditional	**Social Sciences**	F	Late-Career	NGOs; CSOs	Joint research
P18	Technological	**Life Sciences**	F	Early-Career	Industry	Joint research
P19	Traditional	**Humanities**	F	Late-Career	NGOs; Charity orgs	Joint research

Appendix III. The Code Book

This code book provides description of each code used in the thematic analysis of interview data collected in the study on academics' external engagement activities.

Classification	Name	Description
Primary Theme	**Rationale academics engage with non-academic collaborators**	**This refers to the underlying reasons as to why academics engage (or not engage) with non-academic**
Sub-themes	Competence-building activities	To seek information on industry problem & research, get feedback from industry, applicability of research, test feasibility and practical application of research, explore new lines of research and to satisfy intellectual curiosity.
	Access to funding	Generate fund and grants for research. Sometimes motivated or pressured by university/colleagues/society
	Career benefits & reputation	To achieve academic reputation, status, recognition, promotion, visibility
	Networking	Build and expand personal or professional network (Enhance researchers' relatedness and connections)
	Access to in-kind resources	Access to materials, research expertise, equipment
	Contribute to society	Desire to benefit other people/ satisfaction from the application of research in society
	Affective duty	Motivate and teach students better, secure jobs and training for students, invited talks from industry experts, co-supervise student project
	Academic Freedom	Be independent and possess autonomy to make decisions about own research agenda
Primary Theme	**Pattern of engagement between academics and non-academic collaborators**	**Refers to how academics interaction with non-academic external partners happens over time**.
Sub-themes	Disciplinary field	Engagement pattern based on discipline that academics belongs
	University type	Engagement pattern based on the type of university academics belong
	Gender	How academics engage based on their gender classification
	Career stage	Pattern of engagement based on academics' stage of career
	Engagement mode	Interaction mode mostly used for engaging with external collaborators

Appendix IV. Ethical approval letter

MAYNOOTH UNIVERSITY RESEARCH ETHICS COMMITTEE
MAYNOOTH UNIVERSITY,
MAYNOOTH, CO. KILDARE, IRELAND

Maynooth University
National University of Ireland Maynooth

Dr Carol Barrett
Secretary to Maynooth University Research Ethics Committee

21 December 2023

Utieyineshola Adeleke Yusuff
School of Business
Maynooth University

Re: Application for ethical approval for a Project entitled: Examining engagement by academics with industry in the Republic of Ireland

Dear Utieyineshola,

The above project has been evaluated under Tier 2 process, expedited review and we would like to inform you that ethical approval has been granted.

Any deviations from the project details submitted to the ethics committee will require further evaluation. This ethical approval will expire on 30/06/2024.

Please note: all projects now require an end of project report which is attached. Please complete and upload the end of project report to your RIS ethics record after the project end date.

Kind Regards,

Dr Carol Barrett
Secretary,
Maynooth University Research Ethics Committee

c.c. Prof Joseph Coughlan and Dr Bastian Rake, School of Business

Reference Number
SRESC-2023-37645

Appendix V. Interviewee consent form

Page 1

CONSENT FORM FOR RESEARCH PARTICIPANTS

I..... agree to participate in Utieyineshola A. Yusuff's research study titled *"**Examining engagement by academics with industry in the Republic of Ireland**"*.

Please tick each statement below:

The purpose and nature of the study has been explained to me verbally & in writing. I've been able to ask questions, which were answered satisfactorily. ☐

I am participating voluntarily. ☐

I give permission for my interview with Utieyineshola A. Yusuff to be audio-recorded. ☐

I understand that I can withdraw from the study, without repercussions, at any time, whether that is before it starts or while I am participating. ☐

I understand that anonymity will be used in how my data will be collected and analysed in the thesis write-up for confidentiality. ☐

I understand the limits of confidentiality as described in the information sheet. ☐

I agree to quotation/publication of extracts from my interview. ☐

I do not agree for my data to be used for further research projects. ☐

Signed..... Date.....

Participant Name in block capitals .....

Appendix V. Interviewee consent form

Page 2

I the undersigned have taken the time to fully explain to the above participant the nature and purpose of this study in a manner that they could understand. I have explained the risks involved as well as the possible benefits. I have invited them to ask questions on any aspect of the study that concerned them.

Signed..... Date.....

Researcher Name in block capitals ..... UTIEYINESHOLA A. YUSUFF

If during your participation in this study you feel the information and guidelines that you were given have been neglected or disregarded in any way, or if you are unhappy about the process, please contact the Secretary of the Maynooth University Ethics Committee at research.ethics@mu.ie or +353 (0)1 708 6019. Please be assured that your concerns will be dealt with in a sensitive manner.

For your information the Data Controller for this research project is Maynooth University, Maynooth, Co. Kildare. The Data Protection office is located in Room 27, Rye Building, North Campus, Maynooth University, which can be contacted at dataprotection@mu.ie. Maynooth University Data Privacy policies can be found at https://www.maynoothuniversity.ie/data-protection.

Two copies to be made: 1 for participant, 1 for PI

Appendix VI. Interviewee Information sheet

Page 1

INFORMATION AND CONSENT FORM FOR RESEARCH PARTICIPANTS

Purpose of the Study

I'm Utieyineshola Adeleke Yusuff, a Masters Student in the School of Business at Maynooth University.

As part of the requirements for my M.Litt, I am undertaking a research study under the supervision of Prof Joseph Coughlan and Dr Bastian Rake of Maynooth University.

The study is concerned with academic engagement. Specifically, I am investigating "how" and "why" academic researchers engage with non-academic external partners.

What will the study involve?

The study will involve participation of academic researchers from selected Irish universities who have been involved in working with external partners on some research/service projects over the last number of years. This study intends to gain insight into the way academic researchers engage, their motivation for engaging, barriers encountered, and their overall experiences during their external engagements. In essence, the plan of this study is to conduct a one-time interview with each of the 20 participants, which is scheduled to last between 30-40 minutes.

Who has approved this study?

This study has been reviewed and received ethical approval from Maynooth University Research Ethics committee. You may have a copy of this approval if you request it.

Why have you been asked to take part?

You have been asked to take part in this study mainly because you have engaged with non-academic partners in the past and that you met other inclusion criteria for this study. As a result of this, interviewing you will enable me collect insightful and quality information that will be useful in addressing objectives of my thesis.

Appendix VI. Interviewee Information sheet

Page 2

Do you have to take part?

No, you are under no obligation whatsoever to take part in this research. However, we hope that you will agree to take part and give us some of your time to participate in an interview with the researcher. It is entirely up to you to decide whether or not you would like to take part.

If you decide to do so, you will be asked to sign a consent form and given a copy and the information sheet for your own records. If you decide to take part, you are still free to withdraw at any time without giving a reason and/or to withdraw your information up until such time as the research findings are published with the final thesis which will be submitted upon the study's completion. A decision to withdraw at any time, or a decision not to take part, will not affect your relationships with Maynooth University in any way whatsoever.

What information will be collected?

As a participant to be interviewed in this study, I have prepared a set of semi-structured questions to collect information from you. These questions are focused on gaining insight into your past collaboration activities with industry or other non-academic partners. Specifically, I will be asking you questions pertaining to mode/channel of engagement, motivations, and barriers, and how contextual factors influence your interaction.

Will your participation in the study be kept confidential?

Yes, all information that is collected about you during the course of the research will be kept strictly confidential. No names will be identified at any time. The identity of the academic researchers taking part will also be anonymised, with the only descriptive information disclosed being that they will be affiliated to an academic institution.

All hard copy information will be held in a locked cabinet at the researchers' place of work (School of Business, Maynooth University), electronic information will be encrypted and held securely on a MU PC or servers and will be accessed only by the researcher, Utieyineshola Yusuff, and the research supervisors, Prof Joseph Coughlan, and Dr Bastian Rake.

No information will be distributed to any other unauthorised individual or third party. If you so wish, the data that you provide can also be made available to you at your own discretion.

Please also note the following:

It must be recognised that, in some circumstances, confidentiality of research data and records may be overridden by courts in the event of litigation or in the course of investigation by lawful

Appendix VI. Interviewee Information sheet

Page 3

authority. In such circumstances the University will take all reasonable steps within law to ensure that confidentiality is maintained to the greatest possible extent.

What will happen to the information which you give?

All the information you provide will be kept at Maynooth University in such a way that it will not be possible to identify you. On completion of the research, the data will be retained on the MU server. After ten years, all data will be destroyed by my supervisor, Prof Joseph Coughlan. Manual data will be shredded confidentially, and electronic data will be reformatted or overwritten by Prof Joseph Coughlan.

What will happen to the results?

The research will be written up and presented as a final thesis for submission for consideration for a M.Litt Degree. Further outputs may include individual papers for submission to academic conferences, peer-reviewed journals, and/or industry publications. A copy of the research findings will be made available to you upon request.

What are the possible disadvantages of taking part?

I don't envisage any negative consequences for you in taking part, but I am of course available to discuss any potential concerns you may have regarding participation.

What if there is a problem?

At the end of the interview, you will have the opportunity to elaborate on how you found the experience and how you are feeling. You may contact my research supervisors, Prof Joseph Coughlan, either by email (Joseph.Coughlan@mu.ie) or by phone (01 474 7560); Dr Bastian Rake (bastian.rake@mu.ie) if you feel the research has not been carried out as described above.

Any further queries?

If you need any further information, you can contact me by email: utieyineshola.yusuff.2021@mumail.ie.

Thank you for taking the time to read this and for your consideration in participating in this study.