



The entrepreneurial university in Ireland - from rhetoric to reality.

A phenomenological study of the evolution of the entrepreneurial capabilities of universities

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“to enlarge and refine our understanding by asking us to search out and take possession of the sum of our knowledge and then to re-search it, press upon it in order to make it yield up further meanings” Seamus Heaney (1999)

Declaration:

I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of PhD is entirely my own work, that I have exercised reasonable care to ensure that the work is original, and does not, to the best of my knowledge, breach any law of copyright, and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text of my work.

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Date:

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The opportunity to study for a PhD been a defining goal of my life and one which has rewarded me in a way which is unimaginable before commencing the journey. The PhD programme is indeed the great solitary expedition of my life, only made possible through the support of many.

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Abstract

The role of the university has evolved from teaching and research to include the 'third mission' of knowledge transfer and beyond to the creation of 'entrepreneurship capital' which can have a positive socioeconomic impact on national economies (Audretsch & Keilbach, 2005). The modern 'entrepreneurial university' is now expected to fulfil the three roles of teaching, research and entrepreneurship simultaneously.

This research brings to bear a qualitative, phenomenological research methodology using semi structured interviews to understanding both the lived experience and, indeed, the attitudes of senior university leadership across the island of Ireland to the entrepreneurial university paradigm. Executive team members, often at the level of President, in third level institutions were interviewed. The aims of this research are twofold. Firstly, the research looks to explore how these leaders interpret the concept of entrepreneurship within the entrepreneurial university paradigm: how or, indeed, whether it is woven into their institutional strategy and with what effect. Secondly, strategic management theory, specifically dynamic capabilities theory (Teece et al., 1997), has been chosen as a

theoretical lens to consider mission and strategy within the entrepreneurial university. The findings of this research have yielded rich and original insights which have contributed to the development of a new theoretical model of the Entrepreneurial University in Ireland. This contribution is significant, not just in advancing theory, but equally, in terms of guiding senior management of universities as they plan their next steps in their journey to deliver the third mission.

Table of contents

Declaration.....	i
Acknowledgements.....	ii
Abstract.....	iv
List of Tables	x
List of Figures	xi
Chapter One - Introduction	
1.1 Introduction	1
1.2 Research objective and focus	7
1.3 Research contribution	9
1.4 Research methodology and design	11
1.5 Outline of the dissertation	12
Chapter Two - Systematic Literature Review	
2.1 Introduction	16
2.2 Objective of literature review	19
2.3 Framing the entrepreneurial university within strategic management Theory	21
2.4 The Systematic Literature Review	28
2.5 Systematic Literature Review (SLR) methodology	29
2.6 Concept clarification	37
2.6.1 Defining entrepreneurship	37
2.6.2 Economic contribution of entrepreneurship	41
2.6.3 Entrepreneurship capital and knowledge spillovers	44
2.6.4 Absorptive capacity	47
2.7 The historical evolution of role of the university	50
2.8 The evolution of the third mission in universities	54
2.9 Defining the entrepreneurial university	59
2.9.1 The internal evolution to an Entrepreneurial University	62
2.9.2 Initiatives in the development of entrepreneurship within the university	65
2.10 The socioeconomic contribution of universities	67
2.10.1 National systems of Innovation -defining the triple and quadruple helices of innovation	70

2.10.2	Public policy evolution to consider the entrepreneurial contribution of universities	78
2.11	Models of an entrepreneurial university	81
2.11.1	Models of the development of the entrepreneurial university	83
2.11.2	Models of academic entrepreneurship	90
2.11.3	Models considering socioeconomic impact of the entrepreneurial university	92
2.11.4	Models which evaluate the impact of entrepreneurial activities within entrepreneurial universities	94
2.11.5	Summary analysis of models and research gaps	100
2.12	Conclusion	102
Chapter Three - Methodology		
3.0	Introduction	105
3.1	The philosophical approach	106
3.2	Ontology, epistemology and the paradigms	108
3.2.1	Ontology	109
3.2.2	Epistemology	110
3.2.3	Positivism paradigm	111
3.2.4	Interpretivist/constructivist paradigm	112
3.2.5	Inductive, Deductive and Abductive reasoning	115
3.2.6	Social constructionism	118
3.3	Social research in entrepreneurship	122
3.4	Philosophical approach in extant entrepreneurial university literature	125
3.5	Social constructionism and phenomenological research	128
3.6	Research strategy	132
3.6.1	Data collection	133
3.6.2	Phenomenological research design	135
3.7	Research design for this study	137
3.7.1	Locating research population	138
3.7.2	Identification and selection of interview participants	139
3.7.3	Ethical considerations	143
3.7.4	Face validation	144

3.7.5	Collection of data	144
3.7.6	Data explication	146
3.8	Credibility of the study	153
3.9	Interview protocol	155
3.10	Chapter Summary	157
Chapter 4 - Summary and explication of participant interviews		
4.0	Introduction	160
4.1	Summary of the participant interviews	161
4.2	Summaries of semi-structured interviews	164
4.2.1	Participant IA	164
4.2.2	Participant UA	167
4.2.3	Participant TA	170
4.2.4	Participant IB	174
4.2.5	Participant UB	177
4.2.6	Participant IC	180
4.2.7	Participant UC	183
4.2.8	Participant ID	187
4.2.9	Participant UD	190
4.2.10	Participant UE	191
4.2.11	Participant UF	194
4.2.12	Participant UG	198
4.2.13	Participant UH	200
4.2.14	Participant UI	202
4.2.15	Participant UJ	206
4.3	Summary of emergent themes	210
4.3.1	Theme 1: Interpretation/defining of the idea of the entrepreneurial university	212
4.3.2	Theme 2: Enabling the entrepreneurial mission in the institution	216
4.3.3	Theme 3: Role of government policy as a determinant of entrepreneurial strategy	222
4.3.4	Theme 4: How the impact of industry engagement (is driving the success of entrepreneurial activities on campus)	226

4.3.5	Theme 5: Engagement with external ecosystem	231
4.3.6	Theme 6: Developing organisational capacity and capabilities to deliver the university third mission	236
4.3.7	Theme 7: Measurable factors which enable the entrepreneurial third mission	242
4.4	Summary	245
Chapter 5 - Interpretation and discussion of research themes		
5.0	Introduction	248
5.1	Interpretation of findings through the lens of dynamic capabilities theory	249
5.2	Interpreting/defining of the idea of the entrepreneurial university	260
5.3	Enabling the entrepreneurial mission in the institution	263
5.4	Role of government policy as a determinant of entrepreneurial strategy	267
5.5	How the impact of industry engagement is driving the success of entrepreneurial activities on campus	275
5.6	Engagement with external ecosystem	280
5.7	Developing organisational capacity and capabilities to deliver the university third mission	288
5.8	Summary	292
Chapter 6 - Conclusion		
6.0	Introduction	294
6.1	How the research answered the research questions	297
6.2	The contribution this study makes to theory and practice	303
6.2.1	Defining theoretical contribution	304
6.2.2	Contribution to practice and utility	305
6.2.3	Theoretical Contribution	307
6.3	Appropriateness of methodology	312
6.4	Limitations to study	313
6.5	Suggestions for further research	316
	References	318

List of Tables

Table 2.1: Search string results (Source: Author)

Table 3.1: Summary of positivist and interpretivist approaches (Roth, 2002)

Table 3.2: Comparison of Inductive and Deductive research (Saunders et al., 2007)

Table 3.3: Theoretical frameworks for selected articles (Source: Author & Schmitz et al., 2017)

Table 3.4: Comparison of Quantitative and qualitative research (Bryman, 2008)

Table 3.5: Purposeful sampling strategies (Palinkas et al. (2015)

Table 4.1: Representation of higher level academic institutions included in study

Table 4.2: Participant profile and identifier codes

Table 4.3: Themes common across the interviews

Table 4.4: Definitions of the entrepreneurial university

Table 5.1: Organisational forms of university industry collaboration (Source: Ankrah and AL-Tabbaa (2015)

Table 5.2: Definition of elements of entrepreneurial architecture (Nelles and Vorley (2010); Martin et al. (2018))

List of Figures

Figure 1.1: Focus of research study (McNeill & Chapman, 2005)

Figure 1.2: Research structure (Source: Author)

Figure 2.1: Key areas of university entrepreneurial potential (Gibb, 2012)

Figure 2.2: 'Funnel' framework of systematic literature review (Source: Author)

Figure 2.3: Systematic Literature Review process (Okoli & Schabram, 2010)

Figure 2.4: Percentage of articles where themes occurred

Figure 2.5: Linking entrepreneurship to economic growth (Wennekers and Thurik, 1999)

Figure 2.6: Knowledge spillover and the entrepreneurial university (Audretsch, 2007)

Figure 2.7: Knowledge spillover process by level of analysis (Guerrero & Urbano, 2013)

Figure 2.8: Entrepreneurial university spectrum of activity (Philpott et al., 2011)

Figure 2.9: Organising the university for entrepreneurship (Gibb & Haskins (2014)

Figure 2.10: The Triple Helix model of University-Industry-Government Relations (Etzkowitz, 2000)

Figure 2.11: Static centre to the Laissez-faire and the Triple helix models (Etzkowitz, 2002)

Figure 2.12: Triple Helix Triangulation Model (Farinha and Ferreira, 2013)

Figure 2.13: Factors affecting creation and development of Entrepreneurial Universities (Guerrero et al., 2006)

Figure 2.14: Conceptual framework of entrepreneurial universities (Kirby et al., 2011)

Figure 2.15: Systematic framework for Entrepreneurial Universities (Salamzadeh et al. (2011)

Figure 2.16: Conceptual framework of factors involved in the transition of universities into Entrepreneurial Universities (Guerrero & Urbano, 2010)

Figure 2.17: Key areas of university entrepreneurial potential. (Gibb, 2012)

Figure 2.18: Framework of university entrepreneurship (Rothaermel, 2007)

Figure 2.19: Spinoff performance model (O'Shea et al., 2007)

Figure 2.20: Categorisation of evaluation criteria of Entrepreneurial Intensity (EI) (Mahdavi Mazdeh et al., 2013)

Figure 2.21: Knowledge Transfer within the Innovation Ecosystem (Cullen et al., 2009)

Figure 2.22: Model of Impact in the Knowledge Transfer Ecosystem (Cullen et al., 2009)

Figure 3.1: The Research Onion (Saunders et al. 2007)

Figure 3.2: Ontological continuum of positivism to interpretivism (based on Blaikie, 2010)

Figure 3.3: Bhaskar's three domains: populating entities (Bhaskar, 1978)

Figure 3.4 Unpacking the methodology

Figure 4.1: Internal enablers of the university entrepreneurial strategy

Figure 4.2: Benefit of university industry collaboration

Figure 4.3: Evolution of entrepreneurial capabilities in Irish HEIs

Figure 4.4: Factors which impact execution of university third mission strategy

Figure 5.1: Different user groups in quadruple helix (Arnkil et al., 2010)

Figure 6.1: Determinants of a successful university third mission strategy

Figure 6.2: Dimensions for a theoretical contribution (Giola and Pitre, 1990)

Chapter One

Introduction

1.1 Introduction

In today's knowledge economy, universities have a vital and growing role in supporting innovation and facilitating regional economic development (Audretsch, 2007). The addition of a third mission of enterprise to the core missions of teaching and academic research in universities has become increasingly common in the last twenty years (Goldstein, 2010). Universities operate within systems of innovation and this positions university knowledge transfer activities within a triple helix of university-industry-government relations (Yuan et al., 2016).

Universities are large complex organisations which traditionally have not been entrepreneurially focused (Cunningham et al., 2016). However, there has been a long-term academic development from teaching college to research university (the first academic revolution) and then combining the roles of teaching and research with technology transfer (the second academic revolution) (Etzkowitz, 2003). A major catalyst for the second academic revolution was the US Bayh-Dole Act (1980) which gave proprietary rights to academic research to the researcher in preference to the government. It is in the late 1980s that we see the birth of the entrepreneurial university with a third mission of not just the commercialisation of research and the creation of knowledge based start-ups, but more broadly contributing and providing leadership for creating

entrepreneurial thinking, actions, institutions and entrepreneurship capital (Audretsch & Keilbach, 2005). The entrepreneurial universities' missions are focused on fulfilling teaching, research and entrepreneurial activities simultaneously (Etzkowitz, 2004). The modern entrepreneurial society looks to the entrepreneurial university as central to economic growth through its activities as a generator of knowledge and innovation (Pugh et al., 2018). An entrepreneurial society refers to places where knowledge-based entrepreneurship has emerged as a driving force for economic growth, employment creation and competitiveness in global markets (Audretsch, 2007). Framed within the entrepreneurial society, the entrepreneurial university is central to the production and dissemination of knowledge (Guerrero & Urbano, 2012).

The role of the university is ever evolving but the rate of change has increased rapidly since the 1990s due to the expectation from primarily government and industry (and more recently civil society) that they become increasingly innovative and entrepreneurial in order to meet both societal needs and contribute to the knowledge economy. This idea started appearing more prominently in the academic literature from the mid-1990s with academic conversations beginning to discuss the evolution of universities, specifically, in the context of their contribution to socioeconomic growth (Clark, 1998; Gibb, 2012; Guerrero and Urbano, 2010; Rothaermel et al., 2007). The evolution of the university first saw research becoming part of academia in the late nineteenth century (Jencks and Riesman, 1968). This model of universities engaging in teaching and research was the 'undisputed model' (Nybom, 2003) until the 1990s at which point the emergence of a

university 'third mission' of entrepreneurial engagement and the evolution of the 'entrepreneurial university' (Clark, 1998) began to receive attention. Public policy now views the university as a key economic actor within entrepreneurial ecosystems with a role in supporting regional economic development, entrepreneurship and innovation.

A 2017 EU report (Measuring the contribution of higher education to innovation capacity in the EU) on the expectation that universities contribute meaningfully to the knowledge-based economy comments:

“A key challenge for European policy-makers is therefore to determine the extent to which universities are realizing their innovation potential to meet the needs of the knowledge-based economy. By distinguishing which institutions are or are not able to address the innovation agenda, policy-makers can develop a more nuanced set of engagement stimuli that can help to optimize their contribution, and in turn, the returns that European societies receive for their substantial public investments in higher education” (Benneworth and Zeeman, 2017, p. 5).

National systems of innovation are those public and private sector institutions which contribute to the innovative performance of firms (Nelson, 1993). The relationship between universities, government and industry has been framed by many contributors using the triple helix model of innovation (Etzkowitz, 1998). The triple helix of innovation theory considers innovation in knowledge-based societies as being dependent upon coordinated interaction between three of the national system of innovation pillars of industry, academia and government. Government, industry and indeed society now expect universities to behave and be supportive of innovative

and entrepreneurial activity. More recently, the triple helix model has been extended to comprise a fourth quadruple helix (of citizens or users) and indeed an even more broad-based quintuple helix which considers the natural environment (Carayannis et al, 2012). Afzal et al. (2018) consider triple and indeed quadruple helix theory to be a critical component of the national system of innovation.

It has been increasingly recognised that the efforts of the individual entrepreneur are only one contributor to the success of entrepreneurial ventures, and that the entrepreneurial ecosystem and the contribution of national institutions is also relevant to entrepreneurial business success (Autio and Thomas, 2013). To better understand entrepreneurship from both the perspective of the individual entrepreneur and a national systems perspective, Acs et al. (2014) introduced the idea of national systems of entrepreneurship. They propose the following definition of national systems of entrepreneurship as “the dynamic, institutionally embedded interaction between entrepreneurial attitudes, ability, and aspirations, by individuals, which drives the allocation of resources through the creation and operation of new ventures” (Acs et al., 2014, p. 478). The entrepreneurial university must be considered a central plank in the success of entrepreneurial ventures at a regional and indeed national level.

Attempts to achieve this entrepreneurial third mission has pushed universities into both institutional and cultural change to embrace a much wider range of knowledge transfer activities (Etzkowitz, 2003). Essentially, universities are now expected to transform internally to be increasingly entrepreneurial in their “offerings, outlook and culture” (Miller et al., 2018, p.

9). Cunningham and Harney (2006) correctly predicted knowledge as a key driver of economic development in Ireland, with universities central to this evolution to the knowledge economy through their interactions within an entrepreneurial (triple helix) ecosystem.

Klofsten et al. (2019) note that since Clark's (1998) seminal contribution defining the entrepreneurial university but more especially in the past decade, the entrepreneurial university and academic entrepreneurship have become more prevalent in the academic literature. However, Guerrero (2012) and Gibb (2013) both note the limited and rather embryonic nature of research presenting theoretical frameworks and models of the entrepreneurial university. Further, even though Markuerkiaga et al. (2014) highlight that mission and strategy is foregrounded in the prominent entrepreneurial university models in the literature, Klofsten et al. (2019) comment that research on leadership and strategic issues, as universities look to evolve and become more entrepreneurial, is quite limited. This research looks to address this specific research gap, certainly for Ireland, with potential for wider application of the findings. Further, the review of the academic literature highlighted how research on the entrepreneurial university is largely theoretical or quantitative with a lack of qualitative research into the topic. This research also addresses that research gap using a qualitative approach and phenomenological methodology to understand gain insights into the evolution of entrepreneurial university from the perspective of those people tasked with managing this evolution from traditional universities to entrepreneurial universities.

This research utilises a qualitative, phenomenological research methodology using semi structured interviews of senior leaders in higher education institutions (HEIs) across the island of Ireland as a means of data collection. The aims of this research are twofold. Firstly, the research looks to explore how these leaders interpret entrepreneurship within the entrepreneurial university paradigm, the factors which impact the evolution of the entrepreneurial third mission, and also the relationship between university strategy and the evolution of the 'third mission' within their institution. Secondly, strategic management theory, specifically dynamic capabilities theory (Teece et al., 1997), has been chosen as a theoretical lens to consider mission and strategy within the entrepreneurial university construct due to its acknowledged use as a vehicle to understand strategy and organization, as well as management. Based on the research framework outlined, this research looks specifically to address the research questions outlined below:

RQ1. How do senior leaders in Irish HEIs perceive, think about and give meaning to the entrepreneurial university and the entrepreneurial third mission?

RQ2 How do senior leaders in Irish HEIs perceive the dynamics of the relationship between university mission and strategy and the evolution of the 'third mission' within their institution?

RQ3 What are the factors, internal and external, which are impacting the development of the entrepreneurial 'third mission' of Irish HEIs?

1.2 Research objective and focus

McNeill and Chapman (2005) consider the focus of a research study in terms of a four cornered relationship between choice of topic, theoretical preference, practical considerations and research method (figure 1.1).

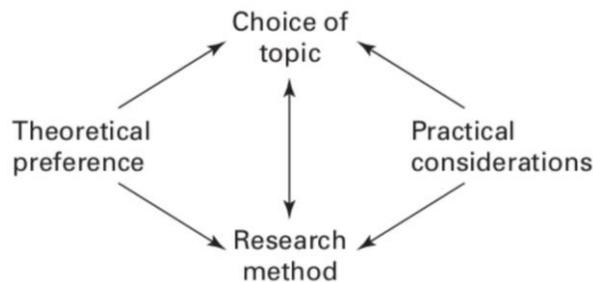


Figure 1.1: Focus of research study (McNeill & Chapman, 2005)

The focus of this research study developed from this researcher's interest in both the evolving role of the university as a socioeconomic actor and the economic environment in Ireland in 2013. The evolving role of the university in Ireland is strongly influenced by the global financial crisis of 2007 which predicated the worst recession in modern Irish history. The economic crash resulted in the need for an EC-IMF-ECB "Troika" bailout in December 2010 with resulting funding cuts to higher education of circa 25% from 2007 to 2011 (Hazelkorn, 2014). Public policy in Ireland since 2000 had already placed universities at the centre of innovation and Irish industrial and economic policy. The 2011 published 'national strategy for higher education to 2030' (Hunt Report) positioned HEIs central to national innovation arguing for further connectivity with industry and society (Zhang et al., 2014).

As noted above, the challenges which emerge during the evolution toward an entrepreneurial university are still insufficiently observed and conceptualised. The entrepreneurial university research field is seen by this researcher to be predominantly quantitative in nature and often lacking theoretical structure. This research uses phenomenological interview as a method to understand how the management of Irish HEIs consider their particular university strategy is contributing to the success of their institution in the evolution of their 'third mission'. Typically, the models of the entrepreneurial university presented in the literature offer an 'outside in' perspective on the development of the entrepreneurial university. Further, while semi structured interviews have been used to understand the phenomenon, there has been no phenomenological study to date of the lived experience within entrepreneurial universities from a strategic management perspective. It is hoped that this research, through capturing the lived experience of senior leaders of universities, will contribute to the field by offering an alternate 'inside out' perspective.

Teece et al. (1997, p. 516) define dynamic capabilities as "an organization's abilities to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments". Dynamic capabilities relate to the organisations ability to *sense*, *seize*, and *transform*, with Teece et al. (1997) defining each of these clusters in terms of opportunity identification (sensing), resource configuration (seizing) and organizational change (renew). Leih and Teece (2016) have extended the dynamic capabilities theory to consider the strategic management of research universities. They suggest that to truly develop as entrepreneurial

universities they need to develop further their dynamic capabilities (Miller et al., 2018). Through addressing university leaders' experiences related to both the development and execution of their strategy in developing university entrepreneurship, this study extends and combines dynamic capabilities theory and related research streams including systems of innovations theory (triple helix and quadruple helix models), absorptive capacity theory and the open innovation framework.

1.3 Research methodology and design

This research uses phenomenological interview as a method to understand how the management of Irish universities and higher education institutions consider their particular strategy is contributing to the success of their institution in the evolution of their 'third mission'. The primary goal of this study is to explore from a phenomenological viewpoint i.e. from the level of lived experience. The research is inherently inductive with theoretical propositions derived from the descriptions of the lived experience, as given by the research participants. To this researcher's knowledge, this qualitative approach, employing a phenomenological methodology, has not been applied previously to consider the management of the entrepreneurial third mission strategy in universities.

Phenomenological research was considered the most appropriate research design to capture the lived experience of senior university leaders of this relatively new paradigm in university strategy for three main reasons. Firstly, the commonality that all the interview participants are leaders from the universities and research producing higher education institutions across

the island of Ireland should develop interesting themes. Secondly, the open-ended design of the semi structured interview process allows interviewees to give deep descriptions of issues and themes they deem significant. Further, the phenomenological methodology allowed the research to develop a rich understanding of the principal themes and issues relevant to this specific population at a particular time. This facilitated the identification of themes and development of theory immediately relevant to the Irish higher education system but also extending beyond to provide general insights into the issues affecting leaders looking to develop the entrepreneurial third mission within HEIs.

Semi structured phenomenological interviews were conducted with fifteen senior leaders in universities and higher education institutions (HEIs) across the island of Ireland. The interviews were conducted between April 2016 and November 2016. These interviews were then analysed and the 'essences' of the phenomenon were captured utilising the methodology of Hycner (1999) and Groenwald (2004) as the basis for the phenomenological analysis of the semi structured interviews. After each interview was transcribed and then read many times, units of meaning were delineated utilising bracketing and phenomenological reduction. These meaning units were clustered to form themes and then a summary of each interview was created taking the interview from the language of the participant to the disciplinary language of the interviewer.

1.4 Research contribution

This study contributes both in the form of a contribution to practitioners with an interest in the entrepreneurial university and in terms of a theoretical contribution. The research gives somewhat equal emphasis to both type of contribution in response to research gaps identified in the review of the academic literature. In terms of the contribution to practitioners, the research identified a number of factors which will be interesting and useful to both policy makers and senior leaders within higher education institutions as they look to develop both the entrepreneurial capabilities of universities and indeed their ability to engage with the wider entrepreneurial ecosystem.

There are two strands to the theoretical contribution of this research. Firstly, the research considers the strategic management of universities within the entrepreneurial university paradigm through the theoretical lens of dynamic capabilities theory. The applicability of dynamic capabilities theory to consider the ability of organisations to adapt in dynamic and changing environments (Eisenhardt & Martin, 2000) is used to consider the role of leadership in the development of dynamic capabilities, the evolution of the university with respect to the external entrepreneurial ecosystem, and efforts by academic institutions to develop their third mission capabilities.

Furthermore, the ability of other related research streams to illuminate this research topic through their relationship to the dynamic capabilities theory elements of sensing, seizing and transforming is addressed. Secondly, this research looks to advance dynamic capabilities theory and foreground the role of university leadership in the development of university dynamic capabilities. This research looks to extend the dynamic capabilities theory

which to date has posited that “asset orchestration” only occurs internal to the organisation (Teece et al., 1997). In contribution to the theory, this research proposes the ability to engage with the external entrepreneurial ecosystem should also be considered as a tangible asset when one considers the dynamic capabilities of universities.

1.5 Outline of the dissertation

It is important to have an understanding of how the theory and data are linked in order to assess the validity of the research (Baur, 2009). Central to a research dissertation is the close link between theory and data. Data is required for theory building and theory testing but in the absence of theory, the selection and interpretation of data is rendered impossible (Knoblauch, 2008). The structure of this research thesis is outlined below (figure 1.2) and is noteworthy as it “shows how the key components... are systematically related to one another in order to link evidence (data) to theory” (Rose, 1982:14). The six chapters in this thesis are briefly described below.

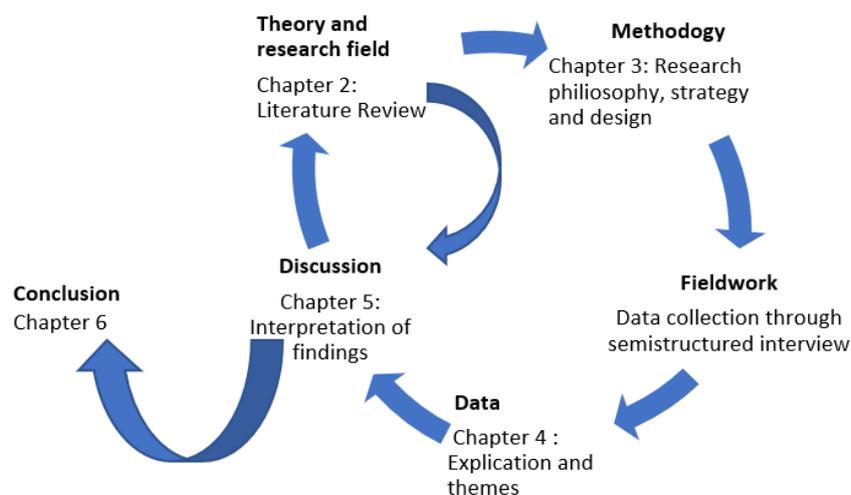


Figure 1.2: Research structure (Source: Author)

The introduction (chapter one) provides an introduction to the research area, the research gap and the theoretical lens through which the research will be considered. Chapter one also looks to briefly contextualise the research by identifying the importance of the development of entrepreneurial capabilities of higher education institutions for both policy makers and industry. The scope and main goals of the research are presented, and the overarching research question is defined. The research methodology is discussed and the contributions of the research to both theory and practice are outlined.

Chapter two provides the basis for the thesis, presenting a comprehensive review of the extant literature and a establishes the rationale of the use of strategic management theory, specifically dynamic capabilities theory, as the theoretical lens for the study. It provides clarification on the key concepts and terms, discusses the evolution of the university from teaching institution through the addition of research capabilities to the evolution of the entrepreneurial university. The review then defines the entrepreneurial university and discusses its socioeconomic contribution, and finally models of the entrepreneurial university in the extant literature are considered.

Chapter three establishes the rationale for the social constructionist philosophical approach to this research and introduces phenomenology and a phenomenological approach to data collection and analysis. The research strategy is a qualitative, inductive approach drawing on semi structured phenomenological interviews. The research design is justified, and the

phenomenological methodology is described including the location of a target population and selection of interview participants, data gathering through semi structured interview and the data explication process. Finally, ethical considerations and issues relating to the credibility of the study are addressed.

Chapter four presents a summary of each interview, created by taking the interview from the language of the participant to the disciplinary language of the interviewer utilising the explication process. The chapter includes the summaries of each interview including the general and unique themes extracted from each interviews and composite summaries of the overarching themes.

Chapter five positions the data within the theoretical framework and academic literature which underpinned the research. Firstly, the research findings are considered through the theoretical lens of Dynamic capabilities theory. Beyond this the principal themes which emerged through the phenomenological interviews and methodology as outlined below are considered with respect to the literature:

- Interpreting/defining of the idea of the entrepreneurial university
- Enabling the entrepreneurial mission in the institution
- Role of government policy as a determinant of entrepreneurial strategy
- How the impact of industry engagement (is driving the success of entrepreneurial activities on campus)

- Engagement with external ecosystem
- Developing organisational capacity and capabilities to deliver the university third mission

Finally, chapter six offers the conclusions which considers the contribution of this thesis. This includes a reflection on the research strategy and methodology and how the research questions are answered. The contribution to theory and practice are addressed, as are the limitations of the research and suggestions for further research.

Chapter two

Systematic Literature Review

2.1 Introduction

This systematic literature review was developed in 2014 from a comprehensive study of the literature examining the evolution of the role of the university. This evolution is considered in terms of how the mission of the university has changed over time from one of teaching, to including research, to now include the 'entrepreneurial turn' of universities. The addition of a 'third mission' of entrepreneurial activities to the core missions of teaching and academic research has become increasingly common within universities in the last twenty years (Goldstein, 2010). With the evolution of economies from traditional, resource based, economies to knowledge-based economies, entrepreneurship has become a key contributor to economic growth (Wennekers and Thurik, 1999). Further, universities are now being seen as having an ever more important role in supporting innovation and facilitating regional economic development (Audretsch, 2007).

Universities now have a crucial role to play in the knowledge economy as generators of knowledge which can spillover into society. The role of the university has evolved from beyond teaching and research to include the 'third mission' of knowledge transfer and beyond to the creation of 'entrepreneurship capital' which can have a positive socioeconomic impact on national economies (Audretsch & Keilbach, 2005).

Since the late 1990s, the concept of the entrepreneurial university has drawn the attention of academic scholars and policy makers trying to define and describe the phenomenon (Clark, 1998; Etzkowitz, 2003; Gibb, 2012; Guerrero and Urbano, 2010; Kirby, 2006; Nelles and Vorley, 2010a; O'Shea et al, 2007; Ropke, 1998; Rothaermel et al, 2007). The literature covers a broad range of areas in relation to the evolution of an entrepreneurial university, from reformulating the university mission and strategy and realigning the university with external challenges and demands to the embedding of entrepreneurship education throughout university curricula and developing an infrastructure to support graduate entrepreneurship (Williams & Kluev (2014)).

Focusing on one specific dimension, Thorp and Goldstein (2010) see the entrepreneurial university as being defined by its culture of entrepreneurship and the development of an entrepreneurial mindset in all graduates. While with a broader perspective, Meyers and Pruthi (2011) propose five core elements of such an entity: (i) top-down vision, strategy and leadership, (ii) clearly defined entrepreneurship learning objectives that drive the curriculum, (iii) robust internal and external networks, (iv) a culture of innovation, and (v) experiential learning and knowledge transfer opportunities.

There is a considerable body of literature concerning academic entrepreneurship, though the literature on the entrepreneurial university is underdeveloped and somewhat embryonic (Guerrero & Urbano, 2010). There are only limited studies devoted to theoretical frameworks and models of the entrepreneurial university (Gibb, 2012). A number of broad frameworks

have been developed which attempt to describe all the components of an entrepreneurial university (Etzkowitz, 2008; Guerrero and Urbano, 2010; Gibb, 2012; OECD, 2012). However, one key element occupies the top of the list in almost all of the established entrepreneurial university models, and it is 'mission and strategy' (Markuerkiaga et al., 2014). The evolution to an entrepreneurial university requires a change in strategy at the very top level of university management - entrepreneurship must be embedded in the university mission as well as in all internal university practices (Williams & Kluev, 2014). A clearly formulated entrepreneurial strategy and mission are the key elements in the process of transformation into an entrepreneurial university (Gibb, 2012). Therefore, a key role of university management concerning the universities 'third mission' is the coordination of resources. Kirby et al. (2011) ranked organizational structure and university governance as the single biggest barrier to universities becoming more entrepreneurial. They feel that without such entrepreneurial policies as clearly stated missions, realistic goals, and achievable objectives (Drucker, 1985), coordinated action would be impossible (Middlehurst, 2004; Sporn, 2001).

To date, this researcher believes that no academic study has fully considered university mission and strategy in relation to the entrepreneurial university from a strategic management perspective. This study proposes to contribute to the body of knowledge in the area of the entrepreneurial university and dynamic capabilities theory relating to the strategic management of entrepreneurship within universities. Theories of entrepreneurship, national systems of innovation theory, the triple helix of innovation framework, absorptive capacity theory and the knowledge

spillover theory of entrepreneurship also partially overlap with the subject area.

2.2 Objective of literature review

The goal of this research is to explore and understand the factors impacting Irish universities ability to engage in and promote entrepreneurial activities and to understand how the management of universities' mission and strategy is contributing to the success of universities in their 'third mission'. Specifically, this literature review considers the evolution of the entrepreneurial capabilities of universities. This is being researched through a phenomenological study of the lived experience of senior leaders in higher education institutions (HEIs) across the island of Ireland addressing the following research questions:

1. How do senior leaders in Irish HEIs perceive, think about and give meaning to the entrepreneurial university and the entrepreneurial third mission?
2. How do senior leaders in Irish HEIs perceive the dynamics of the relationship between university mission and strategy and the evolution of the 'third mission' within their institution?
3. What are the factors, internal and external, which are impacting the development of the entrepreneurial 'third mission' of Irish HEIs?

Using the systematic literature process (SLR) process (Petticrew and Roberts,2006; Okoli and Schabram, 2010) this review explores the existing

literature and theory relating to defining entrepreneurship and the entrepreneurial university, models of the entrepreneurial university and the principal themes and theories within the field. The systematic literature review will follow a ‘funnel shape’ as outlined in figure 2.2. Firstly, concepts and theories related to the field are defined and clarified. The review then looks to the historical evolution of the university from its beginning to the recent development of the entrepreneurial university. The review then considers how scholars have defined the entrepreneurial university and looks at the internal evolution of the university. The socioeconomic contribution of universities is then addressed, and the external engagement of the university is considered through national systems of innovation theory and from a public policy perspective. Finally, models of the entrepreneurial university are considered and metrics in the literature for the evaluation of impact of entrepreneurial activities within entrepreneurial universities are reviewed.

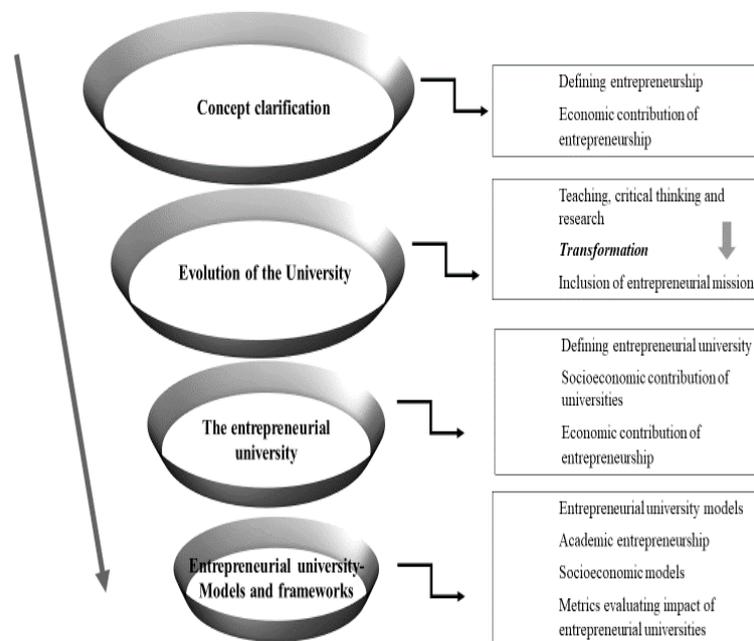


Figure 2.2: ‘Funnel’ framework of systematic literature review (Source: Author)

2.3 Framing the entrepreneurial university within strategic management theory

In keeping with EU higher education policy, many university mission statements include commitments to entrepreneurship (Kirby, 2006). This commitment may be framed in terms of knowledge sharing or technology transfer, supporting spin-out development from primary research, engagement socially or economically with the wider community, the development of entrepreneurial graduates and/or the sourcing of non-public funding streams (Gibbs, 2012). Key contributors to this field (Pinhiero et al., 2013; Kirby et al., 2006; Guerrero and Urbano, 2010) consider the entrepreneurial university and its ability to mobilise resources to realise its 'third mission' in terms of institutional theory (formal and informal factors) and the resource-based-view (resources and capabilities). The resource-based view has been used to consider inputs (internal resources and capabilities, culture and attitudes toward entrepreneurship, structure & triple helix interactions), and outputs (creation of an entrepreneurial ecosystem, centres for entrepreneurship, entrepreneurial graduates, and innovations) through resource utilisation. Barney (1991) considers resources as "all assets" within a firm which enable it to behave more effectively and efficiently.

Inspired by Penrose's (1959) theory of the growth of the firm, the resource-based view was developed to understand an organisation's competitive advantage from a resource perspective (Wernerfelt, 1984; Barney, 1991).

The resource-based view (RBV) is one of the most influential and cited theories in the history of management research. It aspires to explain the

internal sources of an organisation's sustained competitive advantage (SCA). Its central proposition is that if an organisation is to achieve a state of SCA, it must acquire and control valuable, rare, inimitable, and nonsubstitutable (VRIN) resources and capabilities, plus have the organization in place that can absorb and apply them (Barney, 1991). However, Spender (1994) argues that Resource-based theory characteristically overlooks the collective knowledge and skills required to coordinate the resources into a viable bundle. Galunic and Rodan (1998) further argue that with the ever-reducing gaps in competitive advantage between firms, resource recombination is necessary for firms to achieve the levels of Schumpeterian innovation necessary to survive. In arguing for the need to organise the firm to facilitate and encourage the recombination of resources, Galunic and Rodan (1998) note the need for a "bridge or tunnel" to be constructed between resources which would enable recognition of novel resource combinations. Spender (1994) looks to Penrose's theory of the firm and her argument that this coordinating capacity is the essence of the organisation and both the impetus and the constraint to its growth.

Edith Penrose's theory of the Growth of the Firm describes how organisations grow. The productivity of resources is seen in terms of the 'productive services' they yield. These services are considered a function of both the knowledge within the organisation and management strategy. In the theory of the Growth of the Firm (TGF), Edith Penrose (1959) defines an organisation in terms of its (productive) physical and human resources. The organisation is 'an administrative planning unit, the activities of which are

interrelated and are coordinated by policies which are framed in the light of their effect on the enterprise as a whole' (Penrose, 1959, p.15-16).

In this theory, central management determines both mission and strategy. Penrose considers the role of senior management as administrators of how productive resources are utilised and disposed of over time. Central to the TGF, Penrose states: 'One of the primary assumptions of the theory of the firm is that 'history matters'; growth is essentially an evolutionary process and based on cumulative growth of collective knowledge in the context of a purposive firm' (Penrose, 1995, p. xiii).

Kor and Mahoney (2000) distil the Theory of the Growth of the Firm into ten original ideas:

Idea 1: Organisational growth can be usefully studied as a dynamic process of management interacting with resources

Idea 2: Organisations are institutions created by people to serve the purposes of people

Idea 3: Services of resources are drivers of organisational heterogeneity

Idea 4: Services that material resources will yield depend upon the knowledge possessed by human resources. The two together create a subjective productive opportunity that is unique for each organisation

Idea 5: Organisational growth is a function of organisation-specific experiences in teams

Idea 6: Managerial capability is the binding constraint that limits the growth rate of the organisation – the so-called 'Penrose effect

Idea 7: Excess capacity of productive services of resources are drivers of organisational growth

Idea 8: Unused productive services of resources can be a source of innovation

Idea 9: Organisational diversification is often based on a firm's competencies that can lead to a sustainable competitive advantage

Idea 10: An important component of the competitive process is experimentation

Kor and Mahoney (2004) defend the theory of the growth of the firm arguing that Penrose (1959) successfully explains the links between the management and utilisation of resources, and competitive advantage. This researcher concurs with Kor and Mahoney (2004) who link the TGF and resource based view but agrees with Spender (2004) that the resource based view and indeed the TGF consider resources and capabilities from a static perspective, considering just the coordination of existing resources. It has been argued that the explanatory potential of the TGF extends beyond business and management strategy. Indeed, it has proved capable of guiding research in a number of fields including innovation studies, regional growth studies and studies into the relationships between organisations (Turvani, 2002).

The framework of Dynamic Capabilities theory builds upon on the work of Penrose and the Resource Based View (Ambrosini et al, 2009). Dynamic capabilities theory is a highly established theory for guiding research in the field of strategic management (Teece, 2011). Dynamic

capabilities theory provides a useful theoretical lens for strategic management as it addresses the modification of the existing resource base to achieve competitive advantage under conditions of change (Schilke et al., 2018).

Within, the organisation, resources are viewed as 'the inputs or the factors available to an organisation which helps it to perform its operations or carry out its activities' (Amit & Schoemaker, 1993, p.35). Winter (1995) sees organisational capability as high level routines that, when combined with resources, afford management the range of options required to achieve high level outcomes. Amit & Schoemaker (1993) define organisational capabilities as "the capacity to deploy a combination of resources through collective organizational routines to achieve goals".

Teece (2014, p. 328) describes organisational capability as "a set of current or potential activities that utilize the firm's productive resources to make and/or deliver products and services".

Capabilities may be classified in terms of ordinary and dynamic capabilities. Ordinary capabilities are also referred to in terms of static capabilities (Collis, 1994), and also in terms of zero-order and first-order (Easterby-Smith et al., 2008). The zero-, first-, and second- typology is used by Easterby-Smith & Prieto (2008) and Schilke (2014). Ordinary capabilities typically refer to well established administrative, operational or governance functional tasks which are necessary to perform planned tasks. The goal of ordinary capabilities is typically 'best practice' and 'doing things right' and can be benchmarked

internally or against industry best practices. Helfat & Winter (2011 p. 4) consider ordinary capabilities equivalent to operational capabilities.

Dynamic capabilities are seen by Helfat *et al.* (2007) as “the capacity of an organization to purposefully create, extend or modify its resource base”.

Dynamic capabilities relate to the organisations ability to *sense*, *seize*, and *transform*, in order to generate and exploit internal and external organisational-specific competences, and to address the organization’s changing environment (Teece *et al.* 1997).

Teece breaks down dynamic capabilities into three ‘primary clusters’- sensing, seizing and transforming. Dynamic capabilities enable the organisation to (1) identify and develop opportunities and requirements (*sense*); (2) reconfigure and mobilise resources and capabilities to capture this added value (*seize*); (3) continually improve and renew (*transform*).

Dynamic routines encourage diverse and novel combinations of resources through organisational learning (Lei, Hitt & Bettis, 1996). Both individual managers and the top management team are key contributors to dynamic capabilities (Adner & Helfat, 2003). Culture and the ability to implement collective organisational change are also integral to dynamic capabilities (Teece, 2014). Dynamic capabilities are seen as a combination of organisational capabilities and routines coupled with entrepreneurial management and leadership (Auger & Teece, 2007).

Rumelt (2011, p. 6) defines an organisational strategy as “a coherent set of analyses, concepts, policies, arguments, and actions that respond to a high-stakes challenge”. This strategic taxonomy of analysis- policies- actions

clearly interacts with the dynamic capability clusters of sensing-seizing-transforming (Teece, 2014). Hamel & Prahalad (1994, p. 78) suggest that "to get to the future first, top management must either see opportunities not seen by other top teams or must be able to exploit opportunities, by virtue of preemptive and consistent capability-building". The role of management is framed by Teece (2007) in terms of an "asset orchestration" capability comprising the organisational activities of coordination/integration, learning and reconfiguration (Teece, 1997). Asset orchestration can be considered a subset of sensing, seizing and transforming. Coordination and integration refer to the combination of existing institutional resources in an entrepreneurial fashion. Learning can be seen as the outcome of this practice resulting in higher operational effectiveness. Reconfiguration is a transformative process involving the recombination and adaptation of the existing institutional resource base.

Ambrosini et al. (2009) identify three levels of dynamic capabilities, which they associate, with managers' perceptions of environmental dynamism. Firstly, *incremental* dynamic capabilities are those operational level capabilities associated with continuous improvement of organisational resources. The second level dynamic capabilities are renewing, refreshing and adding to the existing resource pool.

The third level moves beyond dynamic capabilities to higher-level capabilities which recognize the limit of learning from experience alone (Winter, 2003). Ambrosini et al. (2009) refer to these as "regenerative capabilities" required by organisations in discontinuous, novel or rapidly changing environments. These strong dynamic capabilities enable an organisation to act in a strongly

entrepreneurial way by renewing and regenerating both its internal resources and those residing within its ecosystem (Teece, 2014). Organisations with strong dynamic capabilities not only adapt to the changes in the ecosystem but also can contribute to and reform the ecosystem through collaboration and innovation. Galavan (2015) sees these regenerative capabilities as both facilitating novel collaboration with exogenous actors and also enabling organisations to develop creative capabilities and the capability 'to learn how to learn'.

It is proposed that this study of the management of universities' entrepreneurial strategy through the prism of the evolution of the entrepreneurial university and strategic management theory, (specifically Dynamic Capabilities Theory) should contribute greatly to knowledge on the capability of universities to pursue their 'third mission'.

2.4 The Systematic Literature Review

The systematic literature review is "a systematic, explicit, comprehensive, and reproducible method for identifying, evaluating, and synthesizing the existing body of completed and recorded work produced by researchers, scholars, and practitioners". (Fink, 2005, p. 3). The aim of a literature review is "to enable the researcher both to map and assess the existing intellectual territory, and to specify a research question to develop the existing body of knowledge further" (Tranfield et al., 2003, p.208).

Rousseau et al. (2008, p. 164), call for a literature review to be a “comprehensive accumulation, transparent analysis, and reflective interpretation of all empirical studies pertinent to a specific question”.

This systematic literature review (SLR) utilises an eight step systematic process developed by Okoli et al. (2010) based upon SLR guides developed by amongst others Kitchenham et al. (2007), Petticrew and Roberts’ (2006), and Rousseau, Manning and Denyer’s (2008) article on SLRs in management and organization science.

2.5 Systematic Literature Review (SLR) methodology

A systematic review is a methodological process that identifies, evaluates and analyses research evidence to synthesize and map it and at its core is the development of a complete body of literature that is reproducible and transparent (Kitchenham, 2004).

The process adhered to in this review is the Okoli and Schabram (2010), eight step methodology as outlined in figure 2.3. These steps are: (1) Purpose of the Literature Review, (2) Protocol and Training, (3) Searching for the Literature, (4) Practical Screen, (5) Quality Appraisal, (6) Data Extraction, (7) Synthesis of Studies, and (8) Writing the Review.

These steps are framed within four themes: Planning, Selection, Extraction, Execution.

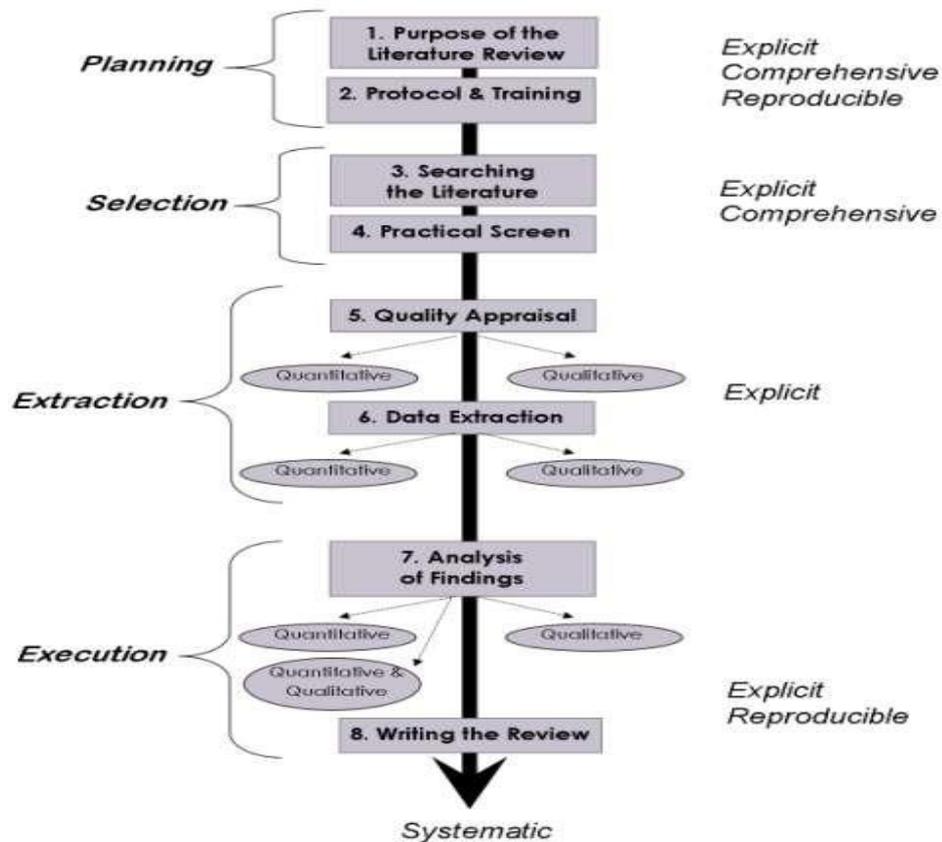


Figure 2.3: Systematic Literature Review process (Okoli and Schabram, 2010, p. 9)

2.5.1 Planning

The first step was a comprehensive initial review and scope of the literature. It is a necessary first step in a literature review for the reviewer to define the intentions and goals of the review (Okoli and Schabram, 2010). This initial search enabled identification of key papers and academic conversants within the entrepreneurial university field. It was decided this SLR should takes an evolutionary approach, exploring the evolution of the entrepreneurial university within the academic literature. As the research field is found to be framed primarily from the publication of the seminal 1998 book, “Creating Entrepreneurial Universities: Organisational Pathways of

Transformation” (Clark, 1998), it was decided to only consider articles from year 1998 forward. The need for the entrepreneurial transformation of academic institutions into ‘entrepreneurial universities’ was first identified and modelled by Burton Clark in this 1998 text. Clark (1998) completed a comprehensive case study of universities which had developed the ability to adapt to changes in the external environment and transform to become more entrepreneurial.

Based on this initial review and scope of the literature, key themes were identified and developed into keywords and search strings. This iterative process involved much trial and error with search strings which yielded an excess of irrelevant papers discarded. Eventually, in order to select the literature, I identified the following keywords which were developed into search strings:

entrepreneur* universit*; triple helix; university-industry-government; higher education entrepren* ;entrepreneurial initiative universit* ;entrepreneurial society ;academic +entrepreneurial capability; entrepreneur*education; ivory tower + entrepreneur*; third mission; entrepreneur* universit*+ strategy; entrepreneur* universit*+ management; entrepreneur* universit*+ dynamic capabilities

2.5.2 Selection

The selection process involves a comprehensive search of the literature and application of a practical screen. Using the search strings, I

conducted searches in the following electronic databases which had yielded the vast majority of articles in my initial review:

Business Source complete; over 2,400 peer-reviewed journals

Springerlink; over 8.5 million articles

Web of Science; over 12,000 peer-reviewed journals across social sciences, sciences, arts and humanities.

The table 2.1 details the search string results. In total this process yielded 6978 articles.

Search no.	Search Database	Search string	Filter	Result
2.1	Business Source complete	entrepreneur* universit*	none	
2.2	Business Source complete	entrepreneur* universit*	academic journal, english	2047
2.3	Business Source complete	triple helix	none	132
2.4	Business Source complete	university-industry-government	none	50
2.5	Business Source complete	higher education entrepren*	academic journal, english	513
2.6	Business Source complete	entrepreneurial initiative universit*	none	7
2.7	Business Source complete	entrepreneurial society	abstract	26
2.8	Business Source complete	academic +entrepreneurial capability	none	2
2.9	Business Source complete	entrepreneur*education	title	291
3	Business Source complete	ivory tower + entrepreneur*	none	18
3.1	Business Source complete	third mission	abstract	82
3.2	Springerlink	entrepreneur* universit*	articles	384
3.3	Springerlink	triple helix	articles	46
3.4	Springerlink	university-industry-government	none	18
3.5	Springerlink	higher education +entrepreneurship	articles sub discipline entrepreneurship	304
3.6	Springerlink	entrepreneurial initiative +universit*	articles sub discipline entrepreneurship	71
3.7	Springerlink	entrepreneurial society	articles	83
3.8	Springerlink	academic +entrepreneurial capability	articles	72
3.9	Springerlink	entrepreneur*education	articles sub discipline entrepreneurship	116
4.0	Springerlink	ivory tower + entrepreneur*	articles	334
4.1	Springerlink	third mission	articles	166
4.2	Web of science	"entrepreneur* universit*"	none	164
4.3	Web of science	triple helix+ entrepreneur*	article , reviews	68
4.3	Web of science	university-industry-government	none	109
4.4	Web of science	higher education +entrepreneurship	article , reviews	461
4.5	Web of science	entrepreneurial initiative +universit*	none	80
4.6	Web of science	entrepreneurial society	articles+ reviews	409
4.7	Web of science	academic +entrepreneurial capability		0
4.8	Web of science	entrepreneur*education		252
4.9	Web of science	ivory tower + entrepreneur*	none	33
5	Web of science	third mission		53
6	Academic Source Complete	entrepreneur* universit*+ strategy	Abstract	25
	Academic Source Complete	entrepreneur* universit*+ management	Abstract	75
7	Google Scholar	entrepreneurial university + dynamic capabilities+ penrose	all words	176
8	Business Source complete	entrepreneur* universit*+ strategy	Abstract	31
	Business Source complete	entrepreneur* universit*+ management	Abstract	34
9	Springerlink	entrepreneur* universit*+ strategy+ dynamic capabilities	None	173
	Springerlink	entrepreneur* universit*+ penrose	None	8
10	Web of science	entrepreneur* universit*+ strategy	None	29
	Web of science	entrepreneur* universit*+ management	None	36

Table 2.1: Search string results (Source: Author)

The next step in the process is the Practical Screen. This is also referred to as screening for inclusion. Articles were screened for inclusion based on a review of the title and abstract for each article. It was considered reasonable to exclude all articles at this stage where the content of the title or abstract displayed little relevance to the research topic. After initial sorting 6821 documents were deemed not relevant, based on title and abstract, and were excluded. This exhaustive process reduced the number of articles to 157. Subsequently, all remaining articles were screened for inclusion/exclusion by a review of the entire article. This thorough reading of the full text of the remaining 157 documents excluded an additional 82. The process resulted in 75 journal articles surviving the double sorting to be included in the first phase of the systematic review. The 75 articles are listed in appendix 1.

In addition, forward and backward searches were then conducted on all included articles using Google Scholar. This involved a review of the title and abstract (where deemed relevant) of all references included in each article. The forward search reviewed title and abstract of all articles which cited the remaining articles. A comprehensive search online for relevant grey literature (documents not published in academic journals produced by government, business, academic institutions etc), books and websites was also completed. At this stage a comprehensive set of literature was available to complete the data extraction and writing of the literature review.

2.5.3 Extraction

Each article was screened based on the criteria – what are the claims made; what evidence is presented; how is this evidence supported (Okoli and Schabram, 2010). Having passed this quality screening, I had finally accumulated the material for the final systematic literature review.

The data extraction process involved reading and rereading of the literature and subsequently sorting and grouping the information into meta-themes and assessing the contribution of each piece of literature to each of these themes.

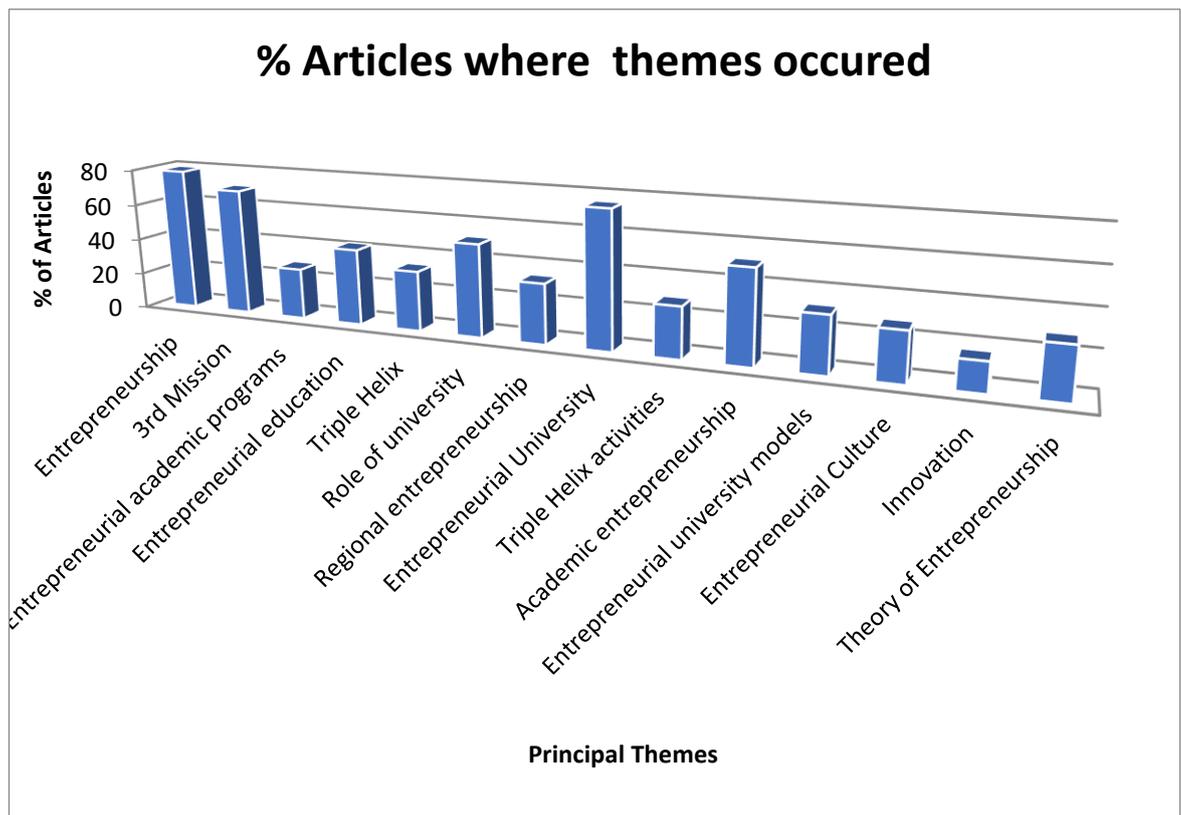


Figure 2.4: Percentage of articles where themes occurred

The principal themes identified in the articles included in the review and the percentage of articles where the themes occurred are outlined in figure 2.4.

The themes of entrepreneurship, the university third mission and the entrepreneurial university occurred in over 70% of the articles with the themes of the role of the university and academic entrepreneurship present in over 50% of the articles.

2.5.4 Execution

This final step involves synthesis of all information extracted from the literature and combining this information in a presentable and coherent fashion. The literature is presented as follows:

First conceptual clarity is given regarding entrepreneurship and the evolution of entrepreneurship within economic growth theory.

The evolution of the role of the university as a consequence of policy makers having increasingly linked entrepreneurship to economic growth is then considered.

The 'entrepreneurial university' is defined and the internal evolution of universities to become more entrepreneurial is addressed.

The socioeconomic contribution of universities is then examined within the framework of national systems of innovation- specifically the triple helix of innovation. Changes in public policy to support the 'entrepreneurial turn' of universities is also discussed. Models of academic entrepreneurship and the entrepreneurial university are reviewed. These models typically look inside the institution to uncover how universities can evolve to become more entrepreneurial with models considering the socioeconomic impact of the entrepreneurial initiatives of universities also reviewed.

Finally, metrics which consider the entrepreneurial capability of universities are also explored.

2.6 Concept clarification

One of the primary objectives of this review is to link the various streams of literature in order to review the evolution of the entrepreneurial university. Therefore, it is first necessary to clarify the principal concepts addressed within the field.

2.6.1 Defining entrepreneurship

The word entrepreneur is derived from the French verb *entreprendre*, meaning to undertake. It is the contention of some contributors (Gartner & Birley, 2002; Mars & Rios-Aguilar, 2010) that entrepreneurship study suffers from a lack of consensus on a definition of entrepreneurship. This review considers the place of the entrepreneur within economic theory (Casson, 1982).

The origins of the field of entrepreneurship are credited to the writings of the Irish-born banker Richard Cantillon (circa 1680–1734). Cantillon defined discrepancies between supply and demand as options for buying cheaply and selling at a higher price. He referred to persons who were alert to such options as ‘entrepreneurs.’ (Cornelius et al., 2006).

Knight (1921) introduced the concept of risk to entrepreneurship by adding risk taking to the contribution of Cantillon. The risk bearing theory

sees the entrepreneur as a predictor of future change within markets. The entrepreneur earns profit as reward for bearing this uncertainty.

Casson (1982, p. 23) built upon Knight's theory seeing the entrepreneur as 'someone who specializes in taking judgmental decisions about the coordination of scarce resources'.

Other economists prefer to consider theoretical perspectives that are centered on how entrepreneurship affects market equilibrium. Schumpeter (1934) did not consider risk bearing and first introduced the modern understanding of innovation to entrepreneurship. Schumpeter (1934) sees entrepreneurship as occurring when the entrepreneur:

1. creates a new product,
2. introduces a new method of production,
3. opens a new market,
4. identifies a novel source of raw material,
5. reorganises an industry.

Schumpeter viewed innovation as radical rather than cumulative and coined 'creative destruction' to describe the continuous process of capitalist development (Ricketts, 2006) resulting in market disequilibrium.

An alternate perspective of entrepreneurship and economic equilibrium is presented by the neo-Austrian school and Israel Kirzner (1973), which sees entrepreneurship as a reactive process that moves asymmetrical economies towards equilibrium. Kirzner does not afford

entrepreneurs the capability to create opportunities. Kirzner sees entrepreneurs as arbitrageurs, possessing the alertness to identify and act on market opportunities which occur when an economy is in disequilibrium. Ahmad & Seymour (2008) see the Schumpeterian and Kirznerian entrepreneurs as capable of working together with Schumpeterian entrepreneurs engaged in innovation and the latter as arbitrageurs.

Venkataraman (1997) contrasts the neoclassical (weak premise) and evolutionary approaches (strong premise) to economic equilibrium. His weak premise holds that the inherent inefficiencies of markets provide opportunities for entrepreneurs to exploit. The strong premise posits that even if a market is approaching equilibrium, entrepreneurs combined with technological advancement will eventually destroy that equilibrium (creative destruction). Further to this Mars & Rios-Aguilar (2010, p 445) synthesise the Schumpeterian and Kirznerian perspectives to define entrepreneurship as “a process of creating and sustaining economic and/or social value through the development and implementation of creative and innovative strategies and solutions that require the identification of opportunity that results from economic (dis)equilibrium, risk- taking and mitigation, and resource allocation and mobilization”.

Ahmad and Seymour (2008, p. 9) see entrepreneurship in terms of adding value rather than conditions pertaining to economic equilibrium and define the entrepreneur, entrepreneurship, and entrepreneurial activity:

“Entrepreneurs are those persons (business owners) who seek to generate value, through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets.

Entrepreneurial activity is the enterprising human action in pursuit of the generation of value, through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets.

Entrepreneurship is the phenomena associated with entrepreneurial activity”.

Interesting from a policy perspective, the EU (2003, p. 6) define entrepreneurship in terms of mindset and culture: Entrepreneurship “is the mindset and process to create and develop economic activity by blending risk-taking, creativity and/or innovation with sound management, within a new or an existing organisation”.

Venkataraman (1997, p. 6) also feels that entrepreneurship should be defined, not just in relation to the entrepreneur but rather the scholarly domain:

“entrepreneurship as a scholarly field seeks to understand how opportunities to bring into existence "future" goods and services are discovered, created, and exploited, by whom, and with what consequences”.

Entrepreneurial opportunities exist where a product can be sold at a cost higher than the production cost (Casson 1982). Drucker (1985) identifies three ways these opportunities occur. The first relates to market inefficiency as a result of either information asymmetry or requirement for technological

advancement to meet market needs. The second is socioeconomic changes impacting the market outside the control of market participants. The third is inventions that create new markets.

Entrepreneurship is also considered in terms of opportunity identification and exploitation. Identification (or exploration) considers the discovery of entrepreneurial opportunities and the ability of entrepreneurs to identify that opportunity and recognize its potential value (Shane and Venkataraman, 2000). Hayek (1945) identified the asymmetry of knowledge in society as creating entrepreneurial opportunities. Only those who are 'alert' will identify a particular opportunity (Kirzner, 1973).

Entrepreneurial exploitation applies a lens to the creation of enterprise and the subsequent economic development (Acs et al. 2013). The entrepreneurial opportunity may be exploited through the creation of a new firm, within the organisation that discovered the opportunity or through the sale of the opportunity.

2.6.2 Economic contribution of entrepreneurship

Entrepreneurship is widely seen as one of the key contributors to economic growth in modern economies. Porter (1990) places entrepreneurial activity as the centrepiece of modern economic advantage of economies at a national level. However, entrepreneurship was not considered within the neo-classical economic growth theory. The assumption used to model economic activity that all the people in an economy possess

'perfect information' removed the role of the entrepreneur to either create or react to opportunities. Also, the assumption of perfect competition meant that there are no profit opportunities for entrepreneurs to avail of (Wennekers and Thurik, 1999). The role of the entrepreneur was seen as one of bringing the market to a state of equilibrium. Price for goods then achieve equilibrium where demand meets supply.

Neo-classical economic growth theories guided much US and European public policy from post world war II to the late 1980s. The endogenous growth model (Romer, 1986) identified for the first time a role for knowledge and entrepreneurship in economic development. Endogenous growth theory sees national economic growth resulting from endogenous rather than external factors. This theory recognises the value of investment in human capital (while considering entrepreneurship a form of human capital) and innovative activity as a source of economic growth. Human capital refers to the stock of competencies, knowledge, abilities, and skills gained through education and training (Becker, 1993). It is therefore of great importance to understand the extent to which knowledge capital from entrepreneurial universities contributes to socioeconomic development (Guerrero, 2014).

Robert Solow (1956), in what is known as the Solow neo-classical growth model, identified physical capital and labour as the key factors of production and drivers of economic growth. In fact, much economic growth remains unexplained by the Solow model, which Solow attributed to technical change and 'fell like manna from heaven' (Solow, 1956) positioned external to the model. The role of the university within the Solow model is as an

institution which prepares students in the liberal tradition as free and independent minds and guardians of culture and tradition (Audretsch, 2012).

The endogenous growth model developed by Romer (1986), and subsequently refined by Lucas (1988), identified a role for knowledge and entrepreneurship in economic development. However, the assumption of the endogenous growth models that investments in new knowledge, either by firms or universities, would automatically spill over for commercialization resulting in innovative activity and ultimately economic growth is seen as not consistently valid (Audretsch 2007).

The evolution of western economies has occurred from the traditional managed economy based on physical capital to a knowledge economy which is driven by entrepreneurship (Audretsch, 2014). In the managed economy, the principal contributing factors are traditional inputs such as unskilled labour, capital and land resulting in the creation of manufactured produce (Nelson, 1981). This is supported by an infrastructure of supply and service networks which facilitate distribution and communication. In the knowledge economy, the principal output is knowledge capital as a source of competitive advantage. This is based upon the identification and exploitation of entrepreneurial opportunities and new knowledge to create innovation and economic advantage. It is also the generation of an entrepreneurial culture and socioeconomic mindset that looks to exploit opportunities rather than resources for economic advantage (Guerrero et al., 2014). Wennekers and Thurik (1999) present a framework for linking entrepreneurship to economic growth (figure 2.5).

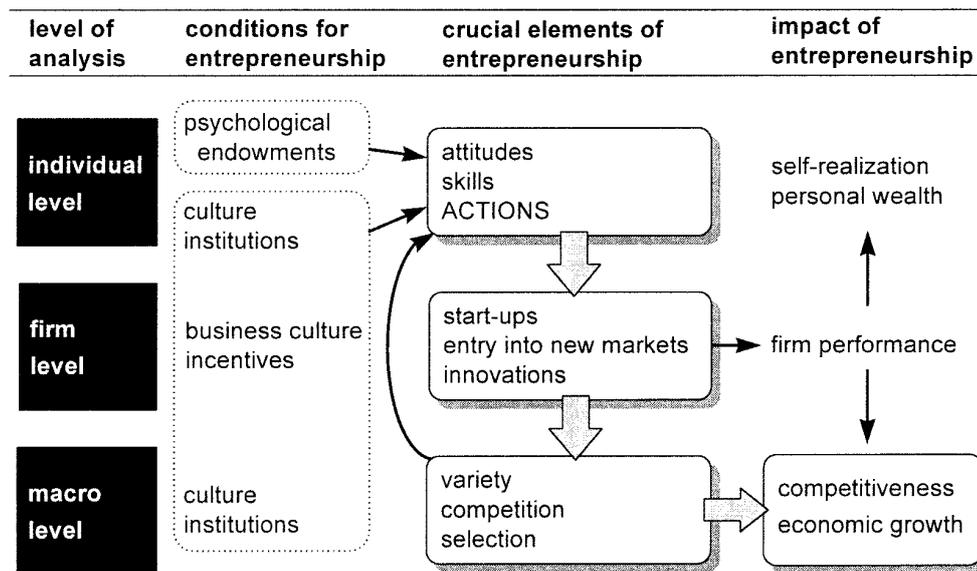


Figure 2.5: Linking entrepreneurship to economic growth (Wennekers and Thurik, 1999, p.51)

Carree et al. (2002) also see as hugely important in this framework the contributions of institutions to the development of entrepreneurship. They see the institutional framework and the culture of entrepreneurship as the principal enablers and barriers to entrepreneurship within a knowledge society. This framework considers the interactions of public policy (government), industry, and universities as determinants of entrepreneurship.

2.6.3 Entrepreneurship capital and Knowledge spillovers

Entrepreneurship capital describes the ability of a region to engage in activities (through its entrepreneurial culture, institutionalised values and networks) which generate entrepreneurial activity and promote new venture formation (Audretsch, 2014). It is based upon the premise that regions, in which institutions share values and beliefs supportive of entrepreneurial

behaviour, see positive economic performance as a consequence. The development of an entrepreneurial ecosystem of diverse entrepreneurial actors from creative people to technical experts and venture capitalists contributes to entrepreneurial capital (Audretsch, 2007).

In the knowledge society, the development of networks are crucial for the realisation of the innovation potential of regions (Almeida ,2008). Acs et al. (2013) contend that we see higher levels of economic output in regions of high entrepreneurial capital compared to regions low in entrepreneurship capital. Reasons for this effect include facilitating knowledge spillover effects and increasing regional competition and competitiveness through increasing the number and variety of businesses. Universities are now being seen as having an ever more important role in supporting innovation and facilitating regional economic development (Goldstein, 2010). This support is not confined to technology transfer activities and the development of spin out companies based on novel research or intellectual property developed within the university. The entrepreneurial university, through its combined missions of teaching, research and entrepreneurial activities, promotes the development of entrepreneurship capital and a culture of entrepreneurship.

The fact that increased investment in knowledge creation has not always resulted in the corresponding increase in economic growth has often been called the Swedish paradox. Braunerheim et al. (2010) note from the endogenous growth model that investment in knowledge creation results in the spillover of knowledge into the economy. However, they have found that there is no direct relationship between R&D spend and growth in GDP. It is not

consistently true that investment in commercially applicable knowledge creation automatically results in knowledge spillover resulting in innovation. First, knowledge must penetrate a 'knowledge filter', which exists between investment in new knowledge and realization of its innovative and commercial potential. Carlsson et al. (2007) identify some of these filters as individual attitudes and organizational, economic, and commercial barriers, which inhibit the transformation of knowledge into economically useful knowledge.

The knowledge spillover theory of entrepreneurship acknowledges both the role of knowledge in the realisation of entrepreneurial opportunity and entrepreneurs in the creation of innovations which commercialise this knowledge. The source of this knowledge is primarily research institutions and large firms. However, Keilbach & Audretsch (2007) feel that the literature on how knowledge spillovers occur is underdeveloped. The knowledge spillover theory of entrepreneurship identifies entrepreneurial activity based on the commercialisation of knowledge and ideas generated by universities and firms but not yet commercially realised as a source of business growth and innovation (Figure 2.6). Audretsch (2007) found that regions with a rich supply of such knowledge exhibited greater amounts of entrepreneurial activity and opportunity than regions lacking in such knowledge. Acs et al. (2004) see entrepreneurship as the missing link in the flow of knowledge from the institution which created the knowledge to that which eventually realises its commercial potential. It is by facilitating knowledge spillover in this way that entrepreneurship creates return in terms of economic growth for the investment in knowledge creation by public and private institutions.

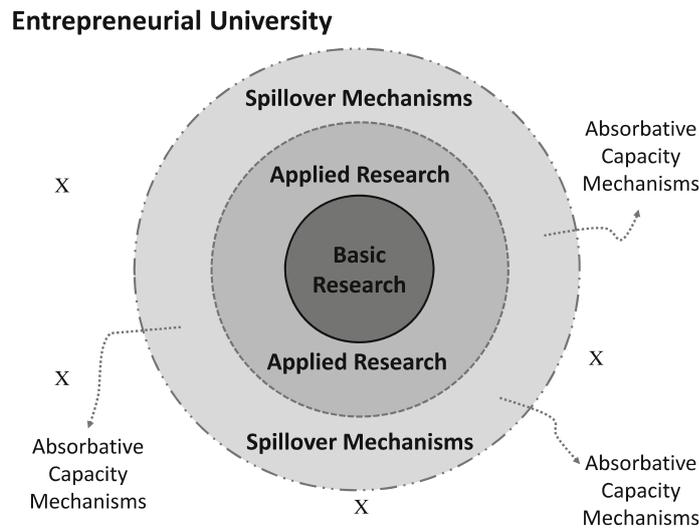


Figure 2.6: Knowledge spillover and the entrepreneurial university (Audretsch, 2007)

2.6.4 Absorptive capacity

Quin & Acs (2013) argue that knowledge spillover relies not only on the creation of new knowledge but also, and perhaps even more importantly, on the absorptive capacity of society to assimilate this knowledge and convert it into innovations which are successfully commercialised. Cohen and Levinthal (1990, p.128) define absorptive capacity as “an ability to recognize the value of new information, assimilate it, and apply it to commercial ends”. This infers that the society in which the university is regionally situated must have the skills and technical knowledge to identify valuable knowledge and absorb it. Absorptive capacity is contingent on four processes; knowledge acquisition, knowledge assimilation, knowledge transformation and knowledge exploitation (Zahra and George, 2002).

The knowledge creating institution must also have the ability to share knowledge it created with the external ecosystem. Desorptive capacity is the organisation's ability to identify technology transfer opportunities based on its outward technology transfer strategy and to facilitate the technologies application at the recipient (Lichtenthaler, 2010). It consists of two process stages, identification and transfer. A well-developed desorptive strategy can result in significant licencing income and successful technology spin-offs. Desorptive capacity can also contribute to inward technology transfer success due to the development of mutual technology transfer arrangements in both directions such as cross licencing agreements or R&D alliances that involve joint development activities. Dahlander and Gann (2010) see knowledge sharing process as a form of open innovation involving inbound or outbound knowledge transfer each of which may involve a financial element. The result is a two-by-two matrix where there are two forms of inbound innovation- acquiring (pecuniary) and sourcing (non-pecuniary) and two types of outbound innovation- selling (pecuniary) and revealing (non-pecuniary). In order to facilitate the knowledge spillover process from universities, many regions have created institutions to enable outside firms to connect with the university and access knowledge. These institutions facilitate the knowledge spillover process from the university to the entrepreneur who can commercialise the knowledge.

The process of transforming knowledge into economic activity combines three elements. Firstly, the opportunity for innovation is created through the new knowledge generated both in universities and industrially. This 'new knowledge' must then be converted to an innovation by

entrepreneurs in order to realize Braunerheim et al.'s (2010) understanding that investment in knowledge creation results in the spillover of knowledge into the economy. Thirdly, this can only occur once knowledge has successfully negotiated the 'knowledge filter'.

Guerrero & Urbano (2013) identify the key elements of knowledge spillover and the 'knowledge filters' at the country, organizational, and individual levels (figure 2.7).

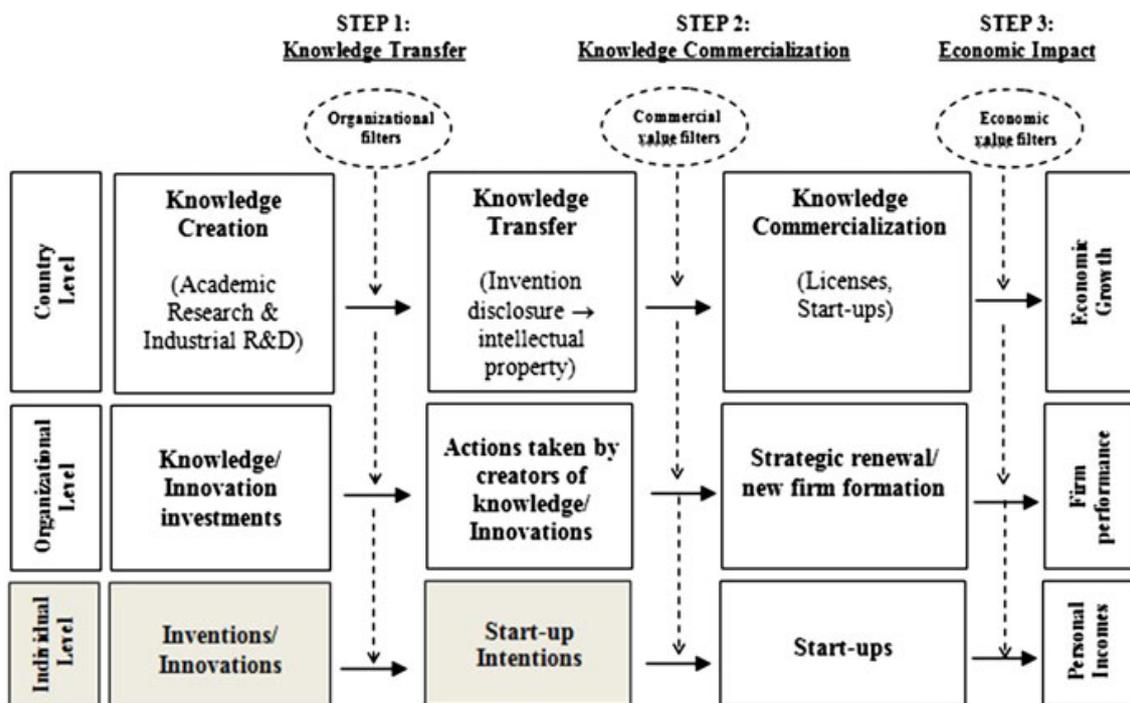


Figure 2.7: Knowledge spillover process by level of analysis (Guerrero & Urbano, 2013, p.60)

The knowledge spillover theory of entrepreneurship can be seen as an important mechanism of delivering economic growth in the knowledge

economy. The role of the university regarding knowledge spillover is twofold. Firstly, the university is an economic actor with the mandate to produce and disseminate new knowledge. Secondly the university must support the development of the entrepreneurial ecosystem and the creation of an entrepreneurial society with a culture of entrepreneurship and a high absorptive capacity.

2.7 The historical evolution of the role of the university

Martin (2012) feels an evolutionary model of the university helps us to understand how it has responded to its changing social, political and economic environment over the centuries. The aim of a liberal education is, according to Cardinal Newman (1851, p. 122), to cultivate “the training of the intellect, which is best for the individual himself and best enables him to discharge his duties to society”. European research universities date from the founding of the University of Bologna in 1088 or the University of Paris (c. 1160–70). In the 19th and 20th centuries, European universities concentrated upon science and research, their structures and philosophies having shaped the contemporary university (Sanz & Sjur, 2006). The original medieval universities arose from the Roman Catholic Church schools that became “the university” (Rüegg, 1992). Their purposes included training professionals, scientific investigation, improving society, and teaching critical thinking and research.

By the 17th century, universities published academic journals (Kronick, 1962) and by the 19th century, the German and the French university models were established. However, until the start of the 20th century religion exerted a significant, limiting influence upon academic curricula and research, by when the German university model had become the world standard.

Elsewhere, the British also had established universities worldwide.

The still dominant model for a contemporary university is founded upon 19th century thinkers - Humboldt and Cardinal Newman. Both Humboldt's and Newman's models of the university were conditioned by the prevailing cultural, economic and political conditions of their time.

The German "Humboldtian" model, conceived in 1810 by Wilhelm von Humboldt, is based on Friedrich Schleiermacher's liberal ideas rooted in the German humanistic ideal of *Bildung*, meaning 'formation of the person' (Pinhiero, 2016). Humboldt envisioned the university education as a student-centered activity of research and felt that the state should not have an expectation of an economic contribution from academia (Nybom, 2003). The guiding principles of this model of the modern research university are the dual roles of teaching and research, the academic freedom of professors ensuring non-interference in their activities and the unity of science and scholarly inquiry in general. (Goldstein 2010).

Later in the nineteenth century, Cardinal John Henry Newman disagreed with Humboldt as to the role of a university. For Newman, the primary role of the university was teaching, not research. Newman begins his *Preface of the Idea of a University* (1851, p. xxxvii) by articulating what he understands to be the nature of the university - "it is a place of universal knowledge. This

implies that its object is, on one hand intellectual, not moral; and, on the other, that is the diffusion and extension of knowledge rather than the advancement” and “the proper end of a university is the education of its students not the advancement of science or philosophical inquiry”.

Newman also believed that a liberal education must be Catholic and grounded in theology if it expects to teach “universal knowledge” (Goyette & Mathie, 2000).

However, Newman did acknowledge the societal role of the university and did not consider the pursuit of knowledge purely for the sake of knowledge advancement a reasonable strategy. However, Newman rejected education for profit and defended liberal knowledge against ‘technical skill’ education (Newman, 1999).

To the middle of the 20th century, the university remained external to economic policy and they remained typically as institutions with guarantees of academic freedom and independence for scholarly inquiry. This continued within Solow economics as long as physical capital and unskilled labour prevailed as the key drivers of economic growth. However, the recognition by Romer’s (1986) endogenous growth theory of the role of knowledge and entrepreneurship in economic growth saw a change in public policy, creating an expectation of an economic contribution from universities (Audretsch, 2014). However, just undertaking scholarly research in basic disciplines did not suffice in generating sufficient knowledge to contribute to economic growth and performance. Recognition of this ‘Swedish paradox’ (Audretsch and Keilbach, 2008) prompted policy makers, both in Europe and the US to promote both the emergence of the ‘entrepreneurial university’ to facilitate

both the spillover of economic knowledge and the generation of a society with high absorptive capacity.

In the literature, the current debate about academic freedom has been marked by a lack of clarity and consistency as to what academic freedom actually means (Åkerlind and Kayrooz, 2003). At its most basic, academic freedom is presented as the right of academics to non-interference in their activities. This concept of academic freedom as 'freedom from' is further developed by O'Hear (2008) who sees academic freedom as also 'freedom to' engage in appropriate academic activities. O'Hear also feels 'freedom to' has implications for the role of institutions of higher education, by way of indicating a responsibility on their part to provide the appropriate support for academic activities required to enable academic freedom. Tight (1988) sees academic freedom as the "freedom of individuals to study, teach, publish, without being subject to or causing undue interference and embodies an acceptance by academics of the need to encourage openness and flexibility in academic work, and of their accountability to each other and society in general".

Other interpretations of academic freedom also highlight collegial/disciplinary and institutional aspects of academic freedom. A distinction emerges in the literature between individual autonomy, collegial or disciplinary autonomy and institutional autonomy. Rendell (1988) sees academic freedom for an institution as including autonomy or self-governance according to the terms of its constitution with power to determine academic policies. Akerlind (2008) found, through an empirical investigation

of the range of meanings of academic freedom among social scientists, five qualitatively different ways of understanding academic freedom:

1. An absence of constraints on academic's activities
2. An absence of constraints, within certain self-regulated limits
3. An absence of constraints, within certain externally regulated limits
4. An absence of constraints, combined with active institutional

support

5. An absence of constraints, combined with responsibility on the part of academics.

2.8 The evolution of the third mission in universities

Over the past two decades universities have become ever more central to society with the socioeconomic migration from a managed economy to knowledge-based economy (Guerrero et al., 2014). The growth of economies is seen as having evolved from being dependent upon physical capital and more recently knowledge capital to the current view of entrepreneurial capital being an important factor in the growth of economies (Audretsch and Keilbach, 2007). The expectation is now that universities are drivers of the economy and no longer seen as academia within isolated ivory tower institutions (Mawson, 2007). O'Shea et al. (2007) acknowledge the role of neo-liberal politics as a driver of the change in public policy which normalized this new role for contemporary universities. Chomsky (1999) highlights how the growth of neoliberalism has seen public policy now directed at facilitating the business community and the economy. Clarke

(1998) sees the demand on universities for socially useful knowledge or for applied research as being reinforced by the neoliberal ideology, which views universities as producers of economically useful knowledge. However, Harland (2014) feels that governments and markets realise the value in liberal education, and certain liberal forms of knowledge are seen to have economic utility. Critical thought and action are seen as desirable skills in knowledge economies with graduates often being employed based their critical reasoning capabilities.

While remaining as teaching and/or research institutions, universities are increasingly expected to engage in what has come to be colloquially referred to as the third mission of universities. The third mission is defined in terms of the level of socioeconomic engagement of the institution- from a broad stroke to include all activities within the university that are beyond the remit of teaching and research to more narrowly being concerned with the commercialisation of research (Nelles and Vorley (2010)).

There has been a long-term academic development from teaching college to research university (the first academic revolution) and then from research university to engaging in technology transfer (the second academic revolution) (Etzkowitz 2003). This new dynamic of universities engaging in technology transfer marks the dawn of a second academic revolution. Essentially, this revolution refers to the process by which public policy has sought to transform universities into more economically engaged and accountable institutions (Mawson, 2007). The notion of universities working with industry is not new. However, this second academic revolution marked a new era in this engagement through its formalisation in public policy.

The US has led this revolution, primarily since the introduction of the Bayh-Dole Act (1980), though some US institutions have long had a culture of economic engagement (Mowery and Sampat ,2005). The Bayh-Dole Act, and its European equivalents, changed the nature of ownership relating to inventions generated in (academic and non-academic) research through federally funded projects. Previous to the Bayh-Dole Act, any inventions generated through work undertaken with federal research funding contracts and grants were assigned and retained as property of the federal government. Bayh-Dole affords ownership of the invention to the inventor in preference to the government. The act encouraged academic entrepreneurs within US universities to participate in technology transfer and engage in commercial collaboration by giving them control of their inventions and other intellectual property that resulted from government funding.

To provide conceptual clarity, this research proposes the Miller et al. (2018, p.13) interpretation of an academic entrepreneur as being an “academic faculty member who undertakes technology commercialisation, using formal modes of engagement that capitalise on specific market opportunities”. Urbano and Guerrero (2013) consider the academic entrepreneur as both an academic, affiliated at an entrepreneurial university, and an entrepreneur involved in a new venture start-up founded to exploit the knowledge generated within these universities. D’Este and Perkmann (2011) identified four main motivating factors for academics to engage with industry: (1) commercialisation of academic research or knowledge; (2) learning through engagement with industry; (3) as a source of non-public funding; and

(4) access to research equipment and materials unavailable through the academic institution.

The entrepreneurial university is expected to fulfil the three roles of teaching, research and entrepreneurship simultaneously. Primarily, teaching's main outcome is the provision to society of graduates who become job seekers and job creators (Schulte, 2004) thus impacting human capital. Research activities as a function of the entrepreneurial university should generate both academic publications and also innovations for new companies. To this end academic entrepreneurship contributes through the attraction of brilliant researchers (Bramwell & Wolfe, 2008) who facilitate the innovation process and the creation and transfer of knowledge through licence, patent and spin off. Finally, entrepreneurship links research results to societal implications with the generation of new companies based on the commercialisation of research. Consequently, academic entrepreneurship can enhance local job growth and regional development by promoting partnerships in key regional clusters that identify and meet needs (Porter, 1998). Lam (2007) concludes that both universities and companies have bigger responsibility in the creation of an open cooperation model.

Whereas the third mission was initially conceived as strategy that was 'bolted on' to the university core missions of teaching and research there has been increasing recognition that the third mission is an integral part of university mission and policy (Vorley and Nelles, 2008). Gibb (2012) notes that throughout the world there has been a gradual evolution in the way that universities are funded, principally due to the inability of government to effectively support ever-growing student numbers. The issue of university

funding is of relevance to the entrepreneurial concept in terms of how it impacts the freedom of academics to engage in non-applied research, and how it impacts the ability of institutions to fulfill their missions (Hearn 2003). Universities increasingly have to balance two objectives: the issue of funding and the goal of supporting regional economic development. Conflict in these goals can manifest through the sale of intellectual property with technology transfer offices often prepared to sell to the highest bidder, irrespective of location. Typically, finance sourced from alumni and independent benefactors rather than commercially or publicly sourced is felt less likely to affect academic freedom in terms of both research and curriculum or the choice of academic staff and the board of governance (Li Chaun Chiang, 2004). Further, engagement in collaboration with parties external to the university can be in fact beneficial to the pursuit of “blue-skies” research resulting in a “win-win” of an improved funding stream for research coupled with increased opportunities for engagement (Nieminen and Kaukonen, 2004). Open innovation and the development of networks for sharing information is increasingly the preferred innovation strategy between industry and academia. Interestingly, improved academic performance as a consequence of increased engagement in the entrepreneurial ecosystem (i.e. a ‘more the more’ hypothesis) rather than a reduction in the quality of academic research has been identified (Ranga et al., 2003).

Wright et al. (2014) present data challenging the assumption that corporate-funded academic research is less accessible and useful to others. Their analysis suggests that corporate-sponsored research is surprisingly valuable for further innovation with corporate-sponsored inventions licensed and cited

more often than federally sponsored ones. The high patent citation rates for corporate-sponsored inventions suggest that firms are funding exploratory research (Wright et al., 2014). Evans (2010) argues that corporations actually urge academics to engage in more speculative science than they might otherwise.

However, the university's third mission is not without its critics. Many of these critiques question the role of entrepreneurial thinking as a major force within universities. According to the opposing thesis, the university, basic research and academic freedom are under threat (Slaughter and Leslie, 1997). These criticisms focus on the narrow view of the role of the third mission in the commercialisation of research. These criticisms are most apparent in academic institutions where the largest funding revenues are still from the public purse (Jacob et al., 2003). Others, however, subscribe to the optimistic thesis, seeing this as an opportunity for the 'entrepreneurial university' to become the 'engine' of the knowledge economy (e.g. Clark, 1998, Etzkowitz, 2013; Martin, 2012).

2.9 Defining the entrepreneurial university

There are many definitions of the entrepreneurial university presented in the literature, differing generally in terms of the scope of entrepreneurial activity. Kirby et al. (2011) foreground conceptual clarity and a shared vision and interpretation of the entrepreneurial university as a priority for stakeholders. The research stream on the entrepreneurial university views entrepreneurial activity as a step in the natural evolution of a university

system that emphasizes economic development in addition to the more traditional mandates of education and research (Etzkowitz and Leydesdorff, 2000; Guerrero et al., 2006).

Scholars have progressively redefined the entrepreneurial university. Clark (1998) first introduced the concept of the entrepreneurial university, building upon early work by contributors such as Etzkowitz (1983) who commenced the academic conversation on emergence of alternative funding streams in American universities as a consequence of the Bayh Dole act (1980). Clarke (1998) addressed the importance of the inclusion of entrepreneurship within the organizational structure and culture in universities as they are required to become more responsive to external changes and challenges. Röpke (1998, p. 2) considered the entrepreneurial university in terms of the institution, the faculty and the wider entrepreneurial ecosystem:

“An entrepreneurial university can mean three things: the university itself, as an organization, becomes entrepreneurial; the members of the university (faculty, students, employees) are turning themselves somehow into entrepreneurs; and the interaction of the university with the environment, the ‘structural coupling’ between university and region, follows entrepreneurial pattern”.

Thorp and Goldstein (2010) see the entrepreneurial university as being defined by its culture of entrepreneurship and the development of an entrepreneurial mindset in all graduates. Meyers and Pruthi (2011) propose five core elements of such an entity: (i) top-down vision, strategy and

leadership, (ii) clearly defined entrepreneurship learning objectives that drive the curriculum, (iii) robust internal and external networks, (iv) a culture of innovation, and (v) experiential learning and knowledge transfer opportunities.

Guerrero & Urbano (2010) consider an entrepreneurial university in terms of the resource-based view of economics and its ability to mobilise these resources to realise its 'third mission'. This includes inputs (internal resources and capabilities, culture and attitudes toward entrepreneurship, structure & triple helix interactions), and outputs (creation of an entrepreneurial ecosystem, centres for entrepreneurship, entrepreneurial graduates, and innovations).

The entrepreneurial university is now considered an institution with a mandate to influence regional development and socioeconomic growth. Zhao and Peng (2008) presume the following characteristics for this institution: it has a strong culture of entrepreneurship; it is engaged in technology transfer and commercialisation of academic research; it contributes knowledge capital toward regional economic development; it has formal relationships with industry and government.

Common to more recent definitions are two initiatives identified by Gibb (2005) which have encouraged both institutional entrepreneurship and the capitalization of academic research outputs. Firstly, the establishment of technology transfer offices and incubation programs to realise the commercialisation of intellectual property and knowledge derived from academic research and secondly, the development of policy and programs to

encourage entrepreneurship activity across the university campus. Further, the role of the entrepreneurial university in the development of an entrepreneurial ecosystem contributing to regional economic development is regularly foregrounded in explaining the entrepreneurial university.

2.9.1 The internal evolution to an Entrepreneurial University

The entrepreneurial evolution of a university is seen by Etzkowitz (2013) as a three-stage process which may occur in no particular sequence or even in parallel. The first stage, (University Entrepreneur One), concerns the university mission and sees the university gaining greater autonomy to define its strategy and priorities. This is realised through greater financial independence, either through alumni donations, fees and higher education grants or indeed through renegotiation of supplier contracts. University Entrepreneur Two sees the university active in the realisation of its technology transfer capability through the commercialisation of intellectual property generated through its research activities. Finally, University Entrepreneur Three sees the university contribute to economic growth through its entrepreneurial activities within a national/regional innovation framework.

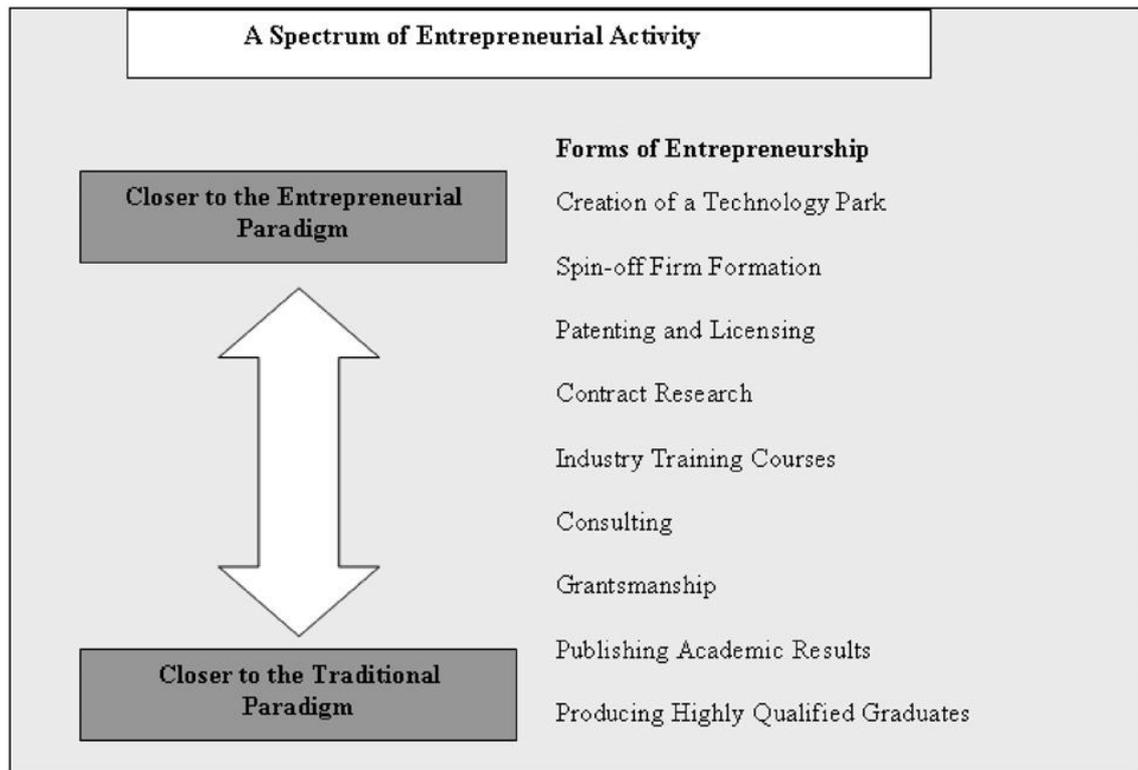


Figure 2.8: Entrepreneurial university spectrum of activity (Philpott et al., 2011)

The entrepreneurial university can be considered in terms of assuming new organisational structures with the goals of enhancing both the internal (coupling) linkages and external (bridging) ecosystems (Pinheiro & Stensaker, 2013). Clark's (1998) interpretation of the entrepreneurial university focused on academic freedom through growing the base of financial support and utilising this freedom to define a mission of collaboration and entrepreneurship through its teaching, research and networking activities. The entrepreneurial activities that a university typically can engage in to realise its third mission have been framed by Philpott et al. (2011) to exist across a spectrum of 'hard' traditional roles to 'soft' more entrepreneurial initiatives (figure 2.8).

It is through coordination of the three university missions of teaching, research and entrepreneurship that Kirby (2006) sees the culture of entrepreneurship being fostered. Human capital is considered the principle driver in the creation of entrepreneurial universities (Urbano & Guerrero, 2013). The creation of an entrepreneurial university also involves the cultural transformation of academia, so that this plays a more active role in society at several levels. Research and teaching activities need to be developed and directed to contribute to economic and social development as well as to the education of students and the advancement of knowledge (Etzkowitz, 2004). The entrepreneurial university develops distinct activities and possesses three primary characteristics: (1) entrepreneurial activities are accepted and systematically supported; (2) interface mechanisms, such as technology transfer offices, exist; and (3) a significant number of staff members create companies, which generate funds for research and other university activities (Etzkowitz and Zhou 2007). There is substantial evidence that innovation is maximised within a climate of informal networks and social interaction (Obsfeld, 2005). Overall, to be successful, an academic institution requires an entrepreneurial mission and culture. Gibb and Haskins (2014) consider the key elements of such an organization below (figure 2.9):

ORGANISING THE UNIVERSITY FOR ENTREPRENEURSHIP

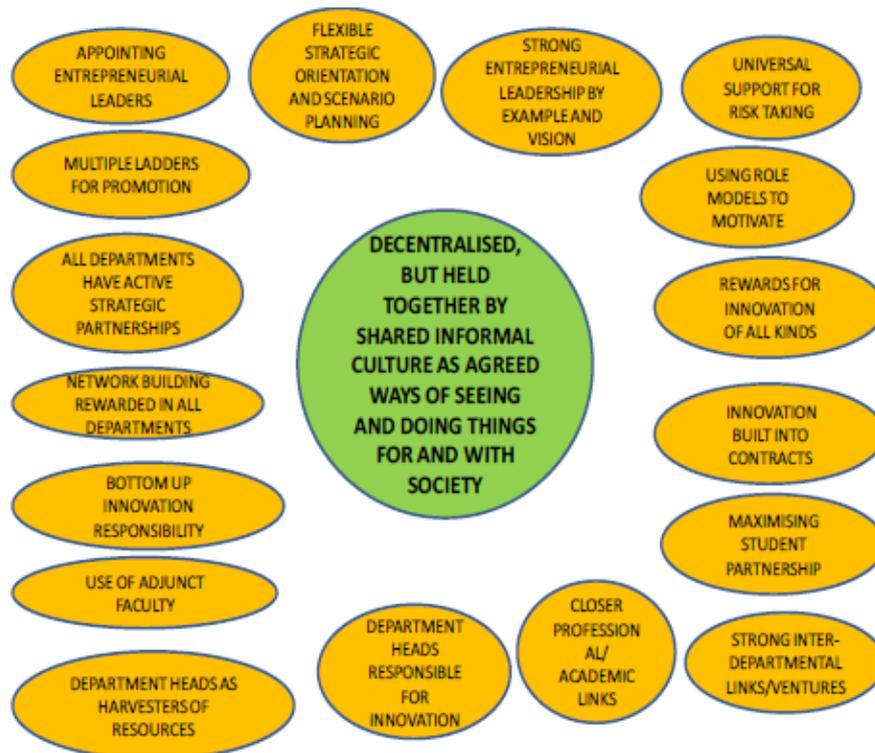


Figure 2.9: Organising the university for entrepreneurship (Gibb et al. (2014))

2.9.2 Initiatives in the development of entrepreneurship within the university

The growth rate of entrepreneurial initiatives within academic institutions is constantly increasing with entrepreneurship courses now common across all faculties from engineering to the liberal arts. Roberts et al. (2014) trace the surge in entrepreneurship education across third level institutions to the rise of neoliberalism in the 1980s and the promotion of entrepreneurship as a driver of economic growth. Therefore, much of the

impetus for growth in entrepreneurship education has come from pressures external to the university. Internally, entrepreneurship education has been typically supported by individual academics championing entrepreneurship education and activities across the campus. Katz et al. (2014) define Cross Campus Entrepreneurial Education (CCEE) in terms of cross faculty efforts to improve the entrepreneurial and creative skillsets of undergraduates whether or not entrepreneurship is considered relevant to their primary field of study. The somewhat ad hoc and indeed chaotic approach to where to position entrepreneurship has led to numerous different approaches to entrepreneurship education. Five models for CCEE efforts are identified by Katz et al. (2014): focused (single-discipline), collaborative (two or more disciplines coordinating), magnet (bringing a campus to a central place for a shared entrepreneurship program), radiant (distributing resources across a campus from a central repository) and mixed (magnet and radial elements). Beyond this Weaver (2010), in considering the third mission of universities, sees universities as also obliged to produce outreach activities that promote economic development in their community's environment.

Heriot et al (2007), consider five elements central to the creation and sustaining of programs in entrepreneurship in schools with little history of entrepreneurship- "what is taught, why it is taught, how it is taught, how well it works, and "leadership support". Buller and Finkle (2013) feel the field of university entrepreneurial initiatives needs more research to evaluate and understand the inner workings of successful entrepreneurship programs.

2.10 The socioeconomic contribution of universities

Kirby et al. (2011) sees the entrepreneurial university as an incubator of entrepreneurial ideas with socioeconomic potential. Urbano and Guerrero (2013) feel cooperation between actors within the regional entrepreneurial ecosystem will deliver the regional competitiveness required to deliver economic growth. The regional economic contribution of entrepreneurial universities can be seen through:

- the creation of employment opportunities, improvements in regional infrastructure and the creation of spin offs through technology transfer
- the development of a regional entrepreneurial ecosystem
- improved innovative capacity of the region allowing rapid response to economic opportunity (McAdam, 2011).

Further, the university catalyses regional economic growth through the development of partnerships with investors, the contribution of highly skilled graduates to the ecosystem, and innovation through the transfer of intellectual property to entrepreneurs within the region generating both employment opportunities and economic growth (Dinapoli, 2011). A McKinsey Global Institute (2011) report on entrepreneurship indicated the development of regional entrepreneurial ecosystems, a culture of entrepreneurship and availability of finance (especially early-stage and sustained financing) as the three pillars of entrepreneurship and innovation, with the university seen as a driver in the realisation of the socioeconomic potential of entrepreneurs.

The socioeconomic impact of universities can be considered in terms of their outputs and the contribution of these outputs to regional social and

economic development in the long term. Drucker & Goldstein (2007)

consider eight roles of universities which can be seen as outputs that have a regional economic impact:

1. Creation of knowledge
2. Human-capital creation
3. Transfer of existing know-how
4. Development and commercialisation of technological innovation
5. Capital investment
6. Regional leadership
7. Creation of a knowledge infrastructure to facilitate knowledge application, and
8. Social and cultural influence on regional milieu

These impacts mirror the mission of entrepreneurial universities' which can be defined in terms of the traditional goals of teaching and research coupled with the third mission of entrepreneurial activities.

The creation of new knowledge (research) and the development of human capital (teaching) are the traditional and universal functions of universities (Kirby et al., 2011). Huggins et al. (2008) see human capital developed through universities as a contributor to economic development both through the knowledge contribution of graduates and training of the existing labour force - referred to by Bramwell and Wolfe (2008) as development of the 'thickness' of the labour pool.

Beyond the direct economic effect of universities' role as employers and purchasers, and the "knowledge effects" identified by Drucker &

Goldstein (2007), two further themes are identified in the literature which consider the economic and social impact of universities. Firstly, the role of the university as a contributor to national innovation systems is considered in this review. Further, the contribution of “engaged’ universities is addressed.

The national innovation systems literature considers the interaction between diverse actors within nations including industry, universities and national policy makers which creates economic growth and a national culture of innovation (Caniëls & van den Bosch, 2011). The role of the university as a key contributor to national innovation systems is widely cited (Mowery and Sampat, 2005). Cooke (2005) sees the role of the university as a ‘knowledge transceiver’ – accessing knowledge on a global level for more localised application. This interaction to create national innovation systems is what Etzkowitz and Leydesdorff (2000) refer to as the triple helix of innovation. The national innovation system is also seen as a key contributor to the knowledge base of an economy (Huggins & Johnson, 2009). The knowledge base of an economy can be defined as “the capacity and capability to create and innovate new ideas, thoughts, processes, and products and to translate these into economic development that is, increasing the value of a regional economy and the associated generation of wealth” (Huggins & Izushi, 2007).

The ‘engaged university’ represents an extension of the third mission where the university is further focused on economic and social development through

- supporting policy initiatives,

- providing leadership
- response to regional and national needs (Benneworth et al., 2007).

2.10.1 National systems of Innovation - defining the triple and quadruple helices of innovation

Goldstein (2010) feels the triple helix model is perhaps the most well-articulated and best historically grounded model to consider the evolution of the university and the requirements of the knowledge-based economy.

George Osborne (UK Chancellor of the Exchequer) stated in 2012:

“you don’t get innovation by a plan imposed by government and you can’t measure it by just counting patents or even just spend on research and development. You get innovation when great universities, leading-edge science, world class companies, and entrepreneurial start-up’s come together” (Open Innovation 2.0).

The triple helix model was developed by Etzkowitz and Leydesdorff, (2000) to model university-industry-government interactions as a national innovation system (figure 2.10). The triple helix thesis postulates that the interaction between university-industry-government is the key to improving the conditions for innovation in a knowledge-based society. Industry operates in the triple helix as the locus for production; government as the source of contractual relations that guarantee stable interactions and exchange; the university as a source of new knowledge and technology. The organising principle of the triple helix is the expectation that the university will play a

greater role in society as an entrepreneur.

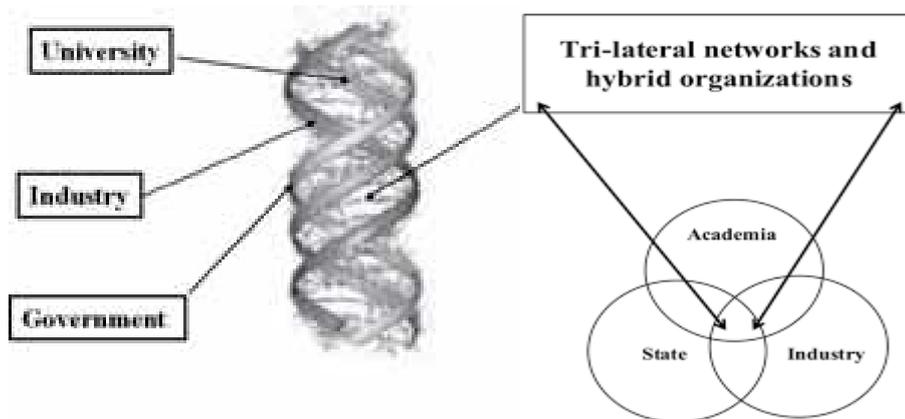


Figure 2.10: The Triple Helix model of University-Industry-Government Relations (source: Etzkowitz & Leydesdorff, 2000, p. 111)

Etzkowitz (2008) expresses the triple helix in a series of propositions:

- Arrangements and networks among the triple helix institutional spheres provide the source of innovation rather than any single driver.
- The development of entrepreneurial ecosystems is as crucial as the development of intellectual property in determining the rate of innovation.
- The linear model of innovation, with the five elements of basic research - applied research - development - innovative products - economic growth, much associated with the managed economy, is considered no longer universally valid (Sweeney, 2002). This traditional linear model of innovation (invention– innovation -diffusion), through mechanisms of market pull or technology push, has been supplanted by an interactive model of linear and reverse linear dynamics.

- Academic institutions are becoming the hub of regional development with universities becoming more 'entrepreneurial' to facilitate this.

Within the triple helix model, it is noteworthy that as universities become more entrepreneurial, the shared space with industry will increase as they take on the role of industry. The entrepreneurial university is seen to engage in nonlinear innovation, joining networks and clusters with industry where, even though functional specialisation continues, both universities and industry perform basic and applied research and experimental development (Carayannis and Campbell, 2009). Similarly, within the open innovation paradigm, innovation occurs through shared ideas within organisational clusters. The idea of "open innovation" as identified by Chesbrough (2003) understands the open innovation paradigm as the antithesis of the linear innovation model (Arnkil et al., 2010). Chesbrough et al. (2006, p.26) originally defined open innovation as "the use of purposeful inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively". Roper (2008) foregrounds the key strategic challenge for organisations as how they can develop the organisational dynamic capabilities in the sourcing and exploitation of both internal and external knowledge to maximise and sustain innovation. The implementation of open innovation can be considered an organisational innovation (Christensen, 2006). Enkel et al. (2009) have differentiated three core processes in open innovation. These are (1) the outside-in process, which in itself is not a novel process, where the organisation enriches its own knowledge base through the integration with the external ecosystem and through external knowledge sourcing and the

development and exploitation of knowledge networks. The (2) inside-out process focuses on the externalisation of knowledge and innovation in order to bring products to market faster than they could through internal development. In this instance both the research producing organisation and the spin out vehicle earn profits through selling /licencing IP and/or multiplying technology through joint ventures with companies both in and beyond its traditional markets. The (3) coupled process, combining the above processes, namely the outside-in and inside-out processes and jointly develop and commercialise innovation. The coupled process is a process of joint creation through organisations with complementary partnerships and typically achieved through alliances, cooperation and joint venture.

From an Irish context, the entrepreneurship in Ireland report (2017, p 50) commented “Irish entrepreneurs and experts were generally very positive about government programmes that support entrepreneurs”. This report also grouped Ireland as second only to the Netherlands in terms of technology transfer support (p 53) and Ireland is also fourth in Europe in terms of high- and medium-tech entrepreneurship (p 5) further highlighting the importance of the role of government strategy within the triple helix.

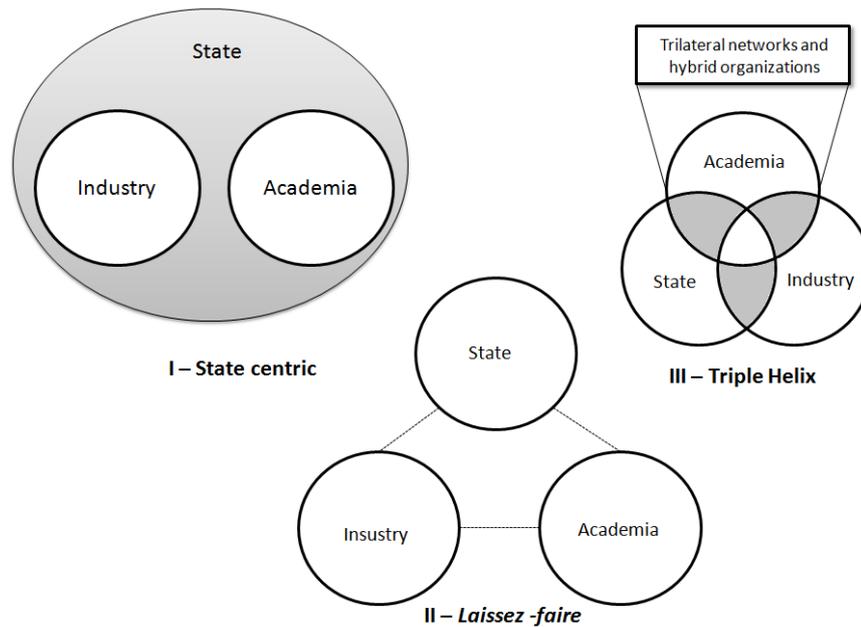


Figure 2.11: Static centre to the Laissez-faire and the Triple helix models (Etzkowitz, 2002)

The triple helix denotes not only the relationship of university, industry and government but also the internal transformation within each of these spheres (Etzkowitz & Leydesdorff, 2000). The knowledge base and its role in innovation can be explained in terms of the evolution of the relationships between universities, industry and government. This evolution is seen in terms of a three step process. The first policy model, the state centred model of relations, which was found in typically Soviet Union socialist countries, is one where the nation state encompasses academia and industry and directs relations between them. The second policy model, the laissez-faire approach, is an opposite approach with government, academia and industry separate and apart from each other, interacting only modestly across strong boundaries. The first policy model is viewed by Etzkowitz and Leydesdorff

(2000) as a failed policy model, which discourages innovation due to lack of encouragement for “bottom-up” initiatives. They view the second model as a “shock therapy” often advocated as a counterbalance to the excessive state control of model 1. In the third model, each of the elements has become open to change and to increased interaction, and cooperation occurs from positions of relative autonomy enhancing each other’s performance of their traditional roles. In this development of a triple helix model each partner maintains its primary role and distinct identity but also assumes some of the capabilities of the others as knowledge infuses. Rather than being subordinated to either industry or government, the university is emerging as an influential actor and equal partner in a triple helix of university-industry-government relations. The triple helix thesis states that the university can play an enhanced role in innovation in increasingly knowledge-based societies (Etzkowitz 2003).

The socioeconomic success of a region is very much reliant on the relations between the elements of the triple helix (Smith & Bagchi-Sen, 2010). Therefore, the concept of regional innovation relies on the generation and dissemination of purposeful knowledge based on the relationships and agreements that guide the entrepreneurial ecosystem of the triple helix. A successful ecosystem will provide the regional government with the knowledge required to define policies that can affect entrepreneurial activity and competitiveness. This requires continuously analysing the actors (institutions, groups, universities, industries) and regional competences as well as the triple helix interactions engaged with innovative activities. (Huahai et al., 2011). Farinha and Ferreira (2013) consider the the triple helix model

in terms of competitiveness and regional development in their “triangulation model” (figure 2.12). The Triple Helix Triangulation (THT) model is structured

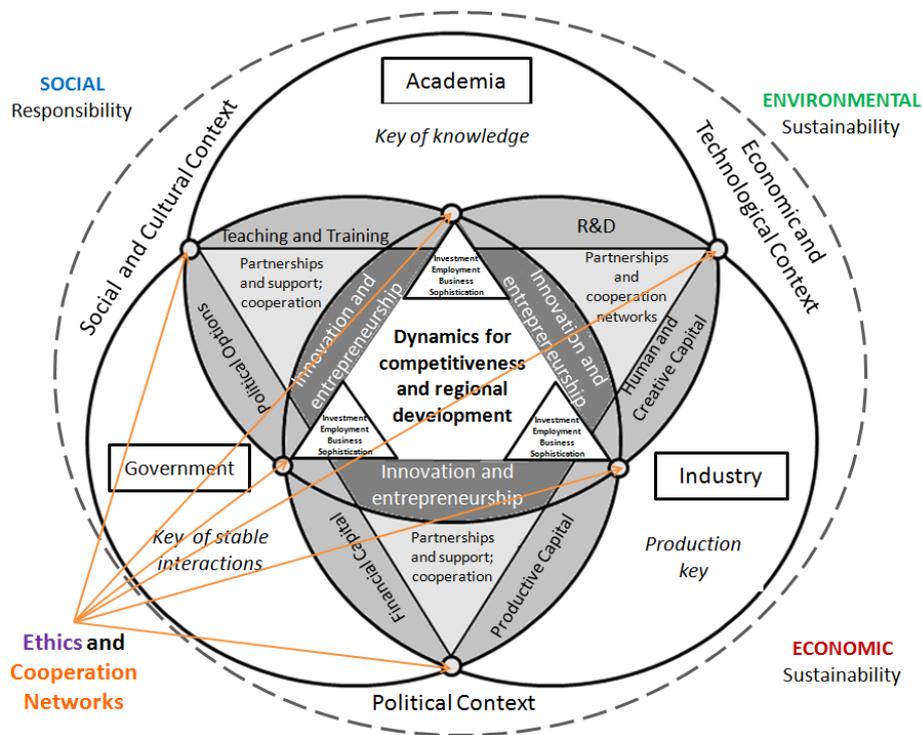


Figure 2.12: Triple Helix Triangulation Model (Farinha and Ferreira, 2013)

around the interactive relationships between the three institutional spheres (university – industry – government) . Seeking to aid in describing and clarifying the dynamics underlying regional competitiveness and development, the Triple Helix Triangulation model leverages the dynamics present in the triple helix. It focuses on local innovation and entrepreneurship as catalysers of development and a region’s ability to compete globally based upon networked management and rooted in the three pillars of environmental and economic sustainability and social responsibility.

To be an entrepreneur, a university must have considerable independence from the state and industry, but also a high degree of

interaction with these institutional spheres. An important characteristic of the entrepreneurial university is that research problem definition comes from outside sources as well as from within the university and scientific disciplines. An entrepreneurial society generates scenarios in which its members can identify and exploit economic opportunities and knowledge to promote new entrepreneurial phenomena that have not been previously visualised. Within these societies, universities are seen as important catalysts for regional economic and social development because they are natural incubators that create new ideas and technologies, promote new business creation, and offer a variety of resources and capabilities that contribute to creating a sustained competitive advantage (Audretsch, 2009).

Some contributors see the triple helix approach to innovation as having its limitations (Arnkil, Järvensivu, Koski & Piirainen, 2010). Helms (2009) sees the meta approach with its top down, expert led system of innovation as the main problem with the triple helix model. Barroso (2010) feels that economic growth requires (a quadruple helix) cooperation between the triple helix partners and civil society (users and consumers). The quadruple helix adds to the triple helices outlined by Etzkowitz and Leydesdorff (2000) through the inclusion of a fourth helix which includes both the civil society and the users of innovation, thereby acknowledging that knowledge and innovation policies and strategies must incorporate the 'public' to successfully achieve goals and objectives. "Within the Quadruple Helix of Innovation, industry, government, academia, and citizens work together to co-create and drive structural changes far beyond the scope of what organizations can do on their own. There is much deeper networking

among all participants, including societal capital, creative commons, and communities” (Curley and Salmelin, 2013, p 9). Further, the quadruple helix identifies that the public perception of innovative culture is defined through media, culture, creative industries and values, and considered to influence national innovation systems. Therefore, government must communicate policy through the media to achieve public support for its strategy (Carayannis and Campbell, 2010). Yawson (2009) also sees the inclusion of a fourth helix, the public, as an essential addition to the triple helix of state, university and industry. This addition of a fourth helix – creating a quadruple helix- then defines innovation at a national level in terms of the role of users being of equal importance to government, universities and industry (Afonso, 2012). Miller et al. (2018) note how the fourth helix (users) create opportunities for open innovation through their demand for innovation. Arnkil et al. (2010) presents the quadruple helix as being complementary to the triple helix and national innovation systems literature but does highlight the limitation in these models that not all innovation processes are as geographically bounded– citing social media as an example.

2.10.2 Public policy evolution to consider the entrepreneurial contribution of universities

Martin (2012) notes that governments and policy makers have increasingly recognized the contribution of universities to national systems of innovation since the first introduction of ‘systems of innovation’ theory by Freeman (1987), Lundvall (1992) and Nelson (1993). Public policy across practically all western economies now contains the goal of the development of

networked societies while recognizing the emergence of the knowledge-based economy and the waning of the 'old economy' (Casson, 2003). What is striking across the EU is the emergence and diffusion of an entirely new public policy approach to generate economic growth—the creation of an entrepreneurial society (Audretsch, 2009). It is in recognition of the challenge of the Swedish paradox that the EU 2010 Lisbon Proclamation stated that Europe would become the entrepreneurship leader by 2020.

According to the European Union (EU, 2003), universities play a crucial role in the development of the knowledge society, economic competitiveness and social cohesion. This is identified in the Bologna declaration where the importance of learning as a prerequisite to societal advance is recognized as a primary goal of the EU. In the United States, the Consortium for Entrepreneurship Education (2004) has promoted a comparable agenda. The Bologna Declaration (a joint declaration of the EU ministers of education in 1999) aimed to create the European Higher Education Area (EHEA) by the end of 2010. Today, the process involves 47 countries, out of the 49 countries that have ratified the European Cultural Convention of the Council of Europe (1954) (Etzkowitz, 2012). In the context of the Bologna Process, the Commission presents the role of the university as one of equipping graduates for personal and societal benefit (Keeling, 2006).

The EU launched the Lisbon strategy in 2000 with the goal of transforming the European Union (EU) to a knowledge-based economy and society by 2010. The "Oslo Agenda for Entrepreneurship Education in Europe" (2006) was the next EU-wide initiative to promote entrepreneurship

education and the development of an entrepreneurial EU society.

Specifically, the Oslo Agenda described their Objective D10 as: “Higher education establishments should integrate entrepreneurship across different subjects of their study programmes; all faculties/ disciplines should develop opportunities for students at every level to experience entrepreneurship” (EC 2006, 3). In the Europe 2020 strategy, the European Commission created the Entrepreneurship Action Plan (covering 2010-2020), with the goals of the creation of an entrepreneurial culture across the EU with an improved public perception of entrepreneurs, and the development of entrepreneurial skillset through the introduction of entrepreneurship modules across higher education curricula (Florea, 2013). Therefore, the aim of EU policy is to make the European university system a model of best practice for the rest of the world by ensuring the availability of sufficient resources, the creation of entrepreneurial ecosystems and increasing the outreach and international appeal of European universities (Talbot et al., 2012). These ideals of best practice are aligned with the mission of modern universities as they seek to become knowledge enterprises (Butera, 2000) or engage in academic capitalism and become more entrepreneurial.

However, the EU Survey of Entrepreneurship in Higher Education in Europe (2008) highlighted the fact that entrepreneurial education is still immature in the sense that it is often person driven and depends upon the efforts of individuals rather than a collective strategic effort on the part of the academic institution or national government. This impacts the number of academics involved in entrepreneurial education and as a consequence the development of an entrepreneurial culture in an institution (Florea, 2013).

The EU president, Barroso, J.M. (2009) noted that the EU approach to the development of an entrepreneurial society has remained a fragmented one. The European Commission has noted that the lack of a unifying policy across all stakeholders has been to the detriment of a culture of entrepreneurship and innovation in higher education (Soriano & Mulatero, 2010). According to UNESCO (2005, p. 87), higher education institutions “are destined to play a fundamental role in knowledge societies, based on radical changes in the traditional patterns of knowledge production, diffusion and application”. However, the traditional entrepreneurship curricula comprising of business management and new business venture development are an inadequate solution to evolving societal needs (Gibb, 2002). The EU (2008) notes that organisationally, within higher education institutions there are significant organizational impediments to delivering cross campus entrepreneurship programs. Often, departments and faculties work in silos typically to the detriment of interested students and staff. “Coordinated change is required both in systems regulation and in institutional governance in order to mobilise the enormous potential of knowledge and energy of European universities to adapt to new missions” (EU, 2006b, p. 1).

2.11 Models of an Entrepreneurial University

While the field of literature on the entrepreneurial university is expanding rapidly, Sooreh et al. (2011) note less than ten relevant scholarly models of the entrepreneurial university. The literature in the area is split into

two related fields - university (and academic) entrepreneurship and literature on the entrepreneurial university. There is a considerable body of literature concerning academic entrepreneurship, however, the literature on the entrepreneurial university is underdeveloped and somewhat embryonic (Guerrero, 2012). There are only limited studies devoted to theoretical frameworks and models of the entrepreneurial university (Gibb, 2013). In fact, Guerrero and Urbano (2010) contend that most of these early contributors to the academic conversation utilised case study methodology as an explanatory framework but lacked a theoretical lens or conceptual framework.

Clark (1998) can be considered among the earliest contributors to the entrepreneurial university academic conversation. Clark (1998) discussed the organisational requirements of entrepreneurial universities from a global entrepreneurship perspective. Many subsequent attempts to theoretically model the entrepreneurial university have adopted the resource-based view to help explain how the internal factors (assets and capabilities) of the organisation and indeed exploitation of these resources afford strategic competitive advantage (Rothaermel (2007), O'Shea et al. (2005), Salamzadeh et al. (2011)). A number of contributors utilised the resource-based view and the theoretical framework of institutional economics (Guerrero and Urbano, (2010); Kirby et al., 2011) to model the development of entrepreneurial universities. Institutional economic theory (North, 1990, 2005) considers how institutions and the institutional context affect economic and social development. North proposes that the role of societal institutions is the establishment of stable norms which frame societal interactions.

Institution is defined very broadly as “the rules of the game in a society, or more formally, institutions are the constraints that shape human interaction” (North, 1990, p. 3).

This literature review segments into four types of models identified in the literature, and these will be discussed next:

- models of the development of the entrepreneurial university
- models of academic entrepreneurship
- models which consider the socioeconomic impact of the entrepreneurial university
- models which evaluate the impact of entrepreneurial activities within entrepreneurial universities

2.11.1 Models of the development of the entrepreneurial university

The need for the entrepreneurial transformation of academic institutions into ‘entrepreneurial universities’ was first identified by Burton Clark (1998). Clark (1998) completed a comprehensive case study of universities which had developed the ability to adapt to changes in the external environment and transform to become more entrepreneurial. The external challenges include the demands of industry for an increasingly diverse skillset among graduates coupled with the expectation of government of increased student numbers at a lower cost. Clark identified academic institutions as particularly resistant to change with transformation of this

nature requiring champions from across all sections of the campus. The Clark (1998) model focuses on the process of a university becoming entrepreneurial and identifies five elements required:

- (i) A strengthened steering core
- (ii) An expanded developmental periphery
- (iii) A diversified funding base
- (iv) A stimulated academic heartland
- (v) An integrated entrepreneurial culture.

Further work by Etzkowitz (2004) expresses the entrepreneurial university in terms of its relationship with its triple helix partners:

1. Interaction –its ability to interact with triple helix partners,
2. Independence – its ability to retain its academic freedom
3. Hybridization - its ability to realize both interaction and independence with its triple helix partners
4. Reciprocity- its ability to continually evolve internally as the relationship with industry and government

Etzkowitz (2008) developed a framework of the entrepreneurial university comprising four parts, or pillars:

1. academic leadership
2. organisational capacity

3. entrepreneurial ethos
4. legal control over resources.

Guerrero et al. (2006) in their literature review on the entrepreneurial university, reviewed theoretical models and empirical studies. Their model is based upon previous contributions from Clark (1998), Sporn (2001), Etzkowitz (2004) and Kirby (2006). The environmental factors which influence effective entrepreneurship within universities are classified formal and informal. Their findings, i.e. factors affecting creation and development of entrepreneurial universities are shown (Figure 2.13):

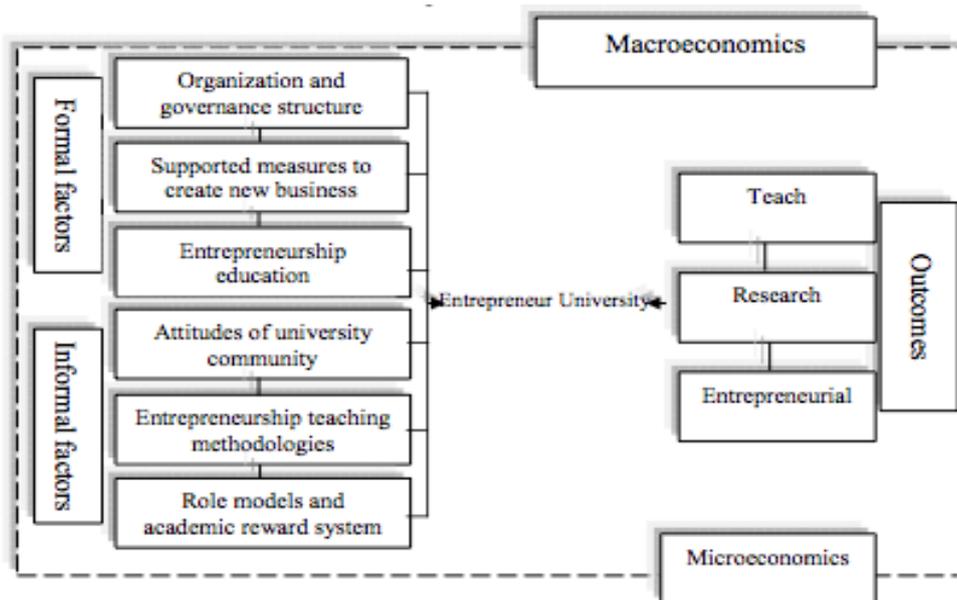


Figure 2.13: Factors affecting creation and development of Entrepreneurial Universities (Guerrero et al., 2006)

Kirby et al. (2011) propose further development of this model in term of influencing factors on the development of an entrepreneurial university and the outcomes of these processes in terms of teaching, research and entrepreneurial activities (Figure 2.14).

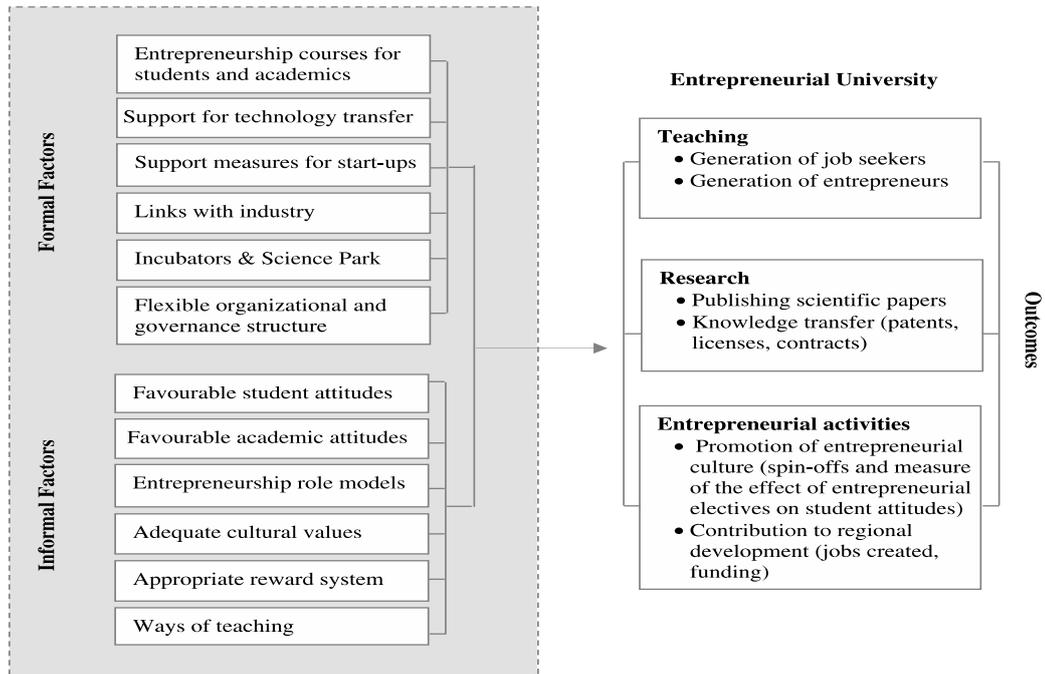


Figure 2.14: Conceptual framework of entrepreneurial universities (Kirby et al., 2011)

Salamzadeh et al. (2011) builds upon the Guerrero (2006) model and utilise systems theory and present a systematic approach using the IPOO Model (Input-Process-Output-Outcomes Model) (Figure 2.15). Salamzadeh et al. (2011) see the framework as dependent on its environmental factors and context.

Context			
Inputs	Processes	Outputs	Outcomes
<ul style="list-style-type: none"> Resources (Human, Financial, Informational, Physical) Rules and regulations Structure Mission Entrepreneurial capabilities Expectations of the society, industry, government and market 	<ul style="list-style-type: none"> Teaching Research Managerial Logistical Commercialization Selection (for students, university professors and staff) Funding and financial Networking Multilateral interaction processes (between students, university professors, staff, industrial researchers, entrepreneurial centers, industries, policy makers and society) Innovation, research and development activities (IR&D) 	<ul style="list-style-type: none"> Entrepreneur human resources (including university professors, graduates, researchers, and staff) Effective researches in line with the market needs Innovations and inventions Entrepreneurial networks Entrepreneurial centers (e.g. incubators, science and technology parks, spin-offs, etc.) 	Third Mission

Figure 2.15: Systematic framework for Entrepreneurial Universities (Salamzadeh et al. (2011))

Guerrero and Urbano (2010) developed the conceptual model of an entrepreneurial university to show the entrepreneurial university as a function of the environmental and internal factors involved in their creation and development (Figure 2.16). They consider the evolution of the entrepreneurial university from an Institutional Economics (formal and informal factors) and Resource Base-View (resources and capabilities). This idea of the inputs and outputs related to entrepreneurial universities is developed to show that the outcomes of an entrepreneurial university are linked with its missions; teaching, research, and entrepreneurial activities. Based on this, the conceptual model of an entrepreneurial university integrates the environmental and internal factors involved in the creation and development of entrepreneurial universities:

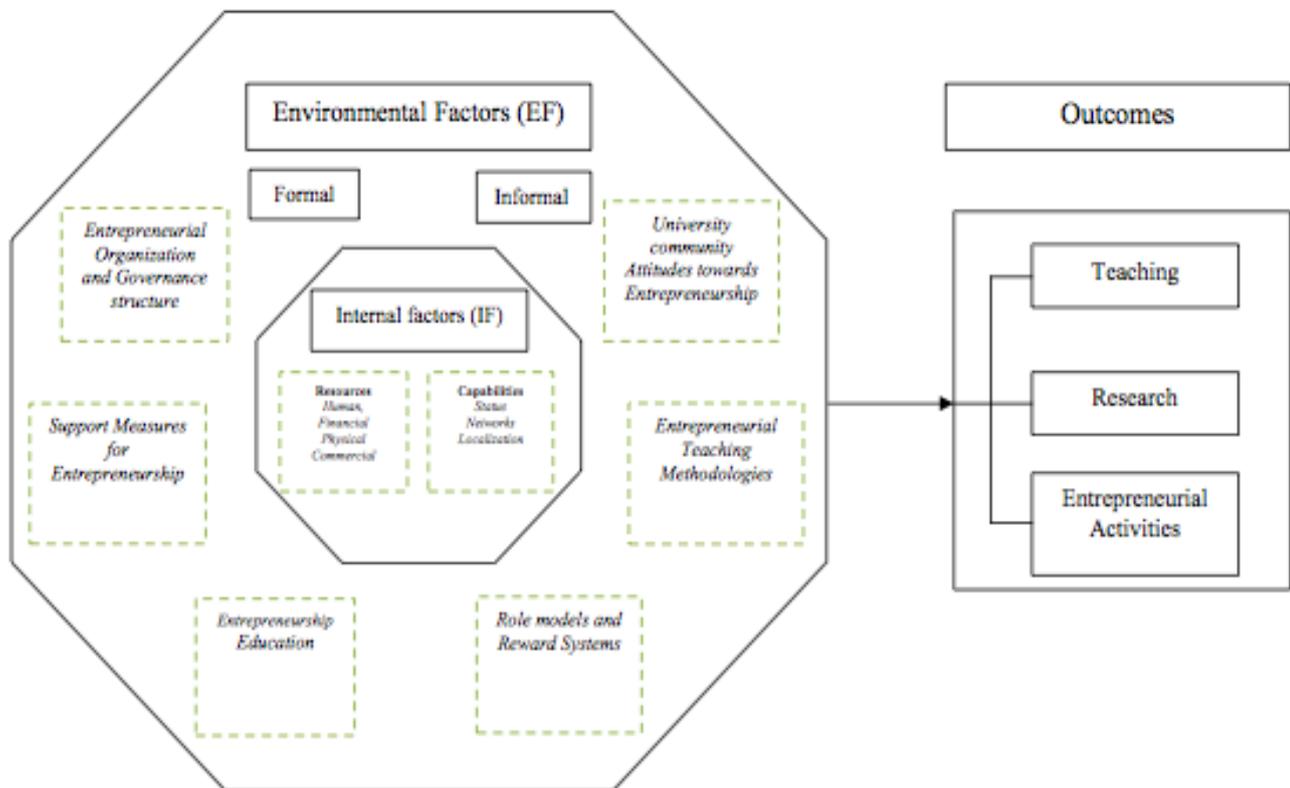


Figure 2.16: Conceptual framework of factors involved in the transition of universities into Entrepreneurial Universities (Guerrero & Urbano, 2012)

Gibb (2012) presents a framework which considers the contribution of the entrepreneurial university to key elements of the university strategy. The framework considers the contribution of entrepreneurial initiatives to the strategic goals of developing as a learning organisation, developing alternative revenue streams and greater innovation and research excellence through interaction with the broader entrepreneurial ecosystem (Figure 2.17). Gibb presents the framework as a potential ‘audit framework’ of a wide range of university entrepreneurial activities.

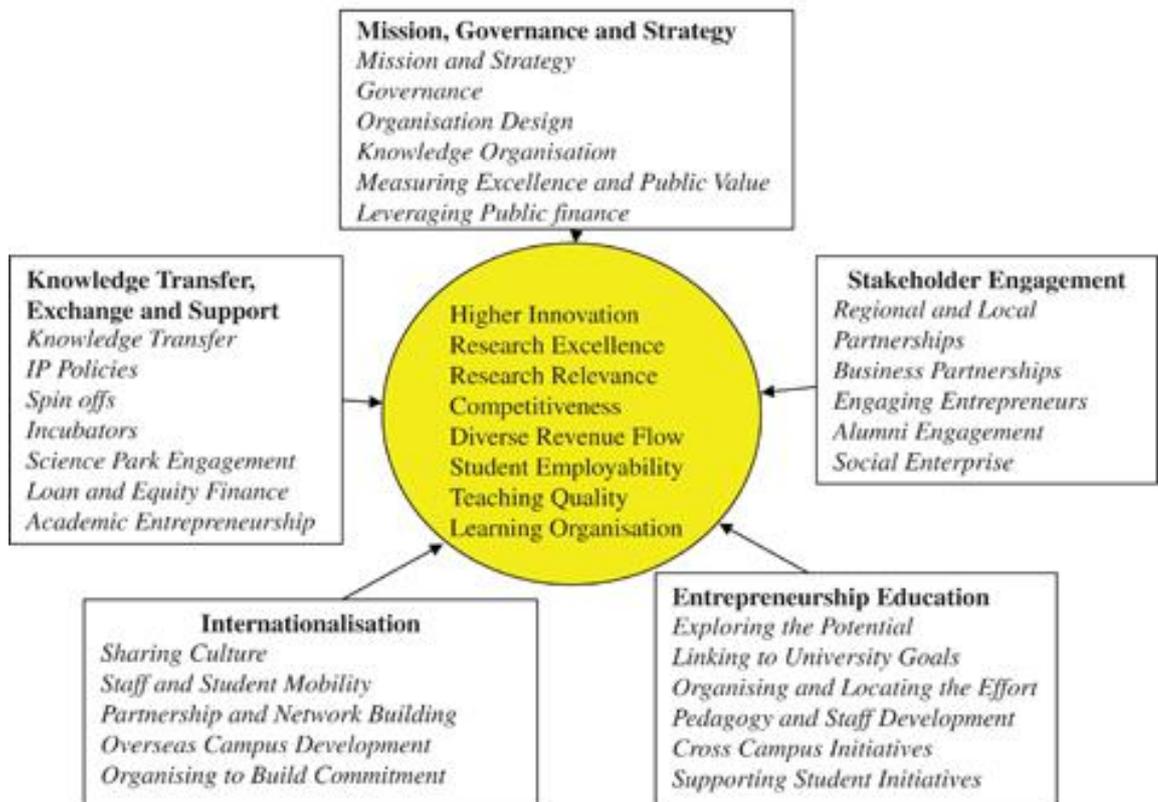


Figure 2.17: Key areas of university entrepreneurial potential. (Gibb, 2012)

Each of the models of the development of the entrepreneurial university presented in this section foreground equal importance of a culture of entrepreneurship as the development of physical resources such as technology transfer offices. However, it is important to note that each university has different cultures, research traditions and priorities (Gibb, 2012). The models highlight that the entrepreneurial third mission is supported and best achieved through the combining of an entrepreneurial culture with physical resources and organisational design. The models illustrate desired outputs including the development of entrepreneurial graduates, knowledge transfer and the commercialisation of research as an additional source of funding, entrepreneurial engagement with external ecosystem and the development of entrepreneurial networks, and the

development of mechanisms and infrastructure supportive of entrepreneurial activity.

2.11.2 Models of academic entrepreneurship

Grimaldi et al. (2011) refers to as “academic entrepreneurship” any technology based entrepreneurial activity which results in the commercialisation of academic research. Within academic entrepreneurship, Grimaldi et al. (2011) include the technology transfer activities of patenting, licensing, start-up creation, and university–industry partnerships.

Rothaermel’s (2007) extensive literature review of university entrepreneurship identified four areas of contribution and an academic entrepreneurship model is developed based on these principal themes. Rothaermel (2007) identified university research, the effectiveness of commercialisation and technology transfer offices, the ability to generate spin offs, and the development of effective entrepreneurial ecosystems as the key contributors to effective academic entrepreneurship (figure 2.18).

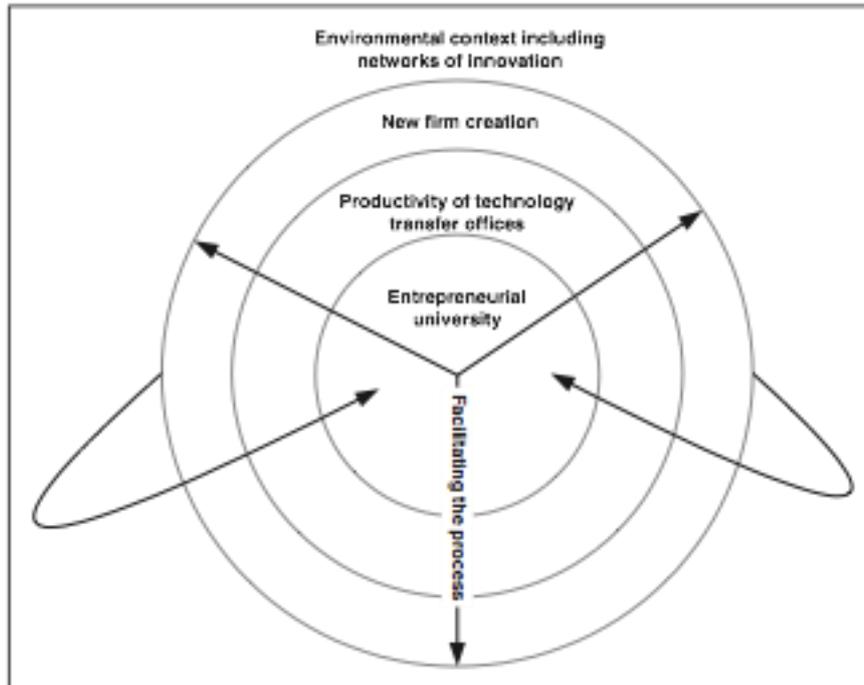


Figure 2.18: Framework of university entrepreneurship (Rothaermel, 2007)

O'Shea et al. (2007) identify, from a resource-based view perspective, the inter-related factors that have contributed to successful academic entrepreneurship in Massachusetts Institute of Technology (MIT), a top spinoff generator in the United States. They present a model (figure 2.19) suggesting that four attributes of the university can be important in supporting and encouraging spinoff activity. The identified attributes include:

- the science and engineering base of the university
- the quality of research by university staff
- the commitment to spinoff activity within management in the university (leadership and supporting policies)

- the culture within the university (Entrepreneurial Orientation of the university)



Figure 2.19: Spinoff performance model (O'Shea et al., 2007)

2.11.3 Models considering socioeconomic impact of the entrepreneurial university

Urbano and Guerrero (2013) develop their work on the entrepreneurial university to consider the socioeconomic impact of activities supportive of academic entrepreneurship within entrepreneurial universities. The entrepreneurial university is considered a natural incubator of new knowledge and technology which can contribute to regional socioeconomic

development. Based on institutional economics, the resource-based view, and endogenous growth theory, the model identifies the need for knowledge capital and entrepreneurial capital to realize the socioeconomic outcomes related to the activities of the entrepreneurial university (teaching, research, and entrepreneurial but, particularly, academic entrepreneurship). The possible socioeconomic impacts of the entrepreneurial university based on these determinants are presented in terms of realizing competitive advantage and productivity gains as an institution and regional benefits through improved GDP and social benefits.

Urbano and Guerrero (2013) focus very much on the traditional areas where universities can add value and subsequently financially exploit that added value through technology transfer, licencing and the development of spin out companies. They highlight how in the Catalonian universities, there is a policy directed at improving the capabilities in these specific areas. Interestingly, the research highlights the importance of universities supporting the development of entrepreneurial capabilities, not only within the university but also within the companies and firms that the universities engage with. They also note the importance of the history and culture of the university as a determinant of the success of the entrepreneurial activities of the institution. However, the research affords less attention to the nature of university government engagement and the role of universities as supports of governmental economic strategy (Pugh et al., 2016).

2.11.4 Models which evaluate the impact of entrepreneurial activities within Entrepreneurial Universities

The nature of an entrepreneurial university is such that there is an expectation of external engagement with industry, the commercialisation of research and the development of entrepreneurially minded graduates. The organisational culture at department and institutional level should reflect this conception. Therefore, the entrepreneurial orientation of the university becomes a key indicator of the entrepreneurial university (Guerrero, 2014). Todorovic et al. (2011) describe development of a scale, ENTRE-U, that measures the entrepreneurial orientation (EO) of university departments. EO is the “inclination of top management to take calculated risks, to be innovative, and to demonstrate proactiveness” (Morris et al., 1987, p 41). The research provides support for the assertion that what it means to be “entrepreneurial” likely varies between industries and universities, and develops a new scale, ENTRE-U, that successfully predicts spinout and patenting activity in university departments. The exploratory factor analysis suggests that university entrepreneurial orientation consists of four dimensions- Research Mobilization, Unconventionality, Industry Collaboration and University Policies.

Research Mobilization refers to an emerging paradigm for the research process in which researchers engage external stakeholders at all stages of the research process, especially in making sure that research outcomes are communicated to multiple audiences in ways that are easily understood, so the results are more readily transferred and applied by stakeholders.

Unconventionality also focuses on research, especially looking for new opportunities and making sure research is useful and benefits stakeholders. However, the items also suggest doing things that are unconventional, and/or innovative. The items do not directly refer to sources of risk (or what is at risk, for example, reputation, resources, or career advancement).

Industry collaboration refers to the department, faculty, and student engagement with the related industry.

University policies relate to the general culture of the university, especially being “responsive to new ideas and innovative approaches”, having a “bottom-up” approach to policy development, and good fit between university policies and department objectives.

The results point to the importance of an entrepreneurial orientation as a partial explanation for the heterogeneity between departments, even within the same university, in commercialization outcomes.

Kiani Mavi (2014) provides a comprehensive criteria set for evaluation of entrepreneurial universities. The environmental and internal factors of entrepreneurial universities as developed by Guerrero and Urbano (2010) were used as the measurement criteria. The author then applied fuzzy analytic hierarchy process (FAHP) for prioritizing critical factors and fuzzy technique for order preferences by similarity to ideal solution (FTOPSIS) for ranking alternative universities with regard to their entrepreneurialism.

An interesting collaboration which further underlines the importance of research on the entrepreneurial university is the HEInnovate collaboration

between the EU and the OECD. They have developed a self-assessment tool for HEIs to consider the entrepreneurial nature of their higher education environment covering the below eight areas for assessment:

- Leadership and Governance
- Organisational Capacity: Funding, People and Incentives
- Entrepreneurial Teaching and Learning
- Preparing and Supporting Entrepreneurs
- Digital Transformation and Capability
- Knowledge Exchange and Collaboration
- The Internationalised Institution
- Measuring Impact

Mahdavi, Mazdeh et al. (2013) feel little research has focused on evaluation frameworks for measuring universities' entrepreneurial intensity and propose an evaluation framework for determining the performance of entrepreneurship development initiatives in universities. The measure Entrepreneurial Intensity (EI) was introduced by Morris and Sexton (1996) and considers varying levels of entrepreneurship.

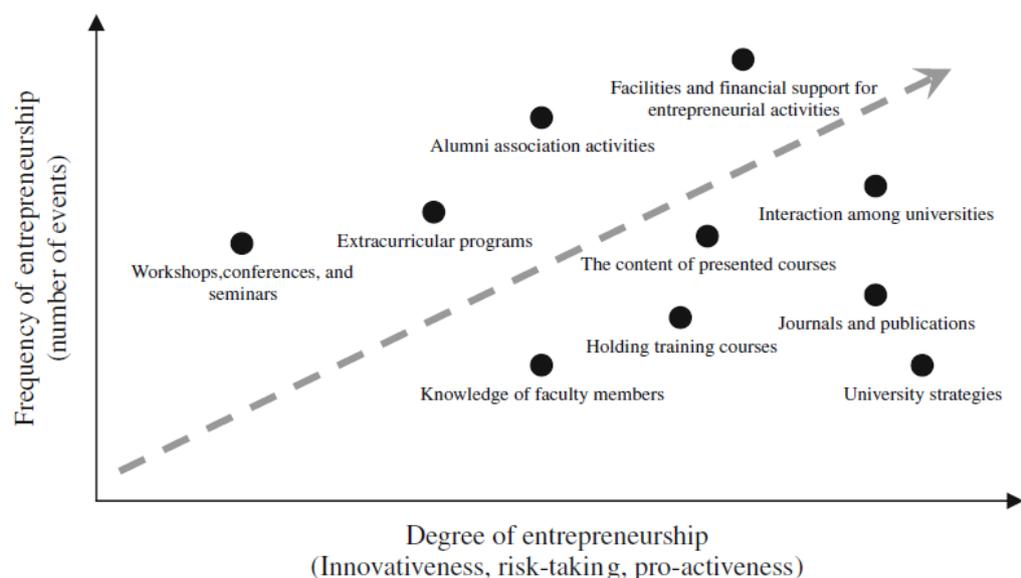


Figure 2.20: Categorisation of evaluation criteria of Entrepreneurial Intensity (EI) (Mahdavi Mazdeh et al., 2013)

The authors use a hybrid multimethod methodology consisting of Delphi, Analytic Network Process (ANP), and the VIKOR method developed to evaluate the EI performance of (Iranian) universities and to provide some directions to improvements. The goal of this research is to facilitate universities in bridging the gap between actual and desired EI performance. The Delphi method is used to localize and reduce the number of criteria extracted from a deep literature review. After that, a group approach to ANP was utilized as an evaluation method to derive the weights of each criterion. Next, the evaluation data were gathered through a questionnaire, and, finally, the compromise ranking of universities was calculated using the VIKOR Method. Finally, weight-variance analysis (WVA) is used to suggest improvement actions.

Cullen et al. (2009) present a framework to measure the success and impact of knowledge transfer activities in UK universities (Figure 2.21). In this model, knowledge transfer activities are effectively in the middle of this innovation system, with research, from which knowledge originates, at one end, and economic activity and impact at the other.

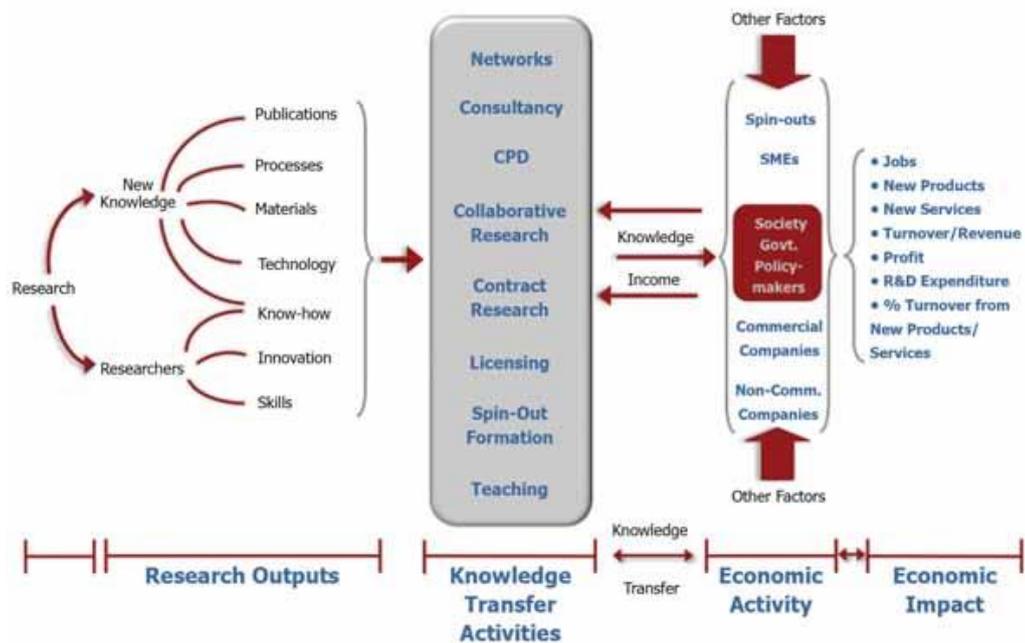


Figure 2.21: Knowledge Transfer within the Innovation Ecosystem (Cullen et al., 2009)

Cullen et al. (2009) adapted a social impact model to clarify what is meant by impact in the context of knowledge transfer, and how to measure it. This knowledge transfer impact model is from the perspective of the universities, given that they are responsible for performing the actual knowledge transfer (Figure 2.22). This shows that impact can be split between gross impact and net impact. Both originally result from an input, which, in this case, is a particular knowledge transfer activity of a university, (e.g. consulting or licensing). Following analysis of the available UK data and both frameworks, Cullen et al. (2009) have come up with a set of measures of both the quantity and quality of the knowledge transfer mechanisms.



Figure 2.22: Model of Impact in the Knowledge Transfer Ecosystem (Cullen et al., 2009)

Typically, the efforts to empirically measure the economic impact of entrepreneurial universities have focused on the measurement of inputs and outputs (such as university earnings from tech transfer) within a managed economy. Few studies have even linked entrepreneurial university activities to GDP. To date there is only one exploratory study completed which proposes methods to measure the economic impact of entrepreneurial universities third mission activities. Guerrero, Cunningham & Urbano (2014) found a positive economic impact from the teaching, research and entrepreneurial activities of UK universities through the use of structural equation modeling to test data from 2005-2007 collected from 147 universities which demonstrated entrepreneurial characteristics.

2.11.5 Summary analysis of models and research gap

The models presented capture the state of the art and the understanding of the entrepreneurial university paradigm. The modelling of the entrepreneurial university has been extensive and present an excellent framework and basis for this research. In summary, the models of the entrepreneurial university call for effective governance, the creation of physical infrastructure to support entrepreneurial activity and diversification of the funding base, the development of an entrepreneurial culture across the university, and the development of organisational units which work outside traditional university departments supportive of third mission activities including knowledge transfer and the management of intellectual property, engagement with external partners including industry and alumni and the broader entrepreneurial ecosystem. However, two gaps in the research were noted which informed and framed this research study. Firstly, as has been noted by other contributors (Klofsten et al. ,2019), while these models outline the factors and indeed the determinants in the development of entrepreneurial universities, comment on leadership and strategic issues, as universities undertake this evolution and become more entrepreneurial, is quite limited. Secondly, the literature on the entrepreneurial university presents models and frameworks which are theoretical or quantitative in nature. A research gap exists in terms of looking at the entrepreneurial university qualitatively and understanding the evolution of entrepreneurial university from the perspective of those people tasked with managing this evolution from traditional universities to entrepreneurial universities.

The principal theories employed – the resource based view, triple helix of innovation theory, institutional economics and the endogenous growth theory, all recognize the importance of the development of entrepreneurial capital as a contributor to the university finance/health. The RBV, being internally focused, has been used in the models presented to identify the key internal resources of entrepreneurial universities. However, this researcher concurs with Spender (1994) and indeed Penrose (1959) that the RBV is a static theory. The RBV is a useful theoretical framework for the identification of the key resources within entrepreneurial universities but it does not consider the strategy required to manage the interaction between these resources to maximise their utility in achieving the university mission and strategic goals. This coordination of resources is referred to by Alchian and Demsetz (1972) as 'team production' who also argue that the outcome of the dynamic interaction of resources is not simply a sum of the individual outputs of each individual resource. This is reflected in the static nature of the entrepreneurial university models in the literature. Indeed, one could argue that the focus of the RBV is on the acquisition of VRIN resources rather than on their application in pursuit of the execution of a strategy. Further, the RBV does not afford the ability to develop a hierarchy of importance of the resources identified within the models developed for the entrepreneurial university.

The models presented to date offer an 'outside in' perspective on the development of the entrepreneurial university. To date, while semi structured interviews have been used, there has been no phenomenological study of the lived experience within entrepreneurial universities from a

strategic management perspective. It is hoped that this research, through capturing the lived experience of senior leaders of universities, will contribute to the field by offering an alternate 'inside out' perspective. Further, it is hoped that the theoretical lens of dynamic capabilities theory will offer useful insights into the coordination of resources within the entrepreneurial university.

2.12 Conclusion

Clark (1998) noted the pursuit of a defined entrepreneurial strategy as an essential characteristic in defining the entrepreneurial university. Key contributors to this field (Etzkowitz, 2004; Kirby, 2006; Gibb, 2012) feel all university mission statements and strategies should reference entrepreneurship to ensure its acceptance as a shared goal at all levels in the university.

The role of the entrepreneurial university has been shown as considerably broader and more fundamental than the facilitation of the commercialisation of university research – it is to provide thinking, leadership and activity to enhance entrepreneurship capital in the wider society. This third mission is now central to the role and mission of the university and is expected to stimulate innovation in the knowledge economy. Policy makers see universities as becoming increasingly central and critical to the functioning of knowledge-based economies. This is the message being delivered through policy documents concerning higher education not just at

EU level but also more locally in both the Republic of Ireland (Enterprise Strategy Group, 2004) and the United Kingdom (DfES, 2003).

Ireland ranks eight of 23 countries in the European Union in terms of overall entrepreneurial activity (GEM, 2013). Entrepreneurial activity is therefore strong in Ireland even though numerous reports (The “Entrepreneurship in Ireland” report (Forfas 2002), Enterprise Strategy Group report (2004) and Towards Developing an Entrepreneurship Policy for Ireland report (2007) among others) highlighted that the Irish education system at second and third level is not conducive to the development of students’ entrepreneurial mindset or skills (Garavan, 2010). The Irish national strategy document for higher education to 2030 (the Hunt report) has also highlighted the crucial role to be played by the university in the support of entrepreneurship calling for changes in both the programme and institutional level.

If the university is to be considered effective as an entrepreneurial university, it must achieve goals firstly as an economic actor with the mandate to produce and disseminate both new knowledge and graduates with an entrepreneurial mindset. Secondly the university must support the development of a regional entrepreneurial ecosystem and the creation of an entrepreneurial society with a culture of entrepreneurship and a high absorptive capacity. The strategy selected by the university is a product of national government policy, the management and leadership within the university, the promotion of entrepreneurial culture across all levels and

departments, the level of engagement with the regional ecosystem, and indeed the quality of the university (Kenney et al., 2011).

This literature review highlights the increasingly important role of the entrepreneurial university beyond teaching and research to include the 'third mission' and beyond to the creation of 'entrepreneurship capital'. The effective management of a clearly formulated university entrepreneurial strategy and mission can be seen from the literature as key elements in the execution of this university third mission. This study of the management of universities' mission and strategy, considered through the prism of the evolution of the entrepreneurial university and strategic management theory, specifically Dynamic Capabilities Theory (Teece, 1997) should contribute greatly to knowledge in this area.

Chapter Three

Methodology

3.0 Introduction

In the previous chapter, the systematic literature review identified an opportunity to contribute to the literature on the entrepreneurial university by researching the lived experience of senior leadership within universities. This research proposes using phenomenological interview as a method to understand how the management of each of the Irish universities consider their particular university strategy is contributing to the success of their institution in the evolution of their 'third mission'. In advance of the fieldwork, a researcher must establish the principles underpinning the different philosophical approaches to research and provide a plausible rationale for the philosophical stance and methodological approach. This chapter is organised to present the research philosophy, research design and methodology. Firstly, approaches to social research are considered. This is followed by a consideration of philosophical approaches to knowledge and research and a description and justification of the social constructionist philosophy adapted by this researcher. Research philosophies and methodologies used in entrepreneurship research are then described. The chapter then considers research strategy and introduces phenomenology and phenomenological approach to data collection and analysis. Finally, ethical considerations and issues relating to the credibility of the study are addressed.

3.1 The philosophical approach

The aims of this chapter are to explain the research philosophy and its link to the research question and research methodology of this study. This research presents an ontologically interpretivist study with the research approached with a social constructionist epistemology. The research strategy is a qualitative, inductive approach drawing on semi structured phenomenological interviews. The research will use the explication processes of Hycner (1999) and Groenwald (2004) as a basis for the phenomenological analysis of the semi structured interviews.

Burns (1997) describes research as a systematic inquiry where information is gathered, understood and interpreted to give explanation to a phenomenon (Mertens, 2005). The selection of a specific research philosophy reveals the beliefs of the researcher relating to the nature of the reality under investigation (Bryman, 2012). It defines how the researcher can 'know' reality' and these philosophical assumptions justify the research methodology (Flick, 2011). A good research project starts with the selection of the problem or research question and a research paradigm (Creswell, 1994; Mason, 1996). Research should be informed by the ideas and beliefs, or research philosophy of the researcher (Creswell, 2013). Huff (2008) argues strongly about the importance of the philosophical stance of the researcher seeing it as a determinant of both the research question and how the researcher seeks to answer the question. These philosophical beliefs of the researcher have been referred to as alternative knowledge claims

(Creswell 2009), philosophical assumptions, ontologies and epistemologies (Crotty, 1998) or as paradigms (Denzin and Lincoln (2000, p. 157)). Denzin and Lincoln (2000, p 19) define a research paradigm as “a basic set of beliefs that guide action”, dealing with first principles, ‘ultimates’ or the researcher’s worldviews. Mac Naughton et al. (2001) provide an alternative definition of paradigm, seeing it as tripartite, including the elements; belief about the nature of knowledge, a methodology and criteria for validity. ‘Paradigm’ comes from the Greek (paradeigma) and Latin origins (paradigma) both of which mean an example or a pattern (Stanage, 1987).

Saunders et al. (2007) approach social research as a six-stage process and called their corresponding model ‘the research onion’. The six stages in the ‘research onion’ include: philosophies; approaches; strategies; choices; time horizons; techniques and procedures.

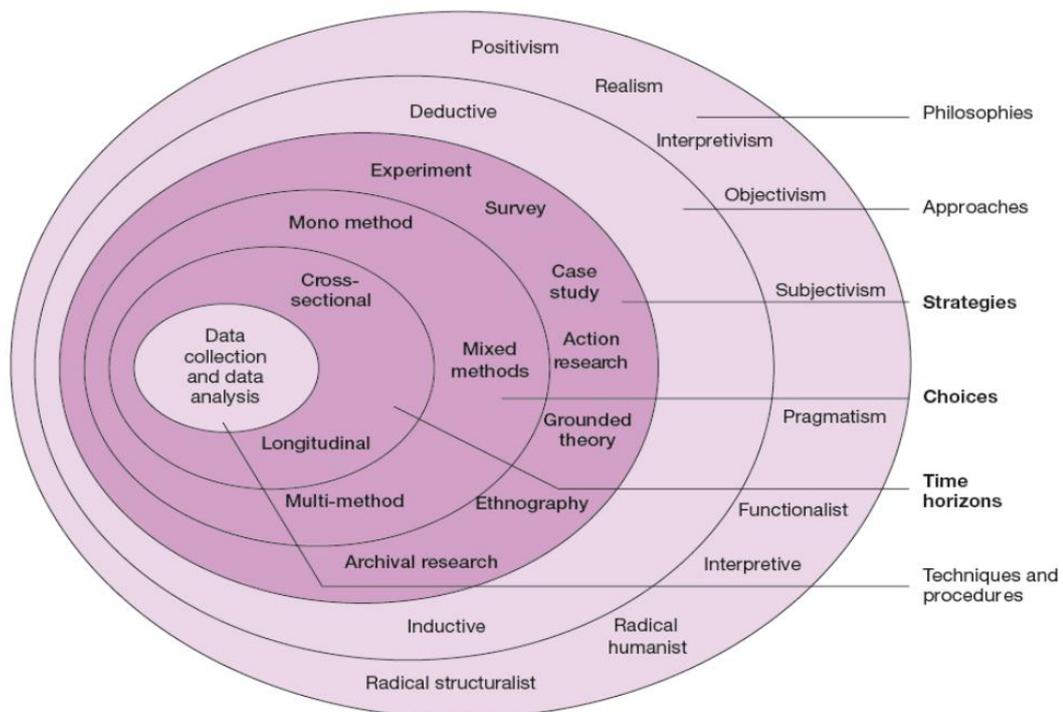


Figure 3.1: The Research Onion (Saunders et al. 2007, p 10)

The research onion does not approach social research through the philosophical stances of ontology or epistemology. Alternatively, and perhaps with greater simplicity, Crotty (1998) illustrates the approach to social research as a four-step approach: epistemology: theoretical perspective: methodology and methods. Creswell (2009) subsequently distilled Crotty's model into just three questions which should be addressed by social research:

- What knowledge claims are being made by the researcher (including a theoretical perspective)?
- What strategies of inquiry will inform the procedures?
- What methods of data collection and analysis will be used?

This researcher found the Saunders et al. (2007) research onion useful in terms of framing the elements of social research, especially as novice researcher. However, ultimately it was decided frame the methodology based on Creswell's (2009) classification due to its simplicity and logical progression from knowledge claims, through strategy of enquiry with both informing method of data collection and analysis.

3.2 Ontology, epistemology and the paradigms

In order to justify the methodology chosen by the researcher, it is necessary to know the philosophical stance of the researcher and the assumptions which inform their theoretical perspective. Each theoretical perspective embodies a certain way of understanding what is real (ontology)

as well as a certain way of understanding what it means to know (epistemology) (Crotty, 1998). Creswell (1994) understands the philosophical stance of researchers in terms of the nature of knowledge (ontology), what we can know about this knowledge (epistemology), a research design (methodology), and how researchers share this knowledge (rhetoric). Koch (1999) argues that researchers need to examine and articulate their ontological and epistemological position before commencement of an interpretive inquiry.

3.2.1 Ontology

Guba & Lincoln (1994) see the ontological question as informing the nature of reality and what can be known about it. Ontology poses the philosophical questions of "what is the nature of reality?" and "what does it mean to be" (Heidegger, 1996). Crotty (1998) depicts a world that exists regardless of whether we are conscious of it which only becomes meaningful when we begin to make sense of it. Blaikie (1993), in linking ontology to social enquiry, sees the ontological position as relating to the theoretical assumptions about the nature of social reality. These assumptions make claims about the kinds of social phenomena that do or can exist, the conditions of their existence, and the ways in which they are related (Blaikie 2010). Blaikie (2010) proposes six types of ontological assumptions along a continuum from positivist- where phenomena which are studied exist independently of the researcher (shallow realist) to interpretivist (idealist) and subtle realist where ontological reality is made from interpretations of reality

created by the human mind.

Shallow realist	Conceptual realist	Cautious realist	Depth realist	Idealist	Subtle realist
Interested only in observable phenomena. Phenomena exist independently of human minds. Science looks to identify patterns in these phenomena.	Reality exists independently of human minds. Reality is not directly observable. Reality exists as a collective consciousness.	Reality exists independently of human minds. We are incapable of knowing reality directly- only interpreting it.	Reality is stratified into the observable (<i>empirical</i>), the <i>actual</i> existing independent of the observer and unobservable underlying structures (<i>real</i>).	Reality is a construct of the mind with social reality a shared interpretation of these constructs.	An independent reality exists which remains unknowable. Knowledge is constructed based on assumptions

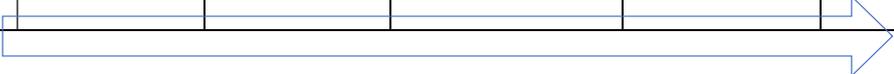


Figure 3.2: Ontological continuum of positivism to interpretivism (based on Blaikie, 2010)

3.2.2 Epistemology

Epistemology questions “the nature of the relationship between the knower and what can be known” (Guba and Lincoln, 1994 p.108). However, they see the epistemology of the researcher as “constrained” by the ontological position. Crotty (1998) describes epistemology as a method of both understanding and explaining knowledge. Epistemology also provides the philosophical base which informs the researcher what knowledge is possible within a legitimate form of study (Maynard, 1994).

Blaikie (2007) sees the social researcher as making a choice regarding the nature of the relationship between the researcher and the researched falling on a continuum between the stance of the natural scientist of ‘detached observer’ to one where the emphasis is on conversation

between the researcher and the researched - 'dialogic facilitator'. Therefore, research paradigms exist along a continuum from the detached scientific /positivist paradigm to the interpretivist (constructionist) paradigm where the researcher exists within the reality and the knowledge being generated. The *positivist* approach maintains that a true explanation or cause of an event or social pattern can be found and tested by scientific standards of verification. The interpretivist approach does not seek an objective truth so much as to unravel patterns of subjective understanding (Blaikie, 2007).

3.2.3 Positivism paradigm

Positivist research in the social sciences is based on the systemic methodologies of the natural sciences. Positivists argue that methods in the fields of natural and social sciences "are fundamentally the same" (Popper, 1961). It is predicated upon 'the rationalistic, empiricist philosophy that originated with Aristotle, Francis Bacon, John Locke, August Comte, and Emmanuel Kant" (Mertens, 2005, p.8). Ontologically, the positivist approach assumes a single objective reality which the researcher can know or approximate through appropriate systematic observational and experimental research methods (Roth, 2002).

Robson (2011) presents the defining elements of positivism as:

- Only objective knowledge, which may be experienced or observed, exists;
- Facts are 'value free', and separated from human values;
- Research is procedure-based and largely quantitative in nature;

- Research is based on known facts with hypotheses tested against what is known;
- The goal of research is the development of universal determinist laws with explanation by relating events to generalizable laws.

Guba & Lincoln (1994) see positivism as being both “reductionist and deterministic”. The research is value free, with research outcomes not subject to the influence of “values or biases”. The researcher and the researched are seen to exist independently of each other with neither exerting an influence on the other. Creswell (2003, p7) also sees positivism as deterministic where research can be viewed through cause and effect mechanisms. Positivism assumes "the social world can be studied in the same way as the natural world, that there is a method for studying the social world that is value free, and that explanations of a causal nature can be provided" (Mertens, 2005, p.8). Positivist research must be replicable beyond the specific case, with a view to generating generalizable social theories comparable to the natural laws of scientific research (Marshall, 1994).

3.2.4 Interpretivist/constructivist paradigm

In advance of the study of sociology, historically it was recognised that to understand the social world, the subjective thoughts and ideas underpinning human behavior must be considered (Merton, 1995). Sociologists researching within the broad interpretivist paradigm, typically follow the lead of American anthropologist Geertz (1973), by researching a

specific situation (often a fluid and changing one) and looking at how people make sense of and understand it (Roth, 2002). Geertz (1973, p.5) stated that “the analysis of culture is therefore not an experimental science in search of law but an interpretive one in search of meaning”. Interpretive research assumes we can know reality through the social constructs of the human mind and therefore does not look to the rule of natural science for explanation (Eliaeson, 2002). Geertz (1973, p 9) claims that facts are “our own constructions of other people’s constructions” and therefore cannot be considered truly objective. Epistemologically, interpretivist research knows reality by "penetrating the frames of meaning used by social actors" (Blaikie, 1993, p 96). Bryman (2008, p.30) presents interpretivism as “requiring the social scientist to grasp the subjective meaning of social action as an alternative to the positivist orthodoxy that has held sway for decades”. The intellectual heritage of the interpretivist philosophy is born from the late 19th and early 20th century philosophers including Husserl, who was recognised primarily his for contributions to phenomenology, and Weber’s ‘Verstehen’ approach to interpretive understanding of human action, often referred to as hermeneutics (Mertens, 2005, citing Eichelberger, 1989). Husserl focuses on the epistemological question of the relationship between the knower and the object of study. He tries to understand the ‘lifeworld’ of reality constructed through the conscious mind. Husserl’s phenomenology frames reality through lived experience and does not look at reality as existing separate from personal experience. Interpretivist enquiry and indeed interpretation is central to the phenomenological method of enquiry as ontologically it

supports the existence of multiple realities which are constructed by the knower (Laverty, 2003).

Verstehen is the term used by Weber to refer to how people understand and give meaning to a phenomenon as expressed by someone else. It is the process by which people make sense of both their actions and the world around them (Bernstrin, 1976). The term is used by Weber in describing efforts by interpretivist researchers to give meaning to the interpretation by people of their experience of being engaged in a particular action (Schutz, 1967). Interpretivism relies upon the participants views of the situation being studied (Creswell, 2003). Ontologically relativist, interpretivism advocates for the use of qualitative data and assumes multiple, and sometimes conflicting social realities. Within the interpretivist paradigm, knowledge consists of those constructions about which there is a relative consensus (or at least some movement towards consensus) among those competent and in the case of more arcane material, trusted, to interpret the substance of the construction. Multiple 'knowledges' can coexist when equally competent (or trusted) interpreters disagree (Guba and Lincoln, 1994).

The positivist/interpretivist 'clash' contrasts positivist explanation with interpretivist understanding (Bryman, 2008). Interpretivist research looks to know "the world of human experience" (Cohen & Manion, 1994), based on the assumption that "reality is socially constructed" (Mertens, 2005). Interpretivists see knowledge existing in shared meaning (Schwandt, 1994) rejecting the single objective reality as proposed by positivism. Interpretivism rejects the limiting by positivism of what we can know, of the social world, to

our sensory experience of the world and our interaction with it. Instead interpretivism holds that to understand motives and actions requires knowing the specific social context (Hughes & Sharrock, 1997). The greatest justification for interpretive enquiry is the need to uncover “the details of the situation to understand the reality or perhaps a reality working behind them” (Saunders et al., 2003). The contrast between positivism and interpretivism is presented by Roth (2002) in table 3.1.

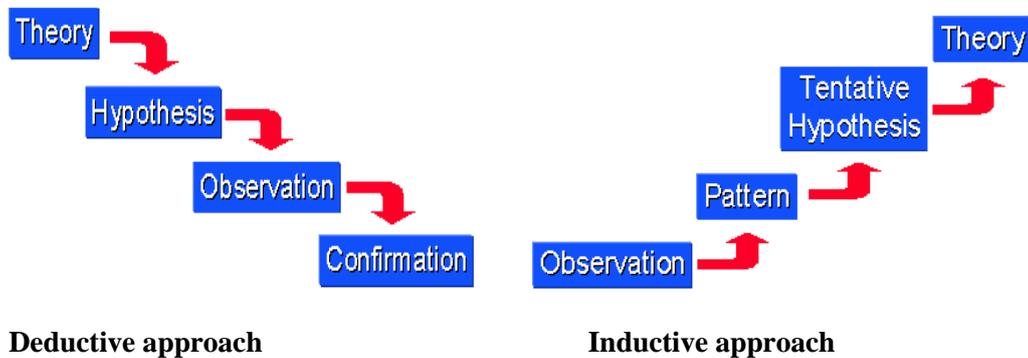
<i>Positivism</i>	<i>Interpretivism</i>
Causation—Seeks to understand the causal explanation for a phenomenon or event	Interpretation—Seeks to understand how people interpret a phenomenon or event
Objective reality—Presumes the “existence of facts”	Subjective reality—Recognizes the “construction of facts”; facts are seen as interpreted and subjective
Generality—Analysis seeks a “law” that extends beyond specific instances studied	Specificity—Analysis is context specific and based only on the subjective understanding of individuals within a specific context
Replicability—Analyses can be tested and verified empirically against other cases	Self-validation—Analyses can only be self-validating, through the consistency and coherence of “thick description”

Table 3.1: Summary of positivist and interpretivist approaches (Roth, 2002)

3.2.5 Inductive, Deductive and Abductive reasoning

Deductive reasoning, which is inherently positivist, commences with the assertion of a theoretical statement which is then applied to a specific situation. Following observations, deductive reasoning determines whether or not the empirical statement tested in the specific situation is true or not. Inductive reasoning, which is typically interpretivist, commences with specific

observations which are codified, and as more evidence is accumulated and relationships become apparent, leads to generalised theory and conclusions (Huff, 2009).



Deductive research normally focuses on causality while an inductive approach normally focuses on exploring new phenomena or looking at phenomena from a different perspective.

In fact, inductive and deductive logics are mirrors of one another, with inductive theory building from cases producing new theory from data and deductive theory testing completing the cycle by using data to test theory (Eisenhardt, 1989).

A deductive approach is based on an earlier theory or model and therefore it moves from the general to the specific (Elo, 2008).

Stinchcombe (in Huff, 2009) offers the three steps below as a deductive approach to research:

1. make a theoretical statement – that says that one class of phenomena will be connected in a certain way with another class of phenomena

2. from this theoretical statement - derive by logical deduction and by operational definitions of concepts, an empirical statement.. (that) the theoretical statement ... implies logically
3. make the observations called for in the empirical statements to see whether or not they are true

An approach based on inductive data moves from the specific to the general, so that particular instances are observed and then combined into a larger whole or general statement (Elo, 2008). The aim of the inductive research strategy is to establish limited generalisations about the distribution of, and the patterns of association amongst, observe or measured characteristics of individuals and social phenomena (Bryman, 2008).

Glaser and Strauss (1967) defined the characteristics of inductive research in terms of building theory upon data, through constant comparison, challenging the data with theoretical questions, theoretical coding and theory development. It is important to stress that descriptions produced by inductive research are limited in time and space and are not universal laws (Blaikie, 2015). Therefore, authors of inductively generated theories have a particular responsibility for discussing limits of generalizability (Whetten, 1989). A key strength of inductive research lies in the development of an understanding of how people interpret their social world. Inductive research is therefore normally interested in the context in which events occur. Inductive and deductive research approaches are contrasted by Saunders et al. (Table 3.2).

Deduction Emphasises	Induction Emphasises
Scientific principles.	Gaining an understanding of the meanings humans attach to events.
Moving from theory to data.	A close understanding of the research context.
The need to explain causal relationships between variables.	The collection of qualitative data.
The collection of quantitative data.	A more flexible structure to permit changes of emphasis as the research progresses.
The operationalisation of concepts to ensure clarity of definition.	A realisation that the researcher is part of the research process.
A highly structured approach.	Less concern with the need to generalise.
Researcher independence of what is being researched.	
The necessity to select samples of sufficient size in order to generalise conclusions.	

Table 3.2: Comparison of Inductive and Deductive research (Saunders et al., 2007)

Abductive reasoning, in contrast to deductive and inductive reasoning, commences in the “real” with the observation of a phenomenon and proceeds then to explain causal mechanisms through modelling and testing (Lawson, 1999).

3.2.6 Social Constructionism

The research philosophy underpinning this interpretivist study is social constructionism. Social constructionism looks to explain how phenomena are

given meaning within society (Berger and Luckmann, 1966). The terms constructionism and social constructivism tend to be used interchangeably. Young and Colin (2004) offer clarity here proposing constructivism as referring to how each individual mentally constructs the world of experience through cognitive processes while seeing social constructionism as having a societal rather than an individual focus. Burr (1995) acknowledges the major influence of Berger and Luckmann (1991) in the development of social constructionism. In turn, they acknowledge the influence of Mead, Marx, Schutz and Durkheim on their thinking. Berger and Luckmann (1966) are concerned with the nature and construction of knowledge, how it emerges and how it comes to have the significance for society. They view knowledge as created by the interactions of individuals within society, which is central to constructionism (Schwandt, 2003).

Social constructionism was popularised in *The Social Construction of Reality* (Berger & Luckman, 1966). Berger and Luckmann (1966) make no ontological claims, limiting themselves to the social construction of knowledge, therefore confining itself to making epistemological claims only. Social constructionism is the epistemological view that “all knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world and developed and transmitted within an essentially social context” (Crotty, 1998, p42). Gergen (1985, p265) defines social constructionism through the belief that “a great deal of human life exists as it does due to social and interpersonal influences”. In social constructionism, the world is interpreted through language and culture, and it is “waiting to be discovered”

or “pregnant with meaning”. That is, the world and the things in it are seen to be not only social constructions, but also “crucial participants” in the meaning making process (Crotty, 1998).

By contrast, Huff (2009) sees social constructionism as having both an ontological and epistemological stance - ontologically saying “individuals and groups participate in the creation of their perceived reality” (Huff, 2009, p 108) and epistemologically referencing Berger and Luckmann - “all knowledge, including the most basic, taken-for-granted, commonsense knowledge of everyday reality, is derived from and maintained by social interactions” (Huff, 2009, p113).

The key principles of Social constructionism are

1. *It is anti-essentialist* - “To be a self is not to be a certain kind of being, but to be in possession of a certain kind of theory”. (Burr, 2015, p 86) Social constructionism rejects the idea that people possess an ‘essence’ which predetermines psychological traits, personalities and identities. Rather social constructionism argues that people, as products of the social world, are a product of social processes, and therefore cannot be of predetermined nature (Burr, 2015).
2. *It is anti-naturalist* – accepting the proposition that it is culture and not biology that forms the human mind and gives meaning to human action (Bruner, 1990).
3. *Relativism* – Social constructionism is seen by Hammersley (1992) as essentially an anti-realist, relativist stance. Social constructionists consider

the underlying nature of reality inaccessible (Robson, 2011) rejecting the idea of 'universal truths' about the world. Social constructionism only considers interpretation of the world.

4. *Meaning*- meaning is given to objects and events through communication with others and the prevailing social culture. Language does not transmit thoughts and feelings but rather makes thought possible by constructing concepts. In this sense, by describing experience through language, language structures experience.

Rather than offering definition of Social Constructionism, Burr (2015) offers that social constructionism is an approach that accepts one or more of the following key assumptions:

1. *A critical stance toward taken for granted knowledge.* Social constructionism challenges the realist stance that knowledge is revealed through 'objective, unbiased observation'. Constructionism emphasises the existence of no single true or valid interpretation (Crotty, 1998).
2. *Historical and cultural specificity.* Social constructionism argues that the ways in which we commonly understand the world, the categories and concepts we use, are historically and culturally specific and are product of the prevailing social and economic arrangements in that culture at that time. Social constructionism sees meaning as rooted in culture and institutional origins with culture providing the lens through which we make sense of phenomena in the world. It is culture which

highlights certain phenomena and gives them meaning while allowing us to ascribe less importance to other phenomena (Collins, 2010).

3. *Knowledge is sustained by social processes.* The true nature of the lived experience of the world is understood through the social constructs created (constructed) by the social interactions of people. Truth can be thought of as how a society currently understands the world.
4. *Knowledge and social action go together* –Social interactions can result in a variety of social constructions of events. Each social construct brings, or invites, a different kind of action from human beings.

Berger and Luckmann (1966) see a subjective reality which is constructed through conversation. This subjective reality holds and assumes meanings and understandings which can be shared unproblematically and without need for constant redefinition (Andrews, 2012). Burr (1995) also comments that within social constructionism, there is language that makes thoughts and concepts possible and not the other way around. It is language that provides the platform upon which concepts are based to explain how we experience the world.

3.3 Social research in entrepreneurship

Qualitative research looks at the world with an “interpretative, naturalistic approach” to scholarly inquiry (Denzin & Lincoln, 2011, p2). The research begins with assumptions and is based within a theoretical

framework where the researcher can consider the meanings actors attribute to a particular question (Creswell, 2013).

Gartner and Birley (2002) consider qualitative research as particularly suitable to entrepreneurship research due to the ability of the researcher to strongly engage with and interpret the environment where entrepreneurial activity is occurring. This implies that entrepreneurship is a social construct that exists in language and the social interactions among people in society.

Shane and Venkataraman (2000, p217) comment regarding the research field of entrepreneurship that “to date, the phenomenon of entrepreneurship has lacked a conceptual framework”. They call on entrepreneurship researchers to give more consideration to issues of ontology and epistemology noting much entrepreneurship literature does not provide any ontological or epistemological assumptions. Lindgren and Packendorff (2009, p26) also lament the fact that much entrepreneurship literature fails to propose any assumptions regarding ontology or epistemology – “implying a tendency to take established concepts, methodologies and empirical operationalisations for granted”. They propose that, ontologically, social constructionist researchers position entrepreneurship as existing in the social interactions between people, with the objective of this epistemological perspective being the development of enhanced understanding of these interactions.

A social constructionist perspective is taken to this research based on ontological and epistemological assumptions. Social constructionism considers how individuals know the world through social interaction

(conversations, relationships , dialogue etc) based on the belief that social reality is an interpretation of relationships. A key assumption is that social reality is always an expression of relationship – to what has gone before and will come in the future. Research questions are directed towards investigating the dialogic, interpretive, social and relational processes through which entrepreneurial activities are constructed (Fletcher 2007). This researcher looked to social constructionism as an epistemological approach based primarily on the assumptions of Burr (2015) and Lindgren and Packendorff (2009) outlined above. Firstly, the belief of constructionism that no single true or valid interpretation exists, aligns with this researcher’s belief that multiple interpretations exist for concepts such as entrepreneurship and the entrepreneurial university. Further, this researcher agrees with Burr (2015) that interpretation of these concepts are language borne and socially and culturally specific and that understanding of these constructs exists through social interactions within groups of people. The ontological position of social constructionism as applied to entrepreneurship assumes entrepreneurship is constructed and interpreted by different individuals, institutions and cultures within society (Berger and Luckmann, 1966). Social constructionism also assumes the interpretation of entrepreneurship as subjectively understood by individuals. Many different ‘constructions’ of knowledge can coexist within multiple contexts (Guba and Lincoln 1994).

Epistemologically, this research is interested, from a social constructionist perspective, in knowing how the strategic management of Irish universities influences the success of the universities’ third mission to produce entrepreneurial action within their institution and beyond. “Given that

entrepreneurship and entrepreneurs are socially constructed concepts it is therefore meaningful to create knowledge on the interaction processes in which the concepts are produced and reproduced” (Lindgren and Packendorff, 2011, p 49). The social constructionist perspective implies interpreting and describing how the management of university strategy contributes to the entrepreneurial activities of universities and how entrepreneurship and entrepreneurial processes are interpreted and constructed in social interactions between people.

3.4 Philosophical approach of extant entrepreneurial university literature

The academic literature on the entrepreneurial activities of universities displays a similarity in philosophical approaches even though the topic is considered through many theoretical frameworks. Table 3.3 outlines a number of the main contributors to the academic literature on the entrepreneurial university, the type of research (theoretical or empirical) and the theoretical lens through which the research is approached.

Type	Theoretical Framework	Authors
Theoretical	Academic entrepreneurship	Wright, 2014; O’Shea et al., 2007
	Triple Helix	Etzkowitz, 2013
	Entrepreneurial Architecture	Nelles and Vorley, 2011
	Entrepreneurial university	Clark, 1998; Gibb, 2012
	Entrepreneurship	Mars and Rios-Aguilar, 2010
	University entrepreneurship	Rothaermel, 2007
Empirical	Resource based view	Guerrero, 2006; O’Shea et al., 2007; Cullen et al., 2009; Salamzadeh et al., 2011; Kiani Mavi, 2014
	Institutional economics and RBV	Guerrero & Urbano, 2010; Kirby et al. 2011; Guerrero et al., 2014
	Endogenous growth theory	Urbano et al., 2013
	Entrepreneurship	Goldstein, 2010
	Entrepreneurial University	Philpott et al., 2011
	Entrepreneurial Intensity	Mazdeh et al., 2013
	Entrepreneurial Orientation	Todorovic et al., 2011

Table 3.3: Theoretical frameworks for selected articles (Source: Author & Schmitz et al., 2017)

Having reviewed the literature, this research proposes the frameworks outlined in table 3.3 typically look to a research philosophy based upon a critical realist perspective to understand and explain the knowledge.

Ontologically, the originator of critical realism, Bhaskar (1975, p17), looks to the philosophical approach to answer the question “what properties do societies and people possess that might make them possible objects for knowledge?” Critical realism looks to positivism for laws of causality and also to interpretivism in accepting the social construction of reality. Realism lies toward the positivist end of the positivism-interpretivism ontological divide. However, unlike positivism, realism accepts the existence of reality beyond observable facts (Chia, 2002). Critical realism accepts the existence of “both an external world independently of human consciousness, and at the same time a dimension which includes our socially determined knowledge about reality” (Danermark et al., 2002, p 5). Cheng (2005) proposes that critical realism is consistent with institutional economic theory, an economic framework used by some of the main contributors to the entrepreneurial university research (Guerrero & Urbano, 2010; Kirby et al. 2011; Guerrero et al., 2014).

“Society is both the ever-present condition and continually reproduced outcome of human agency” (Bhaskar, 1979, p215). For Bhaskar, the individual and society exist independently yet are interdependent. Critical realists construct reality in three levels- the empirical, the actual and the real (figure 3.3). Lawson (1999) believes socioeconomic reality can be quantitatively studied by observing behaviours and perceptions (the empirical) and explained through the study of events which are the result of causal relationships (the actual). Qualitative research typically looks to understand the underlying mechanisms and reasons, which are explored through understanding the experience that explains these mechanisms (the

real). Traditional positivist economic theories typically fail to consider structures and mechanisms (Cheng, 2005).

	<i>Domain of Real</i>	<i>Domain of Actual</i>	<i>Domain of Empirical</i>
<i>Mechanisms</i>	x		
<i>Events</i>	x	x	
<i>Experiences</i>	x	x	x

Figure 3.3: Bhaskar’s three domains: populating entities (Bhaskar, 1978)

Epistemologically, knowledge is revealed within critical realism through “objective, unbiased observation” (Crotty, 1998). Huff (2009) positions the scholarly focus of critical realists in the development of theory and frameworks that “produce generalised claims about causal mechanisms, often using multiple methods and abductive reasoning”.

3.5 Social constructionism and phenomenological research

Phenomenology addresses the ontological issue of ‘what is real?’ with social epistemologies such as social constructionism reaching to phenomenology to answer this question (Berglund, 2007). Phenomenology is positioned within the interpretive paradigm (Burrell and Morgan, 1997). Pettit (1969) defines phenomenology literally as “the understanding of phenomena” with the phenomenon seen as something we are consciously aware of (Moran, 2000). The goal of phenomenological research is to uncover the ‘essences’ of a phenomenon (Pivcevic, 1970), from the perspective of individuals who have experienced it, in order to understand the meanings and reasons that individuals attribute to their experiences (Guba and Lincoln,

1994). Phenomenology prioritises understanding the lived experience i.e. the real life experience of people of a phenomenon (Berglund, 2015).

Hammond et al. (1991, p1) define phenomenology as the “description of things as one experiences them, or of one’s experiences of things”. All knowledge is relative to the knower (Hatch and Cunliffe, 2006), so it is appropriate for a researcher with a social constructionist epistemology, to gain from people an intimate perspective on events they have experienced (Bogdan and Taylor, 1975). Phenomenological research is an opposing research philosophy to positivism offering the perspective that we can only know reality that is subjectively experienced and not through ‘objective’ scientific measures (Hammond et al., 1991). “It concentrates neither on the subject of experience nor on the object of experience but on the point of contact at which "being and consciousness meet" (Edie, 1962, p 19).

Edmund Husserl (1859- 1938) introduced phenomenology, as a philosophical tradition; his work was subsequently further developed by Alfred Schutz (1899-1959), as well as by existential- phenomenologist Martin Heidegger (1899-1976) whose work was further developed and made increasing influential by Merleau-Ponty (1908-1961) and Jean-Paul Sartre (1905-1980) (Abebresse, 2013). Vandenberg (1997, p 11) considers Husserl “the fountainhead of phenomenology in the twentieth century”. All phenomenologists choose a ‘human science’ model of understanding (which finds meaning in the lived experience of people) over the ‘natural science’ of measurement (von Eckartsberg, 1986). This research looks to the phenomenological philosophy of Husserl both theoretically and methodologically.

Phenomenology considers a number of key themes:

- Phenomenology rejects the separation of reality and appearance- the dualism between consciousness and matter accepted by positivists.
- Consciousness is considered 'intentional' in that it is always directed towards something or some object (Sokolowski, 2000). Intentionality is used by Husserl to explain the relationship between an object/phenomenon and how that object is consciously perceived. The terms "noesis" and "noema" are introduced by Husserl to show "the intimate relationship between intentionality as total meaning of what is expected (noema) and the mode of experiencing (noesis)" (Sanders, 1982).
- A major theme in the work of Husserl is a 'presuppositionless' philosophy. Husserl felt that an authentic description of the 'lived' experience requires suspension of all previous cultural, scientific or frequently held assumptions (Moran, 2000). Importantly, the interviewees or contributors to the research remain within the natural attitude, but it is the researcher who assumes the suspension of assumption, referred to as bracketing (Giorgi, 2008). This movement is described by Husserl in terms of 'bracketing', 'phenomenological reduction' and 'phenomenological epoché'. The goal of the researcher adapting bracketing is avoid applying previous knowledge and

experiences relevant to the research question in order to be as open as possible to the lived experience being studied (Sandberg, 2005).

- A change from and beyond the 'natural attitude' to the 'phenomenological attitude' or the 'transcendental attitude' (Sokolowski, 2000) is required to achieve a presuppositionless philosophy. 'Essences' are derived from the point of meeting of the expected perception of an object (noema) and the subjective way of experiencing (noesis). "Every experiencing has its reference or direction towards what is experienced, and, contrarily, every experienced phenomenon refers to or reflects a mode of experiencing to which it is present". (Ihde, 1977).
- The lebenswelt or lived-world experience is how Husserl views human behaviour. To understand and get meaning from the world, "the phenomenologist attempts to see things from that person's point of view". (Bogdan and Taylor, 1975, p14).

Husserl sees the aim of phenomenology as capturing how people live and understand phenomena – to return 'back to the things themselves' (zu den Sachen selbst) (Berglund, 2007; Groenewald, 2004). Guthrie (2007) clarifies that Husserl did not believe in a single objective reality but rather that approaching phenomena with a phenomenological reductionist approach gains very high-level insights. Cope (2001) feels phenomenology should

provide rich description, contextual understandings and emergent interpretations of phenomena within the field of entrepreneurship studies. Roberts et al. (2014) also feel that the field of entrepreneurship research would benefit from the new perspectives brought by a phenomenological approach. There are only a small number of phenomenological studies in the field to date, despite the methodological capability to bridge between theory and real life, offering rich description and context and developing new theoretical concepts (Cope, 2011). Importantly, Dew and Sarasvathy (2007) note the absence of any a priori limits to what is deemed relevant information in the field of entrepreneurship research. Thompson et al., (1989) acknowledge the importance of the phenomenological approach in providing insights into how individuals [interpret the success of Irish universities in their 'third mission'] both live and understand the phenomenon in question (Cope, 2001). Lopez and Willis (2004) opine that researchers need to create more culturally relevant studies within the field of entrepreneurship which should inform policy makers, practitioners and also both educators and researchers.

In summary, this ontologically interpretivist study looks to social constructionism and phenomenology to answer the research questions. The following section looks beyond research philosophy to the research strategy.

3.6 Research strategy

Each research strategy is connected to the both the research paradigm and answering the research question (Blaikie, 2010). The primary goal of this research is to explore from a phenomenological viewpoint i.e.

from the level of lived experience. It is proposed that this research will be inherently inductive. Theoretical propositions will follow from the descriptions of the lived experience, as given by the research participants, of how management of Irish universities' mission and strategy contributes to the success of universities in their 'third mission' to develop and deploy entrepreneurial capital.

3.6.1 Data collection

Crotty (1998) contends that the distinction between quantitative and qualitative research occurs at the methodological level rather than the philosophical level. Bryman (2008) notes that the research method should be appropriate to the research question. While traditionally considered different research methods (Kuhn, 1962), quantitative and qualitative research are now seen as appropriate methodologies across a range of research paradigms (Robson, 2011).

The quantitative research methodology is deductive in approach, epistemologically typically positivist in following the research path of the 'natural' sciences, and ontologically assuming a single objective reality which the researcher can know through measurement. By contrast, the qualitative research methodology is inductive in approach, epistemologically interpretivist focusing on social research in social situations, and ontologically relativist assuming multiple and sometimes conflicting social realities. Typically, one of five approaches can be taken when using

qualitative research: ethnography, biography, case study, grounded theory or phenomenology (Creswell, 2012).

Bryman, (2008) tabulates contrasts in quantitative and qualitative approaches to research (Table 3.4).

Quantitative	Qualitative
Numbers	Words
Researcher's perspective	Participant's perspective
Researcher distant	Researcher close
Theory testing	Theory building
Static	Process
Structured	Unstructured
Generalisation	Contextual understanding
Hard, reliable data	Rich, deep data
Macro	Micro
Behaviour	Meaning
Artificial setting	Natural Setting

Table 3.4: Comparison of Quantitative and qualitative research (Bryman, 2008)

A qualitative approach to this research is considered as suitable as:

- this approach is consistent with social constructionism
- this approach is consistent with inductive reasoning
- the research is looking to capture the perceptions of local actors ...
"from the inside" (Miles and Huberman, 1994)
- qualitative research methods are appropriate as they are "designed to help researchers understand people and the social and cultural contexts within which they live" (Myers & Alison, 1997)

- the goal of understanding a phenomenon from the point of view of the participants and its particular social and institutional context is largely lost when textual data are quantified (Kaplan & Maxwell, 1994)
- the research aim is to produce “a coherent and illuminating description of and perspective on a situation that is based on and consistent with detailed study of that situation” (Schofield (1990, p 203)
- this study aims at generating rich data, meant as data that enable thick descriptions, thick interpretation, and thick meaning (Geertz, 1973)
- It uses open- ended questions as part of a semi structured interview which allows the researcher to gain rich explanations from interviewees (Creswell, 2007) and facilitates moving the conversation in many directions (Kvale, 1996).

3.6.2 Phenomenological research design

It was in the 1970s that phenomenological philosophers developed phenomenological praxis - methodologies to realise phenomenological philosophies and attitude (Stones, 1988). Husserl’s phenomenology was drawn on by Giorgi (1971) and others such as Van Kaam (1966), and Colaizzi (1978) to develop the research approach of empirical phenomenological psychology (Ehrich, 2005). Giorgi (1971) saw the goal of phenomenological research as accurately describing a phenomenon based on reduction and imaginative variation while remaining true to the facts.

As Giorgi (1994) has firmly stated, “nothing can be accomplished without subjectivity, so its elimination is not the solution. Rather how the subject is present is what matters, and objectivity itself is an achievement of subjectivity” (in Finlay, 2009, p 12). Bogdan and Taylor (1975, p14) capture the attitude of the phenomenological researcher:

“The phenomenologist views human behaviour – what people say and do – as a product of how people interpret their world. The task of the phenomenologist, and, for us, the qualitative methodologists, is to capture this process of interpretation . . . In order to grasp the meanings of a person’s behaviour, the phenomenologist attempts to see things from that person’s point of view”.

To achieve Cope’s (2001) ‘rich description, contextual understandings and emergent interpretations’ of the phenomenon, data collection from the research participants was conducted through in-depth, semi-structured interview and then analysed to identify shared meanings. In phenomenological research, the researcher controls all elements of the data collection and data analysis (Groenewald, 2004). Van Manen (2014) dismisses qualitative data software analysis (QDAS) as inappropriate for the achievement of “phenomenological insights”. Gobel et al. (2012), feel the use of QDAS results in a separation of the researcher from the phenomenon. Kelle (1995) contends that phenomenological research data cannot be interpreted through qualitative data software analysis as it is not “an algorithmic process”.

3.7 Research design for this study

As the primary instrument (Denzin & Lincoln, 2005) of the research, this researcher defined the research strategy in terms of an ontological and epistemological perspective. The phenomenon to be studied and the theoretical lenses which would guide the study were determined and then multiple phenomenological interviews to capture as rich a description as possible of the “lived experience” of the phenomenon were completed. The researcher then analysed the interviews and captured the general and unique themes across the interviews utilising the explication processes of Hycner (1999) and Groenwald (2004) as the basis for the phenomenological analysis of the semi structured interviews. Vandenberg (1977) notes how the commonality of the experiences of the participants and the development of general themes help restrain any bias the researcher feels toward the phenomenon being studied. Phenomenological research was considered the most appropriate research design to capture the lived experience of senior university leaders of this relatively new paradigm in university strategy for three main reasons. Firstly, the researcher anticipated a certain commonality of experience due to all participants being leaders in higher education institutions (HEIs) on the island of Ireland. Secondly, the open-ended design of the semi structured interview process and the duration of each interview (averaging 45 minutes) enabled the generation of deep and somewhat exhaustive descriptions of each participant lived experience. Further, the phenomenological methodology employed to analyse the interviews allowed the development a rich understanding of each university leader’s experience and derivation of general themes and meanings through the interpretation of

their experiences. Cope (2005) notes that interpretations offered by phenomenological researchers are themselves based on the interpretive and sense making processes of the interviewees of their experiences.

3.7.1 Locating research population

The primary objective of phenomenological research is the description of the lived experience of a phenomenon by a specific population at a particular time. Cope (2005) recognises this feature of phenomenological research (it represents a “photographic slice of life” of a dynamic process (Lincoln and Guba, 1985)) as the principal differentiator from positivist methodologies. Polit and Hungler (1999) consider the population as an aggregate or totality of all the objects, subjects or members that conform to a set of specifications. Further Borg and Gall (1989) see the target population as all the members of a real or hypothetical set of people, events, or objects to which researchers wish to generalize the results of the research. Within these conditions, the target population for this study was leaders from the universities and higher education institutions across the island of Ireland. As gathering data from this entire target population would be impossible, a sample group of leaders was selected. The aim of the research is to identify themes and develop theory immediately relevant to the Irish higher education system but also extending beyond to provide general insights into the issues affecting leaders looking to develop the entrepreneurial third mission within HEIs.

3.7.2 Identification and selection of interview participants

“The phenomenon dictates the method (not vice-versa) including even the type of participants” (Hycner, 1999, p156). In this research, participants were chosen who have experience of the phenomenon under investigation and can give reliable information on it. Stake (1994) advises phenomenological researchers to select interview participants which the researcher feels offer the greatest learning opportunity regarding the phenomenon being studied rather than looking for a representative sample. Further, van Manen (2014) argues that phenomenological researchers are not looking to achieve a sample which could be considered a “subset of a population” as the goal of sampling for phenomenological methodologies is choosing interviewees who will inform rather than “empirical generalisation”.

This research chose purposeful maximum variation sampling supported by snowball sampling as the technique to identify the interview participants. Babbie and Mouton (2001) describe purposeful sampling as the selection of interview participants based on the researchers’ knowledge of both the aims of the research and the population who can best contribute insight on the phenomenon being studied. Patton (2015) sees the power of purposeful sampling lying in the selection of information-rich participants from whom much can be learned about the phenomenon under inquiry. The technique is non-random and does not need to be grounded in theory or indeed require a certain number of participants. As outlined by Etikan et al. (2016), using purposeful maximum variation sampling requires of the researcher to develop a research question to be answered, and then to create a list of the characteristics which participants require to answer the

question based on their knowledge and experience. The researcher then must identify and select willing participants and determine a sample size.

Palinkas et al. (2015) categorise purposeful sampling strategies under three headings- emphasis on similarity, emphasis on variation and nonspecific emphasis (table 3.5).

Strategy	Objective	Strategy	Objective
<i>Emphasis on similarity</i>		<i>Emphasis on variation</i>	
Criterion	Choose cases that meet particular criteria	Intensity	Typically, similar to extreme case but less
Typical case	Describe normal, typical case	Maximum variation	Identification of participants that match criteria
Homogeneity	Rich description of subgroup	Critical case	Establish a case that facilitates generalisation
Snowball	Identification of similar participants	Theory-based	Identify a case representative of a construct
Extreme or deviant case	Description of untypical cases	Theory-based	Identify a case representative of a construct
<i>Non-specific emphasis</i>		Confirming and disconfirming case	Confirmation of meaning
Opportunistic	Exploit data collection opportunities as they arise	Stratified purposeful	Identification of variations rather than commonalities
Convenient	Utilise easily accessed participants	Purposeful random	Selection of random interviewees for credibility

Table 3.5: Purposeful sampling strategies (Palinkas et al. (2015))

In addition to purposeful maximum variation sampling, snowball sampling was used to identify further interview participants. Snowball sampling “identifies cases of interest from people who know what cases are information-rich, that is, good examples for study, good interview subjects” (Patton, 1990). More specifically, interview participants were asked to identify or recommend other potential participants for interviewing.

The purpose of data collection interviews in qualitative research is normally to arrive at a point of saturation, where the introduction of further interview participants is not bringing forth any new perspectives. Further to this, the sample must be appropriately sized so that repetition of data is not excessive. Sanders (1982) advises in this regard to be mindful not to confuse quantity with quality. Creswell (1998) recommends a phenomenological research study should contain lengthy interviews with approximately ten people. Colazzi (1978) commented that in descriptive phenomenology the number of participants is determined by the research project but recommends around twelve interviewees. Guetterman (2015) in a review of sampling practices in phenomenological studies in education noted samples ranged from eight to thirty one interviewees, with the average sample size being fifteen participants. In this research, fifteen participants were interviewed for the research with the interview duration average of 46 minutes and 6790 words. Two pilot interviews were also conducted.

The data collection through semi structured interviews was conducted according to the procedure outlined below:

1. The target population for the research was identified as the senior leadership within research producing higher institutions of education across the island of Ireland. Based on this list, the seven universities in the Republic of Ireland and, in Northern Ireland, Queens University Belfast and the University of Ulster were identified. A further five of the larger institutes of technology engaged in research and with a technology transfer office were also identified for inclusion. An independent HEI was also included to gain perspective from a HEI with minimal state funding.
2. Based on the sample size of fifteen academic institutions, this researcher sent emails to invite participation in the study to senior leadership members across each of the academic institutions. Potential candidates were chosen based on their seniority and also on their level of engagement in strategy related to developing entrepreneurial capabilities in the institution. Furthermore, snowball sampling during the interview process identified three further interview candidates. Seven college presidents, four directors of the technology transfer functions, and four senior academics with responsibility for entrepreneurship strategy across the fifteen academic institutions agreed to participate.
3. Roth et al. (2002) advise using multiple interviews from different sources to 'triangulate' the phenomenon. The purpose of 'data triangulation' is to compare and contrast the responses and 'validate'

the data findings (Holloway, 1997). Triangulation is perhaps the most commonly used approach within qualitative research (Miles & Huberman 1994; Denzin and Lincoln 2000). However, it should be stressed that validation of interview findings is not an objective of phenomenological research, so this technique was not considered appropriate for this research.

3.7.3 Ethical considerations

The research has been conducted as per Maynooth University Social Research Ethics Sub-Committee guidelines. Maynooth University has rigorous and professional ethical procedures in place governing the conduct of research including humans. The researcher must devise a protocol which was reviewed and approved in accordance with the university *Protocol for Tier 2-3 Ethical Review of a Research Project Involving Participation of Humans*. In advance of each interview, informed consent was given by participants by agreeing to and signing the informed consent letter (appendix 2). The informed consent letter confirmed the nature of the study, voluntariness, confidentiality and how the interview data would be recorded and managed. In order to maintain confidentiality, and even though the material was not of a sensitive nature, each research participant was given a pseudonym.

3.7.4 Face Validation

This researcher conducted two pilot interviews to develop experience in phenomenological interviewing and also to test the usefulness of the technique in developing rich responses on the subject. A former Irish university president and the director of an Irish university organisation involved directly in university industry collaboration agreed to conduct the pilot interviews. Both participants gave positive feedback on the research approach and interview structure. These interviews were not used as part of the research.

3.7.5 Collection of data

Face to face interview or a recorded (written or taped) account are two recognized methods for the collection of information from a person regarding their lived experience of a phenomenon (Englander, 2012). Giorgi (2009) recognises the phenomenological interview as offering typically greater depth and meaning. Fontana and Frey (2000) identify three principal types of qualitative interview:

- (a) Structured interview- the interview follows a strict questioning script without deviation (typical of surveys)
- (b) Semi-structured interview- the interviewer/researcher has some guideline questions prepared but the interview follows a loose structure where questions emerge from the flow of the conversation

- (c) Group interview- two or more people are interviewed in either a structured or semi-structured manner by one or more interviewers.

A semi structured phenomenological approach to the interview process of the fifteen participants was chosen. Cope (2011) notes this approach is “gaining momentum” within the domain of entrepreneurship research. Babbie (2005) highlights as a boon of the semi structured interview both the flexibility and how the interviewee is more open with opinions. The research commenced each interview with the same opening question regarding the interviewee’s individual perceptions of entrepreneurship and the entrepreneurial university. Beyond that, the role as interviewer was to enable the interview to flow freely through the use of open-ended questions. The phenomenological interview should continue until the topic is ‘exhausted’- the point where participants cease offering new perspectives (Groenwald, 2004). However, it is very important that rich descriptions of the phenomenon are allowed to emerge (Kensit, 2000). The primary focus of the phenomenological interview is to get as complete a description as possible of the phenomenon from the participants perspective (Georgi, 2009) with the dialogue being controlled mostly by the research participant (Cope, 2005b) Patton (1990, p 104) describes the goal of the phenomenological interview “as carefully, and thoroughly capturing and describing how people have directly experienced some phenomenon”. In keeping with the semi-structured interview process as outlined in the literature, the interviews proceed as below:

- At the beginning of the interview, general information about the objectives of the research, the research question and research methodology were shared
- The informed consent letter was reviewed and signed by the interview participant
- Recording of the interview was commenced on a secured and password protected device.
- Upon completion of the interview, the interviewee was asked if they had anything additional to add.
- The recorded interviews were saved to an encrypted folder on this researchers computer (which is also password protected) Once saved on the computer, the interviews were deleted from the recording device (a password protected recording device).
- This researcher completed transcripts of each of the interviews and these transcripts were saved on a password protected computer in password protected folders. As the only researcher involved, this researcher will be the only person that will have access to this data. Following publication of the PhD thesis, these folders will be immediately deleted from this researcher's computer but will continue to be securely held for ten years on a secure server in Maynooth University.

3.7.6 Data explication

Hycner (1999) advises against the use of the term analysis relating to phenomenology, preferring 'explication'. This is because 'analysis' implies

“breaking into parts” whereas ‘explication’ is seen more in terms of researching the elements while still keeping a sense of the larger phenomenon.

Giorgi (1985) developed an empirical methodology in the Husserl tradition which looks to use phenomenological reduction in the search for the ‘essences’ of a phenomenon. Cope (2011) describes the steps as:

1. the interview protocols must be transcribed verbatim as soon as possible after the interview
2. the interview protocols must be reread repeatedly in order to achieve the sense of the phenomenon in its entirety as seen by the research participant
3. the interview protocol is broken into specific ‘meaning units’ – bracketing and phenomenological reduction
4. the interviews are then taken from the language of the participant and written in the disciplinary language of the interviewer.
5. the transformed meaning units are synthesised or clustered where the units cluster together naturally (Hycner, 1985)
6. Eidetic reduction, utilising reflection and intuition will then yield the ‘essences’ of the phenomenon

Hycner (1999) developed this explication process of Giorgi and this has been simplified into five phases by Groenewald (2004) as

1. Bracketing and phenomenological reduction
2. Delineating units of meaning

3. Clustering units of meaning to form themes
4. Summarising each interview, validating it and where necessary modifying it
5. Extracting general and unique themes from all the interviews and making a composite summary

This research used the explication processes of Hycner (1999) and Groenwald (2004) as a basis for the phenomenological analysis of the semi structured interviews. Further, the data explication was done without qualitative data software analysis (QDAS) software in keeping with phenomenological research theorists who deem such tools inappropriate for the achievement of “phenomenological insights”.

Bracketing and phenomenological reduction

Bracketing and phenomenological reduction is the central epistemological strategy of the phenomenological researcher. It is a purposeful effort by the researcher to reduce analysis to a subjective interpretation, not influenced by the researcher’s personal opinions or indeed prior theoretical knowledge of the area being studied. This is referred to as adopting the ‘phenomenological attitude’ which is different to how a person normally makes sense of the world. In this research, the goal is to understand and describe the lived experience of senior management of academic institutions of the pertinent issues, from a strategic management perspective, during the entrepreneurial evolution of their academic institution.

Phenomenological reduction is achieved by the researcher “bracketing” or suspending any prior theoretical knowledge to allow the ‘lived’ experience’ to emerge from the interviews. Consistent with phenomenological research, this researcher did not develop any prior theories or constructs in advance of conducting my interviews. However, a full literature review was done in advance of the interviews in order to facilitate the development of research questions which would contribute to the state of the art. Bracketing is described by van Manen (2014, p 215) as " parenthesizing, putting into brackets the various assumptions that might stand in the way from opening up access to the living meaning of a phenomenon".

To achieve this, following each interview, this researcher wrote notes which captured any emphasis made by the interviewee. This researcher then followed the advice of Hycner (1999) and listened repeatedly to the interview in order to develop ‘gestalt’ - a holistic understanding of the interviewees lived experience. A full verbal transcription of each interview was completed as soon as was possible after each interview. Each interview was read and reread many times until a true holistic understanding of the interview emerged. It is through achieving the phenomenological attitude that this researcher could then move forward to the critical phase of delineating units of meaning.

Delineating units of meaning

The next step in the phenomenological explication involves the extraction of statements (meaning units) which are deemed illuminating in

relation to the phenomenon. This is an extremely thorough process of considering every phrase and sentence in order to capture the participants true meanings. This involved the simultaneous reading and listening to the interviews to capture both the relevant statements and also the importance and other cues from simultaneously hearing the interview. This critical element of the research is rendered more challenging by the need to remain in the phenomenological attitude and continue to bracket my own prior knowledge. Hycner (1985, p282) notes that this step is done while retaining the phenomenological attitude as “this point does not yet address the research question to the data”. Having delineated units of general meaning, this researcher then proceeded to apply the research question to the meaning units with the desired objective of determining whether each meaning unit give insight into the research question.

Clustering units of meaning to form themes

Once a list of non-redundant units of meaning for an interview had been completed, the next step was to consider whether any of these units would cluster together to form themes. Bracketing any previous theoretical knowledge and indeed themes which were noted emerging in previous interviews was important here to allow themes to emerge naturally from the interview. The eliciting of these themes, or essences, common to a number of meaning units required the use of “artistic judgement” (Hycner, 1999), referred to as “imaginative variation” by Husserl (1931). Essentially, this involved considering each meaning unit from different perspectives, grouping

related meaning units and identifying significant topics or themes from each of these clusters. It should be noted that overlaps occur where meaning units were clustered under more than once theme.

Summarising each interview

Once the above steps were completed, this researcher proceeded to write a summary of each participant's themes and explanation. The aim of summarising each interview was to capture the themes which emerged and present them as an accurate and holistic account of the participant's experience of the phenomenon being studied. The interview summary contextualises the themes through giving "a sense of the whole" Hycner (1985). The summaries of each interview are contained in chapter 4.

Validation and Member checking

Phenomenological methodology, through utilizing the process of bracketing, protects the validity of the interpretation of the data from the bias of the researcher. Further, through using member checking, returned to each of the participants to ensure the information captured during the interview process was valid. This researcher sent to each of the interview participants a verbatim transcript of the interview and the summary of the interview which captured all the information provided to me by the participant. Each participant was afforded one week to respond, and they were informed that no response would be taken as approval to proceed. None of the research participants responded and the non-response was accepted as a positive

approval to proceed. Creswell (1998) notes that member checking in this way contributes to the credibility of the final study through affording the interview participants the opportunity to determine if both the interview and the summary are correctly captured. "If the investigator is to be able to purport that his or her reconstructions are recognisable to audience members as adequate representation of their own realities, it is essential that they be given the opportunity to react to them" (Lincoln and Guba, 1985, p 314).

Extracting themes and making a composite summary

Having identified and summarized the themes unique to each interview, this researcher then looked to create a holistic view of the data through the identification of the themes which emerged common across the interviews. Hycner (1999) in this regard proposes capturing both the themes seen across most or indeed all the interviews but also the individual variations. In keeping with suggestion from Cope (2005) on how to maintain an inductive approach, themes that were identified across the interviews are initially written up without reference to the literature. This allows the data to 'speak for itself' in the first instance.

An important element of inductive theory building is positioning the themes which emerged during the research within the extant literature. This process is referred to as 'enfolding literature' and it is considered important to consider the emergent themes with a wide scope of literature (Eisenhardt, 1989). Coffey and Atkinson (1996) emphasise the importance of 'going

beyond the data' and discussing the data with respect to the theories that support the research. However, it was also remembered at this point that the objective of phenomenological research is to inform regarding a particular phenomenon and not to achieve "empirical generalisation" (van Manen, 2014). To this end, the explication process was concluded through the development of a composite summary which reflected the emergent themes in terms of the literature.

3.8 Credibility of the study

It is important for qualitative researchers to ensure the credibility of their research and the rigor and robustness of their methodology. There are many criteria in the academic literature to guide qualitative researchers and indeed phenomenological research. Trustworthiness is prioritised by Lincoln and Guba (1985) as an objective in qualitative research. They outline qualitative alternatives to the traditional positivist criteria of validity, reliability and objectivity. Positivist criteria cannot be used for qualitative research as they simply do not conform with the ontological and epistemological values underpinning qualitative research. For example, internal and external validity measure the conformance of theories to objective reality (Kvale, 1995). Further, reliability within the positivist paradigm challenges the reproducibility of the research results, again assuming a known objective reality beyond the human mind. Lincoln and Guba (1985) offer credibility, transferability, dependability and confirmability as criteria to ensure the trustworthiness of qualitative research.

- Credibility is the accurate recreation of the research participants' views by the researcher.
- Transferability refers to the generalisability of the findings.
- Dependability means the research is appropriately documented and methodologically sound.
- Confirmability refers to the honesty of the data and the researcher's interpretations.

Giorgi (2008) affords the researcher "certain openness and flexibility" with his phenomenological methodology, while also expecting academic rigor to ensure the credibility of the study. Giorgi (1997) offers three criteria which must be employed for a research method to consider itself phenomenological. The method must use the interconnected steps of:

(1) Bracketing to achieve phenomenological reduction

(2) Description of the object of an act precisely as it appears in that act. The difference between description on one hand and explanation or interpretation on the other were identified by Merleau-Ponty (1962).

(3) The search for meanings.

In keeping with Giorgi (1985), this researcher ensured the truthfulness of this research through firstly bracketing myself during the interview process, transcription and subsequent explication of the data. Firstly, it was necessary to bracket one's knowledge and themes learned during the literature review

to avoid leading the participant. Further, as the researcher progressed in the data collection it proved important, but also challenging, to bracket all opinions and themes developed by previous interviewees. Similarly, during the explication process, it was necessary to bracket all previous knowledge and consider each interview in isolation to allow the lived experience and themes to emerge.

Further, this researcher member checked the data by returning to each participant a copy of the interview transcription and summary. Lincoln and Guba (1985) note in this regard that for a researcher to validate meanings, it is essential that the research participants are afforded the opportunity to react to them. This researcher also captured and used many direct quotations from the participants in my text to further enhance the transparency and truthfulness of my study.

3.9 Interview protocol

The semi structured interviews followed the below protocol. Each interview was divided into three main parts;

1. The first part was dedicated to understanding individual perceptions of entrepreneurship and the entrepreneurial university. This step is important from the perspective of capturing the participants understanding of the main concepts.

2. The second part involved specific questions regarding defining and interpreting the scope of entrepreneurial activities as a fundamental role of the university. This gives an understanding of the interviewee's perception of

the nature of the entrepreneurial 'third mission' of universities. The interviewee is being asked to consider the level of entrepreneurial engagement of the university.

3. The third section considered the design of university strategy. The interviewee is asked to give their experience of how the elements of university strategy fit together and where does the third mission sit within the overall strategy design? The interviewee is also asked to consider government strategy and how that cascades into the university strategy.

Below are listed questions which were used to guide the interviews:

1. How do you perceive, think about and give meaning to the concept or notion of an entrepreneurial university and the entrepreneurial third mission?
2. How do you perceive the dynamics of the relationship between university mission and strategy and the evolution of the 'third mission' within their institution?
3. What are the factors, internal and external, which are impacting the development of the entrepreneurial 'third mission' of Irish HEIs?
4. What do you see as the barriers and enablers to driving the entrepreneurial agenda in the complex institutional ecosystem that surrounds them?
5. Have you managed to uncover promising pathways to deliver on this entrepreneurial agenda?

3.10 Chapter Summary

This research looks to contribute to the extant literature on the entrepreneurial university through capturing the lived experience of senior university leadership of their experience regarding the development of entrepreneurial capabilities by their academic institutions. A qualitative, phenomenological research methodology using semi structured interviews as a means of data collection was developed within this research to explore the lived experiences of the evolution of the entrepreneurial university among 15 senior leaders in higher education institutions across the island of Ireland.

This chapter presents a set of guiding principles and methodology used to conduct this qualitative research undertaken utilising a phenomenological methodology. The research design presented was developed bearing in mind Creswell's (2009) questions which he feels must be addressed by social research:

1. What knowledge claims are being made by the researcher (including a theoretical perspective)?
2. What strategies of inquiry will inform the procedures?
3. What methods of data collection and analysis will be used?

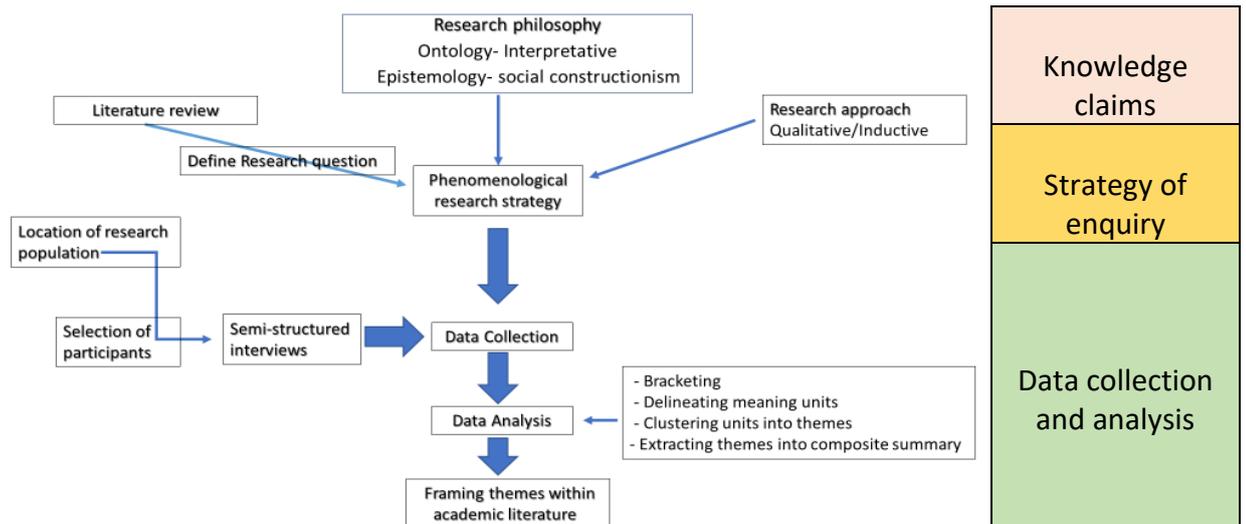


Figure 3.4 Unpacking the methodology

The methodology chapter looked first to outline the philosophical approach and how within this perspective, the methodology and research strategy were developed (figure 3.4). Research philosophies were first considered from an ontological and epistemological perspective, with an ontologically interpretivist, social constructionist philosophy deemed the most appropriate approach for this study. The importance of framing this research within a conceptual framework is discussed. Within this philosophical approach, a qualitative inductive approach was considered most suitable and this in turn influenced the choice of a phenomenological research strategy.

Phenomenology was deemed the most useful strategy to gain meaningful insights and answer the research questions due to its focus on understanding the real-life experience of people of a particular phenomenon. Semi structured interview was decided as the method of data collection with the target population for the research identified as the senior leadership

within research producing higher institutions of education across the island of Ireland.

The choice of method for the phenomenological analysis (explication) of the semi structured interviews was then addressed. Using the methodology of Hycner (1999), a summary of the themes which emerged from each interview participant and from there general themes across all interviews are derived. From these, the explication process is concluded through the creation of a composite summary which considered the emergent themes with respect to the academic literature.

Finally, the importance of issues relating to the robustness of the methodology and the credibility of the study were then addressed.

The following chapter concentrates on the presentation and explication of the data. Chapter 5 then considers the emergent themes with respect to the literature.

Chapter 4

Summary and explication of participant interviews

4.0 Introduction

This phenomenological study explores the lived experience of senior HEI leadership across the island of Ireland. The study examines whether their operating environment: their overarching strategies and their activities have altered significantly, or at all, to reflect the the addition of a 'third mission' of entrepreneurial activities to the core missions of teaching and academic research. Specifically, the research questions shaping this inquiry considered: How do senior leaders in Irish HEIs perceive, think about and give meaning to the entrepreneurial university and the entrepreneurial third mission? How do senior leaders in Irish HEIs perceive the dynamics of the relationship between university mission and strategy and the evolution of the 'third mission' within their institution? What are the factors, internal and external, which are impacting the development of the entrepreneurial 'third mission' of Irish HEIs?

Semi structured phenomenological interviews were conducted with fifteen 15 senior leaders in higher education institutions (HEIs) across the island of Ireland. The interviews were conducted between April 2016 and November 2016. The goal of the phenomenological approach was the generation of rich data, meant as data that enable thick descriptions, thick interpretation, and thick meaning (Geertz, 1973). 1350 minutes of interviews and approximately one hundred and two thousand words were recorded and transcribed. This data was explicated using the methodologies of Hycner

(1999) and Groenwald (2004) as a basis for the phenomenological analysis of the semi structured interviews. This chapter presents the summaries of each interview, the general and unique themes extracted from all the interviews and composite summaries of the overarching themes.

4.1 Summary of the participant interviews

This research chose purposeful maximum variation sampling supported by snowball sampling as the technique to identify the interview participants. A total of 15 participants representative of senior leadership in universities and higher education institutions were selected (table 4.1). Participants were from senior leadership positions in fifteen different HEIs across the island of Ireland – seven college or University presidents, six vice-president's/directors of strategy and two chairs of the department within their institution with responsibility for entrepreneurship.

3rd level institution	% included in study
Universities of Republic of Ireland Dublin City University (DCU) Maynooth University (MU) University College Galway (UCG) Trinity College Dublin (TCD) University College Cork (UCC) University College Dublin (UCD) University of Limerick (UL)	100%
Universities of Northern Ireland Queen's University Belfast Ulster University	100%
Institutes of technology Athlone Institute of Technology (AIT) Cork Institute of Technology (CIT) Dublin Institute of Technology (DIT) Dundalk Institute of Technology (DKIT) Galway Mayo Institute of Technology (GMIT) Institute of Art Design and Technology (IADT) Institute of Technology Blanchardstown (ITB) Institute of Technology Carlow (IT Carlow) Institute of Technology Sligo (IT Sligo) Institute of Technology Tallaght (ITT Dublin) Institute of Technology Tralee (IT Tralee) Letterkenny Institute of Technology (LYIT) Limerick Institute of Technology (LIT) Waterford Institute of Technology (WIT)	36% (5 of 14)
Private, independent colleges College of Computing Technology Dublin Business School Galway Business School Griffith College Independent College Dublin National College of Ireland	17% (1 of 6)

Table 4.1: Representation of higher level academic institutions included in study

Each participant is referred to in the research with a code so it would not be directly possible to associate the responses of each participant with a particular college or person. The profiles of each participant and identifier codes are outlined in table 4.2.

Participant Identification	Position
IA	College President
UA	College President
TA	Director of Commercialisation
IB	Director of Strategy
UB	College President
IC	VP of Strategy
UC	College President
ID	Head of department - entrepreneurship
UD	Chair for Entrepreneurship
UE	Director of knowledge transfer
UF	VP Research & Innovation
UG	College President
UH	College President
UI	College President
UJ	Director of Research and Innovation

Table 4.2: Participant profile and identifier codes

The first letter in each code identifies if the participant comes from:

1. senior leadership within a university (U)
2. senior leadership within a HEI which is not a university (I)
3. senior leadership employed with the TTO of a HEI (T)

The gender breakdown is 12 male to 3 female. The section below presents a summary of each of the academic interviews. The summaries identify the themes and ideas outlined by each of the research participants during their semistructured interviews.

4.2 Summaries of semi-structured interviews

4.2.1 Participant IA

Duration 41 minutes

Length 6900 words

The participant is the president of an independent, private third level college. Participant IA considers the entrepreneurial university in terms of the requirement of the institution to behave in an entrepreneurial fashion and deems bringing entrepreneurialism into the pedagogy as beyond the current capabilities and remit of the institution. He feels that the institution lacks the bandwidth in terms of both the resources required or indeed the intention to back its entrepreneurs. The college will always sign over IP to the student *“particularly at undergraduate level because they’re not really going to get behind that student with the investment and incubate them”*. Every year, the college students develop a number of projects with intellectual property potential. This IP is signed directly to the student as *“we don’t have the resources, the knowledge, the expertise to incubate these projects as the institution does not have state funding to cross subsidise incubation and/or innovation”*. In summary, entrepreneurship is encouraged in this college but not supported due to a lack of resource.

Participant IA defines what entrepreneurial means from his perspective as college president. As a private institution, he sees entrepreneurship within the academic institution as anticipating emerging trends and requirements for academic education and professional training

and rapidly *“getting our programmes to the market that will match those trends”*. The entrepreneurial priority, and indeed the institutions financial priority, is the *“generation of fee-paying opportunities from students”* as *“we’re not a fully funded state institution and get less than thirty percent of funding from the state”*. He sees the entrepreneurial university as one which *“responds to the need for academic education and professional training in an agile and responsive fashion in order to both meet a learner or market need and identify new funding streams”*.

Participant IA noted a number of enablers and barriers to entrepreneurial outcomes. He identifies funding as a key driver of the level of entrepreneurial engagement. As a private college, the institution is not a fully funded state institution. He notes *“institutes of technology receive in excess of 90% of funding from public sector state funding. The universities probably less because they’re generating more research revenue as a percentage of their total whereas private third level institutions get less than thirty percent of funding from the state. So that means we have to generate fee paying opportunities from students”*. He feels that activities such as technology transfer offices and incubation hubs are available as opportunities to larger institutions as they are *“cross-funded”* by the state.

Participant IA notes the role of the culture of academic institutions as a driver/determinant of entrepreneurial outcomes. He commented that *“academics are not very entrepreneurial by nature”* as their careers typically do not demand them to be. In his view, this means often building an entrepreneurial culture around academics is not *“scalable”*. He noted the slow nature of change within academic institutions. He identifies the

“unresponsive nature of academia” and that the cycle of change can take many multiples of the time taken for change in industry.

Participant IA sees the ability of this institution to respond in an agile way as a key enabler of the institution’s entrepreneurial capability. He highlights the unique strength of engaging with industry in a fashion that enables them codevelop a training programme with the institution which allows them *“to hire people, put them through one of our programmes and we can hot house it and we can do boot camp style delivery to get them through in a couple of weeks”*. He feels this agility – *“to be part of your value chain, is something no other institution is talking about”* in Irish education. The participant notes a lack of academic reputation as a barrier to innovative and entrepreneurial activity. He sees the role of this institution as being supportive in *“the first half of the entrepreneurial jigsaw”* in encouraging and infusing a culture and spirit of entrepreneurship in the student body. However, collaboration with industry and developing a model of innovation and technology transfer which encourages inward investment in innovation within the institution is inhibited by its *“academic rankings and the finances associated with that”*.

The interviewee does not see national strategy which promotes entrepreneurial activities within academic institutions as being particularly relevant for this institution of this type due to the lower levels of state support the institution receives. However, it should be noted that this interviewee represents an independent private college and was found to be somewhat an outlier in this research.

4.2.2 Participant UA

Duration 8800 words

Length 52 minutes

Participant UA feels that entrepreneurship must be embedded in the strategy document but that *“culture eats strategy for breakfast”* so the mission and strategy must be *“a lived behaviour in the university”*. He feels that you have *“very few levers for change of culture within academia, but that recognition and promotion”* are such key levers. However, participant UA feels that stratification of awards is important to recognise innovative and entrepreneurial achievements in academics, administrators and students. The interviewee feels the university must be *“rewarding, recognising, behaving”* in an innovative and entrepreneurial fashion.

Participant UA views the mission of the entrepreneurial university as both encouraging entrepreneurial behaviour and culture and also the institution itself behaving in an entrepreneurial fashion. He sees keeping the university entrepreneurial mission and strategy alive in the minds of stakeholders as crucial and has adopted *“a rolling planning function”*, which annually challenges the strategy. The interviewee also sees the role of academic deans as champions for innovation and entrepreneurship as very important in this regard. He highlights the important role that department deans play as *“conveyors of the entrepreneurial strategy from senior management to the university community”*.

Participant UA defines the entrepreneurial university in terms of

engagement internally with both students and staff but also externally in terms of the broader societal ecosystem- *“it’s both about the staff and student experience but also about the value added by the university to the broader society”*. He offers the definition of the entrepreneurial university as *“a university with culture and awareness of entrepreneurship and innovation, which fosters innovative mindsets in students and staff but also focuses on translating knowledge into societal and economic benefit and engages proactively with the enterprise sector”*.

The participant also offered the definition of the entrepreneurial university as created at HEInnovate (Brussels, 2016) as *“the entrepreneurial and innovative HEI right is designed to empower students and staff to demonstrate creativity, innovation and enterprise in education, research and societal engagement. Its activities are directed to enhance learning, knowledge production, translation, that’s translation of knowledge and transformation in a highly complex and changing societal environment. It is dedicated to create public value via processes of open engagement”*.

Participant UA noted the need for the entrepreneurial university to be an engaged university- *“engaging with enterprise, engaging with local and central government and engaging with civil society”*. He feels that through quadruple helix engagement, co-creation and co-definition leads to clearer articulation of problem statements. He comments *“innovation itself best happens in convergent spaces at interfaces between different perspectives and the quadruple helix and the engaged university are critical to this”*.

Participant UA sees the role of the university president as

ambassadorial in creating that connectivity but notes the need for engagement from *“local, regional, national and global”* levels. He acknowledges the value of multiple partners in *“solving problems”* of innovation and entrepreneurship but feels partnerships must be based on *“common mind-set and common vision”*. Therefore, the participant stresses that universities at an international level are *“better off with a small number of deep international partnerships than a large number of shallow ones”*.

The participant also foregrounds the importance of the university supporting and developing entrepreneurial initiatives that are current and distinctive. By way of example he noted how the university was *“embracing and fostering social entrepreneurship, is now running hackathons for students and for the outside world”*. He highlights as one of the most successful entrepreneurial activities a programme run for one semester for first and second year undergraduates focused on innovation and creativity in the digital space which results in students developing a digital app. Students are specifically never ‘taught’ in conventional ‘classrooms’. Instead they are taught through team work, online learning, live webinars, project work and mini-conferences with speakers and attendees from the wider business community. The participant attributes much of the the success in theses initiatives to *“the creating a framework of both formal and informal learning opportunities for students and staff ”*.

The interviewee opines that government currently views universities as drivers of economic prosperity and developers of greater human capital mobility. He also highlights the issue of increasing expectations from

government, to produce more for less, from reduced funding. The interviewee is increasingly uncomfortable with governments' ever-increasing view of "*universities as instruments of government policy*" in spite of reductions in "*the fraction of total state funding*". Participant UA highlighted how all seven Irish universities have signed up to a compact or, effectively a contract, with the state in terms of performance-based funding and that this is central to government policy now.

4.2.3 Participant TA

Duration 55 minutes

Length 10870 words

Participant TA describes the model of entrepreneurship and innovation detailing how the university has a two-pronged approach to developing entrepreneurial culture and activity. Firstly, the university has a central hub for innovation which looks to inspire creative and entrepreneurial graduates at the university. Technology transfer, business incubation and industry engagement are also supported through dedicated centres of excellence at the innovation hub. Secondly, participant TA highlights how the impact of industry engagement is driving the success of entrepreneurial activities on campus. He values industry as supportive of "*research, academic training, and student training*". Participant TA sees the added value of engagement with industry in terms of development and mentoring of "*softer*" entrepreneurial skills but also through contributing to research

financially and with their own ideas. He sees these relationships as primarily leveraged *“to inform and guide the educational research”* through contributing both research ideas and finance and also sharing entrepreneurial skills. Participant TA feels that mentoring of start-ups is a critical success factor *as, he/she believes “your biggest protection for your business and for developing your business is velocity- getting to market quickly”*

Participant TA feels that there is a requirement for universities to engage with the wider entrepreneurial ecosystem due to the expectation from government that *“research funding has an economic impact”*. This policy drives the need for institutions *“to have innovation and entrepreneurship in the strategy”*.

The interviewee positions the university as the *“amplifier of the quality of human capital”* within a regional or national innovation ecosystem. He feels the small scale of the Irish ecosystem gives Ireland a unique competitive advantage of *“agility”*. Participant TA argues that *“Ireland is a comparatively smaller ecosystem, and therefore, those elements should work tighter together to develop quickly, clear policies, with rapid execution of those policies”*. The interviewee highlights the need to reengage entrepreneurs who have previously had success in spinning out companies as critical to the success of the university entrepreneurial strategy. He believes the university must create this *“virtuous circle”* where successful entrepreneurs are reengaged either as mentors or indeed to develop further start-up activity.

Through engagement with peer universities, participant TA also notes that *“universities are increasingly involving themselves in the investment effort for university start-up companies, either individually or collectively”*. The interviewee highlights the need for novel engagements with the entrepreneurial ecosystem to financially facilitate the *“scaling”* of spin out companies. However, participant TA finds that the university *“looks at many”* but actually has developed rich entrepreneurial relationships with a relatively small number of other academic or industry partners.

Participant TA sees the government as a triple helix partner and key stakeholder in both driving the policy which frames the university strategy and as a contributor to the strategy document. He highlights the national government policy regarding funding of research as crucial to entrepreneurial outcomes, saying *“If you cut-off that or you deplete that then by definition we’ll have less ideas coming through, therefore, we’ll have less opportunity to exploit those ideas”*. Participant TA also opines that government cutbacks have resulted in academics being unable *“to balance the time between teaching and research”*. He notes how these two factors are having a deleterious effect on research output and as a consequence, the entrepreneurial culture and environment. He comments *“everything gets tied and everything is tied together”*.

Participant TA sees the scale and size of the academic institution as a key enabler of successful entrepreneurial outcomes with regard to technology transfer and new company creation. He points to the fact that as the quantum of ideas in a smaller university will, by definition, be smaller, it is very difficult *“to build a big infrastructure around that”*. He believes that *“scale*

and performance it will always outdo no scale and performance". Participant TA feels the benefit of scale is reflected in the quality rather than the quantity of spinouts. He feels that increasing the number of start-ups beyond four to five per year *"only dilutes the effort"*. The university strategy is focused on improving the quality of the programmes that impact the quality of the outputs.

Participant TA also identified key quality measures and metrics which could be used to evaluate and measure the success of the institutions entrepreneurial mission. In highlighting *"velocity to investment"* as a quality metric, the interviewee notes that a measure of how quickly external parties are prepared to invest is a measure of the *"quality"* of the startup. Participant TA points to *"in one year how much money was invested?"* as a facile metric of startup quality. This investment may come from external sources but that, especially in the UK, *"universities are increasingly involving themselves in the investment effort"*. Participant TA also highlights the measure of the number of successful entrepreneurs *"coming back into your environment"* as an interesting measure of the success of your entrepreneurial engagement. He comments *"recycling people back into the system because they believe in the system, or they tell you it's very positive"*.

4.2.4 Participant IB

Duration 34 minutes

Length 5200 words

As head of strategic development, the participant has a clear vision for the institution. He defines the entrepreneurial HEI in terms of the addition of the pillar of “*stakeholder engagement*” to the traditional pillars of teaching and research. Participant IB feels that “*by definition, the entrepreneurial HEI should be very externally facing*”. He sees external engagement for the HEI in terms of primarily industry engagement but also the development of “*knowledge for the benefit of the broader society*”. The stated entrepreneurial mission for the HEI is to promote and nurture entrepreneurship among all stakeholder groups and also to be a pillar of the regional entrepreneurship ecosystem.

To succeed with the entrepreneurial mission, participant IB emphasises the need for the three pillars of activity to combine to create an “*an innovative entrepreneurship ecosystem*”. Critical to the success of the mission, the interviewee feels that the organisation needs to “*move its internal structures and work practices*”. The HEI has established “*a single point of contact to support enterprise or community groups in all forms of interaction*” with the institution. The institution embraces the dual engagement missions of the development of applied knowledge in science and technology through collaboration with industry partners combined with leveraging knowledge for the “*benefit of the broader society*” and “*specifically*

lower socio-economic groups". The HEI mission also embraces entrepreneurial education as "*a critical element of the academic career*".

Participant IB emphasises the history of the HEI in determining the level and type of entrepreneurial engagement. As this HEI is traditionally an engineering school, the interviewee notes how entrepreneurial activity is "*primarily about creating that ecosystem where companies, research groups, academic departments can cooperate, and collaborate*".

The participant feels that activity "*incoherent*" with the history and culture of the institution will be extremely difficult. Engagement with the entrepreneurial ecosystem for the HEI has focused on "*industrial/enterprise engagement*" and "*leveraging knowledge for the benefit of underrepresented groups and societies*". Enterprise engagement has manifested in two ways. Firstly, in terms of both research collaboration and sharing resources for "*utilising or leveraging knowledge*". Secondly the HEI has developed agile capabilities to act itself entrepreneurially through rapidly co-developing bespoke training courses with specific companies or market sectors. Alliances with other academic institutions are very much project based with a view to delivery of specific co-developed programmes rather than with a view to mission development.

For both the development of entrepreneurship education and engagement with the external entrepreneurial ecosystem, the HEI favours a model which typically directs all activities from a central point or repository on the campus. The participant notes the positive impact this "*centralised model*" has had on the collaborative culture between departments with

regard to external engagements. The HEI takes an “*outside in*” approach to external engagement and looks to facilitate collaboration with the external ecosystem through a single point of contact for rather than through multiple siloed engagements. The participant feels this has discouraged academics and departments from being “*territorial*” with external industry contacts, instead encouraging a true collaborative and sharing mindset. The promotion of an entrepreneurial culture and mindset across the campus and curriculum is driven from a single point of “*entrepreneurship excellence*”. The strategic goal is the integration of entrepreneurship “*into every [academic] programme*”.

The participant highlights the restrictive nature of the tenure system and the “*public sector culture of custom and practice and collective bargaining*” as the main barrier to the development of an entrepreneurial and collaborative culture. The restrictive nature of employment contracts for these HEIs means that any activity outside the core of teaching and research is done as “*grace and favour*”. Also, the activity of these “*champions*” is not recognised or rewarded “*in a tangible way*” and currently not possible to “*develop as a legitimate career pathway*”.

The participant also notes the issue of funding as a barrier to driving the entrepreneurial strategy both across campus and beyond. He notes that assignment of funds from the HEI steering committee is competitive and while the income stream from both teaching and research is “*reasonably clear*”, unfortunately “*though there’s been a lot said about how important engagement is, the income stream from it isn’t as obvious*”.

The interviewee feels that driving the strategic evolution toward an entrepreneurial university requires reconfiguration of resource and changes to *internal structures and work practices*. This has proved challenging in this HEI as “*there is an overarching culture here which would be [resistant to changes in] custom and practice*”.

4.2.5 Participant UB

Duration 54 minutes

Length 8050 words

The institution is a large HEI which is very much “*rooted in the community*”. Participant UB sees the HEI as possessing a “*particular differentiation*” within the higher education infrastructure of Ireland which complements the offering of the other universities. The participant notes that while the third mission and the entrepreneurial university are recent constructs, this institution has been an outward looking institution, supporting regional development, since its inception. He defines the institutions entrepreneurial activities in terms of the engaged university with strong social and entrepreneurial engagement beyond its walls.

Noting the importance of the history and the environmental “*context*” to the institution, the interviewee sees the development of “*access*” to the wider entrepreneurial ecosystem, from creating “*career ready graduates*” to entrepreneurial activity in company incubation and industry engagement, as “*part of the same continuum*”. The participant defines the entrepreneurial

university in terms of a high level of entrepreneurial engagement between the institution and its environment, the staff and student bodies being “*entrepreneurs*” and indeed the institution itself behaving in an entrepreneurial fashion. The interviewee highlights the importance of entrepreneurial activity being a “*continuum from the physical [resource]*”. The focal point for entrepreneurship, the technology transfer office, is located physically at the heart of a campus. Coupled with this, the campus is designed for the wider community to enjoy by both being accessible and having a variety of non- educational amenities on the campus.

Beyond the traditional roles of teaching and basic research, the interviewee sees the HEI as very focused on the expanded socioeconomic activities of ‘engaged universities’ - knowledge transfer, policy development and economic initiatives. The institution is highly engaged in knowledge transfer activities both through technology commercialisation and supporting new business ventures through the technology transfer office. Participant UB highlights activities supportive of economic development - “*licencing, thought leadership for example... to underpin national goals*”, noting that “*the HEIs legal mission is to contribute to economic development*”. Economic initiatives, such as an off campus business incubator and development of a science and technology park, both located in the local area, are perceived by the participant as getting “*the balance between indigenous entrepreneurship and the genuine attraction for direct investment*”.

With regard to the role of the HEI senior management in the development of a culture of entrepreneurship, the interviewee feels that “*a lot of what of you’re doing in managing higher education is creating and*

resourcing the appropriate environment for things to happen". He stresses the need for "*differentiation*" between HEIs in Ireland, highlighting the need for each institutions' entrepreneurial offering to be "*contemporaneous and distinctive*". The participant also stresses the need for each HEI to occupy a unique place within the entrepreneurial ecosystem, "*evolving over time so that each possesses a different entrepreneurial ethos serving different needs*". The interviewee positions "*empowerment*" as a key differentiator in the entrepreneurial culture at this HEI. He links the "*intrapreneurial*" capability of the institution to "*a continuum of empowerment, of self-starting*". He feels a key driver of this capability is the certainty afforded to staff and students through the college policy of automatic assignment of intellectual property to its developer rather than to the institution.

The interviewee notes how much of the social entrepreneurship activity derives from the "*administrative staff responsible for access and community engagement*". He notes how the lack of a formal administrative building, resulting in administrative staff being "*embedded*" with academia, has resulted in a common entrepreneurial culture. However, the participant sees "*siloiing*" as the main barrier to the development of the entrepreneurial culture. He feels "*disciplinary*" siloiing of ideas "*among academia, administration, and the researchers*" is inhibiting entrepreneurial outcomes. He also notes how academics and departments have multiple siloed relationships with external companies and stresses the need for more harmonised strategic relationships.

The development and delivery of entrepreneurial education programmes, entrepreneurial research and indeed technology transfer and

incubation activities are centralised through the central innovation hub. Resources and the delivery of entrepreneurial education programmes is also shared with the business school. This combining method of delivery and resources is an attempt by the institution to ensure entrepreneurship education is a *“resource across the institution”* and not *“ghettoed in business education”*.

Participant UB also notes the importance for the institution in establishing targets and measuring entrepreneurial activity. He sees value in measuring both in terms of knowledge transfer activity but also in terms of undergraduate participation in, for example, *“modules in entrepreneurship, start up competitions etc”*. Notably, the interviewee identified difficulty in benchmarking and finding *“comparable institutions”* in Ireland.

4.2.6 Participant IC

Duration 39 minutes

Length 6640 words

Participant IC notes how the institute approaches the development of entrepreneurial capabilities with the goal of *“not so much creating the graduate entrepreneur but creating the entrepreneurial graduate”*. She sees the entrepreneurial graduate as one who develops both *“technical skill in their discipline”* and *“entrepreneurial attributes, behaviours and traits such as problem-solving, communication skills, negotiation skills and teambuilding”*.

The participant sees the incorporation of entrepreneurship into the institutional strategy being strongly guided by its *“history and geography”*. The level of engagement with the ecosystem and *“thinking around strategic alliances”* are also highly informed by these factors. The academic institution has developed the entrepreneurial strategy around four key pillars. The first works on reimagining how to embed entrepreneurship in new programmes. For example, the faculties of business, engineering and the technology transfer offices worked together to deliver a new entrepreneurship engineering programme. Secondly, the levels of *“cross-disciplinary and cross-faculty”* engagements were increased. The third pillar considered how to increase engagement of the technology transfer offices and incubator facilities with the academic programmes, and the fourth element being cultural change.

Participant IC was very concerned and careful that the development of the culture of entrepreneurship *“didn’t become like a project, or an initiative”*. The institution developed a strategy of *“bottom-up and top-down approach meeting”* framed by the mission statement that all students from across all disciplines would be exposed to *“entrepreneurship, entrepreneurship education or facilitated in being enterprising”*. The top down approach comprised firstly establishing best practice by creating *“a cross faculty enterprise entrepreneurship working group”* of all stakeholders from senior management, through academic heads to student representatives. Academic champions were also appointed across all schools with the goal of building a unified vision and understanding of entrepreneurship as there appeared many *“different perspectives and different views on it”*. From the bottom up,

the interviewee saw *“peer to peer networking”* as a consequence of a student enterprise internship programme as a key driver of cultural change. In this programme, masters students from across all disciplines were engaged by the college to develop enterprising skills among their peer group through *“engaging students in enterprising activities in fun and engaging ways”*. The profile and enthusiasm for these entrepreneurial activities really *“catalysed the whole engagement with academics”*. In her experience, the critical factor in the success in the development of the entrepreneurial university *“is more than [the institution] size, it’s an attitude”*. The evolution of entrepreneurial activity on campus has been greatly enhanced through cross-disciplinary and cross-faculty measures such as the engagement of *“the TTO offices and incubator facilities with the academic programmes”*. The senior leadership team has also been very influential in the development of regional alliances with an economic remit which have had a transformative effect on regional development. Participant IC notes that for a regional institution, geography is a key determinant of the nature of the entrepreneurial alliances formed.

The approach to delivery of cross campus entrepreneurial education is guided by collaborative principles which are outlined in the mission and strategy document and executed through collaboration between department heads to ensure *“entrepreneurial learning outcomes were embedded in each of their programmes”*. However, Participant IC feels that the institution lacks a clear structure for evaluating the outcome of these activities and that the weakest element of the entrepreneurial strategy *“is actually measuring impact”*.

A key element of the entrepreneurial university strategy is the development of the regional entrepreneurial ecosystem. The institution has created key strategic alliances with two other universities in the region. These alliances have contributed in terms of developing thought leadership and best practice regarding the entrepreneurial graduate. Further, the strategic alliances offer support for regional SME's which contributes to the development of high tech start-ups but also supports existing industry, as well as supporting commercialisation of intellectual property developed within the institution. The college is also strongly engaged in "*social innovation, social enterprise and community projects*". These supports revolve around providing economic and social support to the local SME and start up community. The support mechanism references Europe 2020's key priorities including increasing labour market participation, improving education and training systems to develop a skilled workforce, combating social exclusion, addressing the agenda for new skills and jobs, and supporting entrepreneurs and the self-employed.

4.2.7 Participant UC

Duration 64 minutes

Word count 7660 words

The participant is the president of a university which has a strong liberal arts heritage coupled with engineering and science faculties.

Participant UC opines that it is essential that universities adapt their practices

so that both staff and students are capable of being entrepreneurial and that the two “*are capable of feeding off each other in that way*”. In defining the entrepreneurial university, participant UC notes how one interpretation “*centres around the capacity of the university corporate for action*” where a looser definition considers the extent to which the “*university stimulates entrepreneurial action in student and faculty body*”. To this end, participant UC feels the definition of the entrepreneurial university starts with “*the posture of the institution*”. The interviewee broadly defines the entrepreneurial university as “*an institution with an appetite for and capacity for strategic action*”.

The interviewee feels that the mission and scope of universities has evolved in recent years from being “*political, narrow and reactive*” in scope to being “*strategically led and managed*”, “*proactive*” in developing their capacities and “*broader in scope*”. However, Participant UC notes the role of language and the sensitivities among academics within the institution to the definition of the entrepreneurial university. This institution is highly concerned that entrepreneurial universities have become narrow in scope, “*corporatist*” and excessively supportive of an “*enterprise driven agenda*”. Linguistically, the academy prefers to define entrepreneurship in terms of “*agency or creativity*”. Participant UC notes there are many interpretative assumptions and rhetoric associated with using the word entrepreneurial. However, participant UC also notes the student population possesses a broader definition of creativity and entrepreneurship.

The interviewee feels a fundamental step for a university moving from a traditional model to a more entrepreneurial model is the leadership of the

university ceding a certain amount of control to departments while encouraging and rewarding entrepreneurial and proactive behaviours.

Participant UC stresses that the change in culture should be incentivised, but not forced. He notes how in academic institutions, it is highly important that consensus on the strategic direction of the institution is achieved and while being entrepreneurial is a lived part of the strategy, it must not be “*overtly articulated for fear of misinterpretation*”. Participant UC sees low cost incentives and competitions to encourage student entrepreneurship as a very valid approach. However, he feels it is “*actually paradoxically unhelpful*” to financially encourage departments to think more entrepreneurially as it can artificially subsidise poor business cases. Rather, departments are encouraged to identify and pursue opportunities which attract resources to the institution. Participant UC also notes how the history and smaller scale of the institution has created interdependency between departments which has positively affected the interconnection and collaboration between academic departments. A key “*uniting theme*” in the university strategy is “*its balanced commitment, to humanities, social sciences and sciences*” rather than “*a rush to technology*”. The interviewee highlights a concern across the academic staff of excess rhetoric about entrepreneurial universities and how graduates are not getting equipped with “*higher order thinking skills*”. The university is addressing this through the inclusion of critical thinking modules for all undergraduates and the creation of a centre for entrepreneurship, design and innovation which encourages students develop their creative and entrepreneurial confidence and actualise creative ideas.

Participant UC feels that the experience of the institution in engagement with the broader entrepreneurial ecosystem is “*very mixed*”. As university president, he notes how little dialogue there is between industry and academia in Ireland. He notes how he has “*never had a conversation, with a senior industrial person on curricula*”. He also sees strong relationships with industry siloed to particular departments but that “*organisation to organisation relationships are very weak*”. Significantly, participant UC notes that from speaking to other HEI presidents, the geographical location is influential on the level of enterprise engagement with relationships between Dublin universities and major enterprise notably weaker than the regional HEIs. He attributes this to the forming of leadership bonds between industry and academic institutions. Regionally, he feels that it is “*intuitive*” for industry to partner with the local HEI and develop deep relationships, but he suspects that the choice of institutions in Dublin leads to many shallow relationships.

Participant UC feels that the university is still at a very early stage of a journey from being a “*traditional, scholarly university to being a much broader and strategic and engaged university*”. To this end, he notes that the resources to support entrepreneurial capabilities of the institution are not very highly developed. He opines that the cultural evolution in development of an entrepreneurial and engaged university requires “*changes in governance, management and resource allocation and resource flows, and information flows*”. Participant UC highlights the ability the institution to monitor and “*realise*” the differences in intergenerational interpretation of entrepreneurship. The current student cohort possesses “*a broader definition*”

of creativity and entrepreneurship” and the university has evolved its educational offering to reflect this. However, he feels the institution lacks capability to effectively engage with regional enterprise and sense new collaborative opportunities. Despite the development of strong technology transfer capabilities, participant UC feels the engagement is *“all one way”*.

4.2.8 Participant ID

Duration 39 minutes

Word count 5460

In defining the mission of the HEI in terms of delivering entrepreneurial outcomes, participant ID sees the *“application and context as extremely important”*. As head of the department of entrepreneurship, the participant is looking to creating a learning environment where the student body *“learn about entrepreneurship, but also learn to be entrepreneurial”*. The approach is experiential with the desired outcome *“developing a competency, and a mind-set that is entrepreneurial”*, and not necessarily focused on venture creation. The participant sees the sociology of language as very relevant with respect to entrepreneurship in an artistic HEI and feels there is *“undoubtedly a dilemma how you position entrepreneurship in particular disciplines”*. This requires the institution itself to behave entrepreneurially, conducting *“needs analysis”* to ensure the message you are delivering is relevant to the desired educational outcomes of the student body.

Over the last ten years, the HEI has moved *“from the talking about entrepreneurship to engaging with the experiential learnings outcome of an entrepreneurship education”*. The interviewee sees the development of the entrepreneurial HEI as being about more than *“venture start up”* and sees the development of entrepreneurial competencies in students as directly related to their employability. In the graduate outcome space, for this institution *“it’s about actually developing a competency, and a mind-set that is entrepreneurial”*. The mission and strategic plan look to embed the pillars of engagement, entrepreneurship and employability into all programmes.

The participant highlights the influence of the national strategy for higher education on the move by the institution to reframe entrepreneurship education toward learning outcomes. She also feels the capital investment by enterprise Ireland to *“ensure that there was an associated incubation type space on all campuses”* as a very positive development in developing the culture of entrepreneurship on campus. The increased level of engagement between the incubation space and programmes, the innovation voucher scheme and associated increase in industry engagement and *“even the physicality of the space on a campus”* has greatly influenced the level of entrepreneurial activity and engagement across all campus disciplines. The interviewee also highlights the influence of mission based performance compacts for the allocation of funding between the institution and the higher education authority as a key driver of the development of the entrepreneurial mission.

Participant ID sees *“the historic context”* as significant in terms of the interpretation of the entrepreneurial mission by the HEI. She feels that as a

consequence of the institutions history, it is “*significantly outward facing*” with strong industry links. She also considers the small size of the institution as significant in that most external relationships are managed quite informally. The focus of the HEI with regard to external engagement comprises knowledge generation and transfer and engagement with community and enterprise. The institution has also developed a very active engagement with alumni and entrepreneurship education networks which the interviewee feels keep the academic programme “*current and relevant*”. The HEI also engages industry and other academic institutions in academic programme development and can cite “*plenty of examples of industry and academics jointly developing programmes that will fit a particular niche and outcome*”.

Participant ID believes that for the “*meaningful*” development of the entrepreneurial mission in the HEI, “*entrepreneurship has to be embedded in the learning outcomes of the programme and the discipline*”. The strategy must “*have both the top-down and a bottom-up approach*”, and needs “*champions*” at all levels. However, participant ID sees resource and time constraints posing a significant challenge to developing opportunities on the educational front as well as technology transfer and the commercialisation.

4.2.9 Participant UD

Duration 38 minutes

Word count 4970 words

The participant believes that an institution can be considered entrepreneurial “*because the people in it are entrepreneurial*”. Participant UD notes that while most universities in UK and Ireland have a commitment to innovation and entrepreneurship in their mission statements, he feels that there is an issue with interpretation. He suggests that many universities do not differentiate between innovation and entrepreneurship and are satisfied with their their mission “*so long at they’re dealing with innovation*”. Participant UD sees entrepreneurial capabilities as “*filling the gaps between that innovative activity and the market*” and feels this “*competency equation needs to be addressed*”.

Within the university, participant UD found that to achieve support across campus for an agenda for entrepreneurial learning it was necessary to disseminate a view that entrepreneurship learning was all about establishing or developing an appropriate mind-set and competencies and not “*just all about making money*”. The interviewee also believes the interpretation and definition of entrepreneurial plays a central role in the development of a culture of entrepreneurship in the university. Distinguishing between education and teaching, “*teaching being directive and education being more about drawing out of people what they have in themselves*”, the interviewee thinks the development of an entrepreneurial culture would benefit from the entrepreneurial educating of university senior management

coupled with “*the identification of champions for the agenda*”. However, he cautions that entrepreneurship champions “*have to be joined up so that they can be effective*”. He also stresses the need for appropriate resourcing of the entrepreneurship agenda, *noting* that champions typically “*burnout due to lack of resources or from being isolated and unable to build connections that will lead to some sort of fusion*”. Participant UD notes that a campus centre for entrepreneurship provides a vital focus to the agenda and to the message, from providing an infrastructure supportive of creativity and entrepreneurial learning through to commercialisation and external engagement. Participant UD also highlights how the recognition of academic enterprise as a determinant for promotion, along with the traditional markers of teaching and research, has had a very positive impact on the level of entrepreneurial engagement of academics. The interviewee notes a high level of external engagement with both government and business. However, the interviewee notes this engagement is “*siloed*” with little interaction between university faculties.

4.2.10 Participant UE

Duration 40 minutes

Word count 5900 words

Participant UE highlights that the mission statement of this Northern Irish university demonstrates a clear commitment to conducting research with a societal benefit. The interviewee sees the research ethos of the university being guided by its entrepreneurial mission and strategy and “*the*

importance of being permeable at the boundaries and making sure that the knowledge it creates is used”.

The interviewee notes how a move in government policy, with twenty percent of UK research funding now based on *“impact”*, has increased expectation of socioeconomic benefit from state funded research. He feels this has resulted in *“some fairly fundamental shifts in research activity in the university sector”*. This coupled with the *“catapult funding”*, which sees the government matching industry contributions to specific research projects, has seen further migration within the academy toward applied research. The interviewee notes how it has resulted in the evolution of regional triple helix (economic) networks which the university has to accept as being industry led.

Considering that the university has been involved in knowledge transfer for over twenty five years, the interviewee notes how the reaction to the expectation of more *“economically and socially beneficial”* research has developed from *“insulting and patronising”* to an acceptance of this *“new reality of the funding landscape”*. In terms of commercialisation outcomes, the institution is now the highest revenue generator in the UK.

The support by the university for entrepreneurial activity is split by the institution into undergraduate and postgraduate/academic activities. Notably, at undergraduate level, support for entrepreneurial activity is considered *“part of the student experience and led out of the student union”*. The student union is funded to support entrepreneurial activities including education and mentoring, proof of concept support and start up support services.

At postgraduate research and academic research levels, all intellectual property is owned by the institution with all associated supports through the knowledge transfer office. The university has put incentives in place for researchers and academics to support their entrepreneurial activity. In terms of licencing, royalties on any patented intellectual property “*are split evenly between the university and the inventor*”. The university is also very supportive in terms of investing or co-investing in early stage ventures, from early stage proof of concept through to “*supporting companies through the early valley of death issues*”. The interviewee identified how the university has co-canvassed with spinout companies to generate investment through crowd funding models noting that he “*didn’t know any other university that has co-invested alongside the crowd*”. The university has also began approaching knowledge exchange opportunities with a “*customer driven market approach*” through collaboration with other academic insitiutions and potential customers. This has greatly accelerated the time to market for these spinout companies.

However, participant UE notes that “*academics are still generally judged on academic activity*” and the lack of reward and recognition for entrepreneurial activity is a barrier to increased entrepreneurial engagement by academics.

4.2.11 Participant UF

Duration 44 minutes

Word count 5860 words

Participant UF feels there is a lack of clarity around entrepreneurship and the entrepreneurial university, going so far as to suggest that *“they’re seriously mis-abused words”*. She positions the role of entrepreneurial university as threefold - *“encouraging research commercialisation and related entrepreneurial activity, encouraging the student community to actually consider entrepreneurship as a career and also the third part, where the university is a repository of information and skills [for the wider entrepreneurial ecosystem]”*. Participant UF notes the adaptability and agility of the university as central to the entrepreneurial mission.

Participant UF feels that even though *“not everybody across the university campus would be involved in entrepreneurship but it’s very important that the culture is”*. The interviewee highlights elements critical to the development of the entrepreneurial culture and breaks this down into activities targeting different cohorts of the university population. For undergraduate student engagement, participant UF feels the focus should be on developing an entrepreneurial mindset. She considers competitions encouraging co-collaboration among students from different disciplines as very successful at informally developing entrepreneurial behaviours. The interviewee also sees connecting undergraduate students with entrepreneurs in their regional ecosystem as highly beneficial. Formally, participant UF feels this activity should be supported by a mentoring programme driven by a

dedicated specialist resource within the university. Participant UF sees the next level of engagement, the incubation and commercialisation of start-ups typically at graduate level, as “*almost growing entrepreneurs*”. Participant UF contrasts the “*nurturing*” role of the institution with the student body with the need for “*incentivising*” of the academic and administrative staff. She feels that the institution must recognise positively time spent engaged in entrepreneurial activity, both in terms of promotion and recognition, and not focus solely on publication output.

Participant UF also highlights activity by the institution in the development of entrepreneurial behaviours and capabilities outside of the stem curricula, “*it’s about the researchers in the humanities reaching out into community agencies in the region and, using their expertise to develop entrepreneurial outcomes with not for profits*”. Participant UF feels there is a lack of engagement with social scientists and that “*the technology transfer approach within our universities have been all technology focused*”. She stresses the need for more engagement with social sciences to identify unmet and unrealised needs for these novel technologies.

Regarding the development of a cross campus entrepreneurial mindset, the interviewee sees a “*wish of an entrepreneurial education*” being pursued through many academic “*sole traders*” developing localised projects but feels the combined impact would be greatly enhanced through increased collaboration. Participant UF considers the best model for enhancing entrepreneurial activity across campus as a radiant (distributing resources across campus from a central repository, ideally from the business school) model.

Participant UF notes a lack of vision in the national research prioritisation with excessive focus on intellectual property (IP) development over *“ideation”*. The policy drives the research agenda in the institution as *“most of the large-scale research funding which is available at the moment requires you to leverage partnerships with industry and to demonstrate short-term commercial outcomes”*. The interviewee highlights the success of *“influencing the national policy, so that the national policy mirrors what your strengths are”*. However, she does note the lack of correlation between the government policy surrounding entrepreneurial education and policy regarding entrepreneurial outcomes generated through technology transfer, business incubation and industry engagement. Participant UF sees policy *“developed as though they are two separate pillars where in reality they need to be tied together”*. She highlights the lack of understanding among academic and administrative staff of the complexities of engaging in campus related entrepreneurship and innovation coupled with lack of incentive for staff to work outside their own *“silo”* as the principal barriers to the development of an entrepreneurial university. Participant UF feels that a champion at the highest managerial level is required *“to buy into entrepreneurship and to see it as a core priority”*.

Participant UF highlights some metrics which would be useful in understanding the outcomes of the campus entrepreneurial activity. From an academic entrepreneurship perspective, the interviewee feels tracking over time the proportion of academics who highlight their entrepreneurial engagements on their homepage would give a measure of both how academics view the importance of the entrepreneurial mission to the

institution and how the institution is incentivising entrepreneurial behaviours. Participant UF also sees tracking the level and scale of repeat engagements between university research teams and industry partners, especially beyond the initial research funding stage as a very important metric. The interviewee feels this highlights the capability of the university to “*match*” its resources with the needs of the entrepreneurial ecosystem.

4.2.12 Participant UG

Duration 36 minutes

Word count 6530 words

Participant UG feels that the development of the entrepreneurial university may be hampered by a lack of clarity across academic institutions in terms of understanding “*the nature of entrepreneurship*”. He comments, “*institutions may be buying into the wrong definition of entrepreneurship*”. For participant UG, “*entrepreneurs need organisation*” and a developed entrepreneurial ecosystem for entrepreneurs to operate within and he notes how this is frequently underestimated. Participant UG opines that universities place excessive emphasis on the development of the entrepreneurial individual over the entrepreneurial ecosystem and that “*one without the other will never work*”.

Participant UG identifies four elements required for an entrepreneur to be successful. Firstly, the entrepreneur must understand the entrepreneurial

ecosystem and how each organisation contributes to the success of entrepreneurial ventures. Secondly, there must be a demand for the innovative product or service. Thirdly, there must be an appropriately skilled labour pool. Finally, there must be finance available to support the venture. For the interviewee, *“entrepreneurship is something which takes place in the context of developed society”*. To this end, participant UG highlights the role of the entrepreneurial university as a facilitator, enabling entrepreneurs to access the entrepreneurial ecosystem- not so much creating the infrastructure as ensuring it is available so that the individual can take advantage of it. Therefore, the interviewee suggests that if a university is to promote entrepreneurship it has to ensure that those supports (*“incubator units, technology transfer offices, activities supporting intellectual property protection, venture capital, all that...”*) are available, and that there are people resourced to take advantage of them. He feels that for an entrepreneur to flourish, a highly organised ecosystem of support must be in place. He comments, *“fundamentally entrepreneurship triumphs in a society where the organisation is there”*. The participant believes that while encouraging entrepreneurship at the individual level is important, universities place insufficient emphasis on understanding the ecosystem they are creating.

Participant UG also views the creation of entrepreneurial graduates, from creative people to technical experts, as fundamental to the success of the entrepreneurial mission. He sees equal possibility *“of creating entrepreneurial activity in humanities, and social sciences, as there is in science and engineering”*. The interviewee also highlights the need to

produce graduates both to work “*within organisations that are entrepreneurial but also have the orientation that they themselves can become entrepreneurial*”. He highlights positive attitude among the academic and administrative staff towards entrepreneurship as the critical success factor in driving the success of the entrepreneurial university. Stating that “*entrepreneurship is as much about the support as it is about the individual*”, participant UG reinforces that young entrepreneurs need assistance and mentoring to successfully avail of the organisational supports within the entrepreneurial ecosystem.

Participant UG highlights the emerging role for academic institutions of engagement in local communities and comments that there is an ever-increasing need for social entrepreneurial interventions. In particular, he notes the role of social science and humanities graduates in supporting socially entrepreneurial projects at a community and regional level. To this end, the interviewee highlighted how the university has put in place modules where undergraduates engage in community volunteering and “*add value to those communities*”.

The university strategy is framed around the guiding principle that graduates must shape their own future – across all academic disciplines. Participant UG highlights the need for the university to champion a culture of entrepreneurship through engagement in “*real world activities*”. The interviewee sees this being achieved through the university “*giving access to organisations and helping its students and indeed its staff who are entrepreneurial to avail of these organisations*”. Participant UG also feels the

university should push as many students and projects as possible rather than resourcing a smaller number of high value projects.

4.2.13 Participant UH

Duration 54 minutes

Word Count 6780 words

Participant UH is not actually familiar with the term “*entrepreneurial university*” but very much feels that that “*entrepreneurial thinking should be at the heart and soul of the experience of staff and students in universities*”. He sees the role of the president as a leader and a creator of the environment where it is “*easy for people to be entrepreneurial or innovative in terms of the systems that apply in the university*”. The participant also highlights the requirement of the university to behave itself in an entrepreneurial fashion. He encourages the staff to produce self financing models for the development of resources on campus and highlights this “*entrepreneurial thinking*” as a strength of the institution.

While the university is embedded locally at community and industry level through a number of economic and social activities, participant UH stresses the role of the university “*as an educator, not a trainer*”. The interviewee stresses that external engagement should support and enhance the tradition role of the university of teaching and research. The university strategy is outward facing, reaching out (“*to communities and employers, to*

the local region, to our alumni, to external collaborators and to the international scene in a particularly forceful way") with the impact extending *"beyond the region to the country and the world depending on the effectiveness of those interventions"*. These interventions extend from volunteering, where the students are supported in getting volunteering opportunities in the community, to facilitating on-campus collaboration for industry with postgraduate and research academics across many disciplines. Participant UH sees an open innovation collaboration model, where companies locate their research & development team on campus, as proving very popular in the last five years. He notes that manufacturing organisations are seeing *"high value in being able to bounce ideas off people who might have a different perspective on their discipline that they have themselves"*. The participant also highlights the role of the university in protecting high tech manufacturing jobs from migrating to low cost economies through supporting this open innovation activity *"by making their processes more efficient and also more accurate"*. He also emphasises the role of the university as a supporter of regional start up businesses through the incubation centre where start up companies can avail of services such as marketing and IT through co-location with the university business school or through the software engineering research centre.

Participant UH sees the role of the president as one of developing an entrepreneurial organisation as well as facilitating entrepreneurial outcomes for students and the wider entrepreneurial ecosystem. He foregrounds the culture of entrepreneurship and stresses the benefits of celebrating positive

entrepreneurial outcomes as a driver of entrepreneurial culture across the institution.

An entrepreneurial mindset is being developed across the student body through the integration of a series of *“graduate attributes”* into every course. These attributes capture elements critical to development of an entrepreneurial mindset with students encouraged to develop their inherent qualities which would be supportive of entrepreneurship and creativity. The entrepreneurial mindset is being championed in the regional entrepreneurial ecosystem through the company start up incubation facilities. Participant UH sees alliances with the entrepreneurial ecosystem as very important and feels they *“will be a much stronger feature of the higher education sector in the future particularly”*. He values partnerships at a community level, with industry and with other academic institutions. At a community level, participant UH sees a role for the university in the economic, social and cultural development of the region primarily through student volunteering programmes. He aspires to having the impacts of these social interventions *“extended beyond the region to the country and the world depending on the effectiveness of those interventions”*. These interventions include, for example, the student body supporting the local councils in the implementation plan for their town strategy for economic and social development. Participant UH feels alliances with other academic institutions can offer a solution to the question of how to provide a broad education to students while hiring people in your research specialties. To meet this need, the university is collaborating with institutions that have different research specialities thus covering *“all the bases required for a broad education”*. The

interviewee stresses the role of the university leadership as a facilitator and catalyst to initiatives which contribute to the entrepreneurial ecosystem.

Participant UH sees the role of senior campus leadership as one of “*creating an environment in which the people who work here and who study here have the minimum barriers to being innovative and expressing their entrepreneurial tendencies*”.

4.2.14 Participant UI

Duration 43 minutes

Word count 6790 words

Participant UI sees the entrepreneurial evolution of the university over the past twenty years as a migration from academics looking to commercially exploit research to today where “*entrepreneurship now is perceived as very much part of the core curriculum*”. He notes how the triple helix stakeholders of industry and government now view universities as “*engines for economic development*”. The participant acknowledges the existence of conflict between the traditional roles of academics as teachers and researchers and the university management perspective of the institution gaining greater autonomy through the development of income streams from research activities and stronger links with industry. He interprets the entrepreneurial role of the university as multifaceted. Firstly, he looks to entrepreneurship education and the development of the entrepreneurial capabilities within the student body. Secondly, he considers universities behaving themselves as

entrepreneurial enterprises in terms of their ability to manage scarce resources. He also sees a role for the idea of the entrepreneurial university as a branding concept, with universities using “*entrepreneurial as a distinguishing brand*”. Participant UI also notes the role of the entrepreneurial university as an enabler of industrial innovation through conducting research and reducing the innovative risk for companies.

Participant UI stresses the need for the “*evolution*” of the university culture. He sees this evolution “*starting at the edges (the high performing research units) and evolving into the centre*”. The participant notes the need to manage the conflict between an entrepreneurial culture, with its inherent metrics and performance measurement, and the autonomy and traditional academic freedoms enjoyed by the academy. The interviewee feels that central to the success of the entrepreneurial third mission is the redefining of entrepreneurship in the broad context of “*identifying a problem and finding a solution for it*” and indeed how the academic institution engages with society. The participant sees the evolving entrepreneurial culture is then manifest threefold, in terms of the intellectual debate surrounding the impact of entrepreneurship on academic research, the development of entrepreneurial capabilities within the student body, and also how the institution behaves more entrepreneurially in terms of resource allocation across academic, administrative and the student bodies.

Regarding the development of relationships with the wider entrepreneurial ecosystem, participant UI notes how the institute developed an “*open innovation model*” based “*on defining the relationship between the various stakeholders*”. However, the interviewee cautions that

entrepreneurial engagement is difficult with stakeholders that are not themselves entrepreneurial. The participant also notes the increasing opportunity for arts faculties to be entrepreneurially engaged, especially through social entrepreneurship, but stresses the need to afford space for these faculties to define entrepreneurship within their own context. Participant UI sees the value of increased engagement with other academic institutions, especially as it increases the amount of shared support resources without diminishing any of the autonomy each academic institution enjoys.

The interviewee also notes that being the only university in the region coupled with its innovative reputation has resulted in it becoming the focal point for the development of a high-potential start-up cluster. Regarding the incubation of university spin out companies, the interviewee highlights the need for these incubator companies to target their research efforts “*on technology bottlenecks*” as identified through deep understanding of the “*industry technology roadmap*”. The second phase of this evolution has seen the development of an innovation triple helix relationship with local councils becoming increasingly supportive of the creation of local incubation centres linked to the institution.

Participant UI feels that in the evolution toward an entrepreneurial university, initially it is best to host your centre for entrepreneurship external to the institution. He feels this creates a more comfortable environment for entrepreneurs to engage with the university noting that “*innovations that are disruptive should start outside and then be brought in*”. Participant UI sees the next phase of the evolution as best served through the creation of a

central space within the university for all entrepreneurship related activities. However, the participant notes how geography defines the nature of the evolution of the entrepreneurial university. He feels that the demand for entrepreneurial engagement with the region is stronger for those institutions which serve a region alone than for those institutions with other large regional universities in close proximity.

4.2.15 Participant UJ

Word count 5420

Duration 47 minutes

Participant UJ notes how the role of the university has changed hugely, even within the past decade. Within the university, the interviewee comments on how universities *“are expecting their academic faculty to be research active, while questioning what is the return on investment from the universities?”* Externally, participant UJ highlights how *“business, industry and more now government are now more looking at the university and seeing it as a catalyst for economic growth and development”*. However, he notes that *“many academics feel universities are not here to serve industry because if we are just training people for their first job as opposed to for their life, the view is we would be doing them a disservice”*. Participant UJ has seen an evolution in the attitude of the academy regarding engagement with industry from one which saw *“the university corrupting its ideals to deliver some value back for the economy to one of academics realising that the*

problems that industry are setting them in some ways are far more challenging and interesting than some of the problems that they wanted to focus on themselves”.

Participant UJ opines that “ *when you think about entrepreneurial and innovation strategies for a university, it’s really important to get the context of the macro ecosystem in which universities now operate and more importantly what is expected of universities within that ecosystem”*. He suggests that within Irish industry, there is a very poor tradition of research. To build “*research credibility*”, the participant suggests, companies are “*borrowing research credibility from academic institutions*” by building relationships with leading academics and securing research funding to support that. Participant UJ argues that these university industry collaborations grow over time to “*a scale of activity that makes the company site competitive for an r&d investment and not just a manufacturing investment*”. The university is also supportive of the SME sector who “*engage with the university for access to infrastructure, access to students for internships, access to researchers for either collaborative projects or consultancy and access to services*”.

However, participant UJ sees the universities’ engagement with industry as very siloed and normally just “*looked at through the filter of research*”. The university has commenced engagement with larger industry partners which the participant notes have multiple “*strands of engagement*” with the university. However, he comments that these industry partners are traditionally “*siloed in their engagement strategy*”, with the university “*siloed in its reciprocal strategy*”. Participant UJ highlights how most companies are interested in research collaboration at higher technology readiness levels

while universities are *“much more skilled at the lower tiered technology readiness levels”*.

He notes how most collaborative funding from industry is for early stage research and that this contrasts with government policy in Ireland where he feels *“there is a misnomer that universities should be aligning themselves with industries research activity requirements”*. Participant UJ argues universities should be *“misaligning”* and focusing research activity on those elements *“industry cannot do well”*. The participant suggests, that since government policy expects that up to seventy percent of research funding secures matching industry funding, this may be giving excessive power to industry to define the research agenda. Participant UJ highlights the success of some government policy initiatives such as matching funding to support patenting and commercialisation of research and also innovation partnership awards for enterprise engagement. He attributes much of the success to the initiatives being *“opt in for academics, as it allows individual academics to focus where they have got strengths”*. In contrast, the interviewee notes a *“lack of recognition at government level of student entrepreneurship”*. He suggests there is a lack of government focus on the potential to get the two hundred thousand students in Irish third level *“entrepreneurially activated”*.

The participant stresses that *“it would be a mistake to think that there is some grand strategy that drives all that entrepreneurial thinking within the university. It’s not really all top down, a lot of it is opportunistic”*. He believes that the development of an entrepreneurial culture in a university differs from industry and is *“really about building a coalition of the willing”*. Participant UJ

notes *“at the leadership level, there is a clear understanding of the mutual benefit to managing the relationship and building the capability to have a peer relationship with industry”*. The university is prepared *“to release resources to stimulate industry engagement”* where there is commitment to co-funding from industry. Participant UJ describes academics in the university as *“one thousand sole traders operating under a single roof”* but highlights that *“that college has limited strategic funding, so where it chooses to place its funding and resources does get attention”*. The entrepreneurship strategy is *“about providing students with real visibility and indeed skillset to look at being entrepreneurial as a viable career option”*. This is supported through programs providing the student body with support such as *“undergraduate/postgraduate training in entrepreneurship and a student accelerator programme which takes every year a number of student companies and accelerates them from idea to hopefully investable business proposition”*. Participant UJ highlights three elements which are limiting the developing the culture of entrepreneurship across the university. Firstly, problem recognition and a lack of staff across the faculties who understand the importance of entrepreneurial engagement with the wider ecosystem. Secondly, the interviewee highlights the lack of industry engagement experience across campus. He notes *“the academy built their credibility from thinking differently to industry and what we need to do now is to find ways to build that continuum to industry, while retaining the capacity to think differently”*. Thirdly, the participant highlights the fear within the academy *“that universities are becoming overly reliant on industry as a stakeholder”*.

Finally, the participant commented on measures and metrics related to entrepreneurial outcomes in the university. He notes that the university captures what he perceives as “*good indicators of activity and cultural change*”. These include some economic metrics like licencing revenue, venture investment rate by campus companies, jobs created by those companies, the number of inventions, disclosures, patent applications, and licences to companies, and the number of products to come from those licences. The interviewee feels that the best measure of entrepreneurial success is potentially through capturing the success stories over time and looking at this information as a longitudinal study.

4.3 Summary of emergent themes

Phenomenological research is inherently inductive, with the goal of the research to present a thematic description of the lived experience of the participants from which hypothesis can be drawn (Cope, 2005). As outlined in the methodology, after each interview was transcribed and read many times, units of meaning were delineated utilising bracketing and phenomenological reduction. These meaning units were clustered to form themes and then a summary of each interview was created taking the interview from the language of the participant to the disciplinary language of the interviewer. Once this researcher had prepared a narrative description of each of the interviews and identified the themes, he then looked to create a holistic view of the data through a summary of the emergent themes. This next stage of the phenomenological methodology involved rigorous cross

comparison and content analysis of each of the interviews. “Content analysis involves identifying coherent and important examples, themes, and patterns in the data. The analyst looks for quotations or observations that go together, that are examples of the same underlying idea, issue, or concept” (Patton, 1987, p149). Seven principal themes emerged as outlined in table 4.3. The themes are summarised in this chapter without reference to the literature to allow the voices of the participants to emerge. These emergent themes are then considered with respect to the literature in chapter 5.

Theme 1	<i>Interpreting/defining of the idea of the entrepreneurial university</i>
Theme 2	<i>Enabling the entrepreneurial mission in the institution</i>
Theme 3	<i>Role of government policy as a determinant of entrepreneurial strategy</i>
Theme 4	<i>How the impact of industry engagement (is driving the success of entrepreneurial activities on campus)</i>
Theme 5	<i>Engagement with external ecosystem</i>
Theme 6	<i>Developing organisational capacity and capabilities to deliver the university third mission</i>
Theme 7	<i>Measurable factors which enable the entrepreneurial third mission</i>

Table 4.3: Themes common across the interviews

4.3.1 Theme 1: Interpretation/defining of the idea of the entrepreneurial university

Interpreting and defining entrepreneurship in terms of the role of the university emerged as a key theme in the participants descriptions of their lived experience of the development of entrepreneurial capabilities in HEIs.

Three participants specifically note the impact of interpretation of the entrepreneurial mission of the institution on entrepreneurial outcomes within and beyond the institution's walls. Participant UD notes that while most universities in UK and Ireland have a commitment to innovation and entrepreneurship in their mission statements, he feels that there is an issue with interpretation. Participant UD highlights his concern over *"misinterpretation of what entrepreneurship means and what it means to be entrepreneurial"*. In defining the mission of the HEI in terms of delivering entrepreneurial outcomes, participant ID highlights the *"application and context as extremely important"*. He highlights utilising *"needs analysis"* to ensure the message you are delivering is relevant to the desired educational outcomes to different departments as he feels there is *"undoubtedly a dilemma how you position entrepreneurship in particular disciplines"*. Participant UC stresses the sensitivities among academics within the institution to the definition of the entrepreneurial university. He notes how many academics see the idea of the entrepreneurial university as excessively supportive of an *"enterprise driven agenda"*. Linguistically, Participant UC feels the academy prefers to define entrepreneurship in terms

of “*agency or creativity*” while the student population possesses a broader definition of creativity and entrepreneurship. Participant UB foregrounds the history and the environmental “*context*” of the institution and emphasises the role of the university being “*rooted in our community*”. He defines the entrepreneurial university in terms of the development of “*access*” to the wider entrepreneurial ecosystem, from creating *career ready graduates* and entrepreneurial activity in technology transfer, to societal engagement and support with all activities as “*part of the same continuum*”. Definitions of the entrepreneurial university derived from this research are presented in table 4.4.

A number of key elements surfaced in the defining of the entrepreneurial university. Firstly, participants considered the entrepreneurial university in terms of the academic institution itself behaving entrepreneurially. Participant IA sees the entrepreneurial university as one which “*responds to the need for academic education and professional training in an “agile and responsive fashion”* in order to both “*meet a learner or market need*” and “*identify new funding streams*”. For a university to achieve success with its entrepreneurial mission, Participant IB highlights the need for the institution to “*move its internal structures and work practices*” and develop the agile capabilities to act itself entrepreneurially through rapidly co-developing bespoke educational offerings with specific companies or market sectors.

Source	Commentary
Participant UA	<i>The entrepreneurial university is a university with culture and awareness of entrepreneurship and innovation, which also fosters innovative mindsets in our students and staff but also focuses on translating knowledge into societal and economic benefit and engages proactively with enterprise, local and central government, and civil society.</i>
HEInnovate (Brussels, 2016) offered by participant UA	<i>The entrepreneurial and innovative HEI is designed to empower students and staff to demonstrate creativity, innovation and enterprise in education, research and societal engagement. Its activities are directed to enhance learning, knowledge production, and translation of knowledge in a highly complex and changing societal environment. It is dedicated to creating public value via processes of open engagement.</i>
Participant UC	<i>An entrepreneurial university is an institution with an appetite for and capacity for strategic action. Centred around the posture of the institution and the capacity of the university corporate for action, the university stimulates entrepreneurial action in student and faculty body.</i>

Table 4.4: Definitions of the entrepreneurial university

Participant UI defines the role of the entrepreneurship in the university in terms of the development of the entrepreneurial capabilities within the student body and also the institutions behaving themselves as entrepreneurial enterprises in terms of their ability to manage scarce resources. Participant UI also notes the role of the entrepreneurial university as an enabler of industrial innovation through conducting research and reducing the innovative risk for companies.

Participant IA sees the definition of the entrepreneurial university as bounded by the ability of the institution to behave itself in an entrepreneurial fashion. He defines entrepreneurship within the academic institution as *“anticipating emerging trends and requirements for academic education and professional training and rapidly getting programmes to the market that will match those trends”*.

The entrepreneurial university is also defined in terms of the inclusion of entrepreneurship within the pedagogy and the development of entrepreneurially minded graduates. Participant UA looks to the entrepreneurial third mission as both encouraging entrepreneurial behaviour and culture and also the institution itself behaving in an entrepreneurial fashion. Participant TA views the third mission as *“inspiring creative and entrepreneurial graduates at the University”*. Participant IC looks to the third mission *“not so much creating the graduate entrepreneur but creating the entrepreneurial graduate”*. Interestingly, Participant IC defines the entrepreneurial graduate as one who develops both *“technical skill in their discipline”* and *“entrepreneurial attributes, behaviours and traits such as problem-solving, communication skills, negotiation skills and teambuilding”*. Participant TA looks to *“inspire creative and entrepreneurial graduates at the university”*. Participant UC highlights the *“the posture of the institution”* in developing *“higher order thinking skills”* as crucial to *“stimulate entrepreneurial action in student and is body”*. Participant ID feels that in terms of graduate outcomes, the desire is the *“developing a competency, and a mind-set that is entrepreneurial”*, and not necessarily focused on venture creation.

Engagement with the broader community and industry also emerged as a major theme across the definitions with all participants associated with public HEIs highlighting external engagement as a key role of institutions engaged in third mission activity. Participant IB defines the entrepreneurial HEI in terms of the addition of the pillar of “*stakeholder engagement*” to the traditional pillars of teaching and research. Participant IB notes that “*by definition the entrepreneurial HEI should be very externally facing*”.

4.3.2 Theme 2: Enabling the entrepreneurial mission in the institution

Eight of the participants (UA, ID, UD, UE, UF, UG, UH, UI) spoke about behaviours and practices within the academic institutions which enabled the advancement of the entrepreneurial third mission. Within the university, Participant UD found that to achieve support across campus for an agenda for entrepreneurial learning, it was necessary to disseminate a view that entrepreneurship learning is about establishing or developing an appropriate mind-set and competencies and not “*just all about making money*”. Theme 2 consists of the subthemes of (a) recognition and promotion as an enabler of entrepreneurial activity (b) keeping the entrepreneurial mission and strategy alive (c) development of support resources. Figure 4.1 captures the key enablers of the entrepreneurial third mission identified in this research.

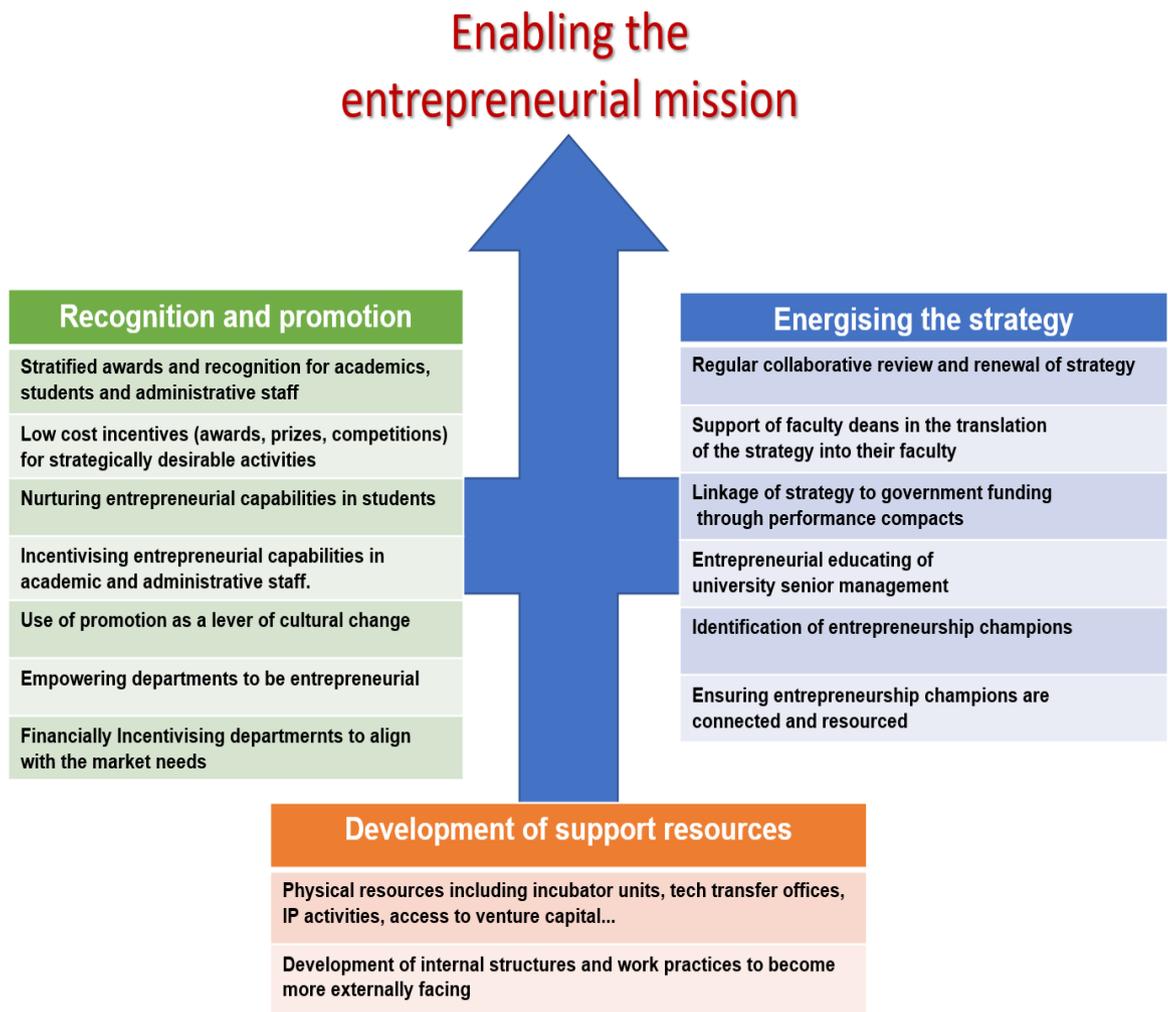


Figure 4.1: Internal enablers of the university entrepreneurial strategy

(a) Recognition and promotion as an enabler of entrepreneurial activity

Six participants (UA, IB, UC, UD, UE, UF) noted the recognition and reward of entrepreneurial behaviour among staff as a significant enabler of entrepreneurial activity.

Participant UA commented regarding the use of recognition as a lever of change *“one of the key questions is how does the university show that it really values this. So, we have a separate award for academics, a separate one for students and interestingly a separate one for administrative and*

professional staff. We stratified that award because people expect this is just going to go to academics”.

Participant UC notes *“there is enormous benefit in kind of what you might call low cost incentives (of awards, prizes, competitions, incentives in that scale) for strategically desirable activities”.*

Participant UA commented on the need to also reward academics for success at entrepreneurial activities. He noted *“the other thing that’s important is, you’ve very few levers of change of culture within the academic world but promotion is one of those. If innovation is important, then it should start to appear in terms of the issues that are evaluated and promoted, so that’s something we’ve started to introduce at some grade levels and again it’s a strong message”.*

Participant UF contrasts the *“nurturing”* role of the institution with the student body and the need for *“incentivising”* of the academic and administrative staff. Participant UF also stresses how the institution must recognise positively time spent engaged in entrepreneurial activity both in terms of promotion and recognition and not focus solely on publication output.

Participant UF states that *“if you really want to drive an entrepreneurial institution it needs to be clear to the academic staff that in terms of promotion, in terms of their own respect internally, that the time that they spend on this type of activity (engaging with an entrepreneur in the region or starting up a company and if that has an effect on their own publication output) will feedback”.*

At a departmental level, participant UC comments *“it’s important to signal that departments are empowered to be entrepreneurial - I think it should be incentivised but not forced.”* Participant UC highlights encouraging departments *“being business like in their approach to how they operate”*. He notes that the university in turn must be *“much more transparent about what sort of cross subsidies it is prepared to support and then work with department to ensure that the incentives are aligned with the market reality. In which case then you are being truly entrepreneurial. You’re looking at winning resources for the institution on the basis of strategic opportunities”*.

Participant UD also highlights how the recognition of academic enterprise as a determinant for promotion, along with the traditional markers of teaching and research, has had a very positive impact on the level of entrepreneurial engagement of academics. He comments on how *“promotions in the university, for example, was traditionally based on how good a lecturer a person is and how good you are as a researcher. We introduced academic enterprise as a third measure for success.”* He notes how *“working at that interface between the university and business, getting involved in commercialisation activities of research and innovation, and developing innovative teaching material would be a basis for looking for promotion and expecting to get it.”*

Participant IB commented *“So there isn’t within our structure at the moment that gives ability for us to I suppose reward it, and develop it as a legitimate career pathway, so we’re majorly restricted in that context. So that is certainly a big break on the amount of flexibility we would like to have. I would like to create a career pathway which allowed a member of academic*

staff to, you know, prioritise in one phase of their career teaching and learning, and another phase research and in another phase external engagement”.

Participant UE notes that in his institution “*academics are still generally judged on academic activity*” and the lack of reward and recognition for entrepreneurial activity is a barrier to increased entrepreneurial engagement by academics.

(b) Keeping the entrepreneurial mission and strategy alive

Participant UA stresses the need to keep the strategy document “*alive*” and highlights the success of an annual “*rolling planning function*” which challenges the university strategy document through a process of continuous analysis needs and opportunities. He also highlights the role of the faculty deans as “*gatekeepers of that conduit from academic departments to senior management*”. Participant UA comments “*that the degree of buy-in of the deans and I suppose their translation of the strategy locally into their faculty is a crucially important part of how the [enterprise] strategy permeates the university*”.

Participant UD adds that the development of the entrepreneurial university would benefit from the entrepreneurial educating of university senior management coupled with “*the identification of champions for the agenda*”. However, participant UD cautions that entrepreneurship champions “*have to be joined up so that they can be effective*”, noting that champions typically “*burnout due to lack of resources or from being isolated and unable to build*

connections that will lead to some sort of fusion". Supporting this view, participant UG states that "*entrepreneurship is as much about the support as it is about the individual*".

Participant ID notes the value of developing "*mission based performance compacts*" between the academic institution and the government funding provider as a facilitator of the entrepreneurial third mission.

Participant UH remarked on how encouraging the staff to produce self-financing models for campus resources develops "*entrepreneurial thinking*" within the institution.

(c) Development of support resources

The importance of combining behaviours and practices with the physical resources the third mission is addressed. Participant UF frames the behaviour of the HEI in terms of "*encouraging*" entrepreneurial behaviours. Participant UA uses the language of "*rewarding and recognising*" entrepreneurial behaviours and feels the entrepreneurial mission should be "*a lived behaviour in the university*". Participant UG suggests that if a university is to promote entrepreneurship it has to ensure that both physical and human resources are in place to support these activities. He stresses the need of "*having incubator units and having tech transfer offices, having IP activities, having access to venture capital, all that... If the university is interested in promoting entrepreneurship it has to invest in those areas. It's a question ensuring the infrastructure is available so that the individual can take advantage of it.*"

Participant IB comments that if an academic institution wants to become more externally facing, *“it does need to move its internal structures and work practices in order to facilitate that as well.”*

Participant ID notes how the investment in an incubation space *“has been a really positive development because even the physicality of the space on a campus creates an awareness and increasingly an engagement with many of the [academic] programmes”*.

4.3.3 Theme 3: Role of government policy as a determinant of entrepreneurial strategy

Ten of the participants specifically discussed how government policy significantly impacted the entrepreneurial strategy of their academic institution. Theme 3, impact of government policy on entrepreneurial strategy, consisted of three subthemes: (a) expectation of government, (b) funding and (c) an outlier theme relating to the nature of academic public service employment contracts.

(a) Expectation of government

Six participants (UA, ID, UF, IC, ID, UJ) indicated how government policy was specifically impacting the entrepreneurial third mission of the institution.

Participant ID notes the positive influence of the national strategy for higher education on the move by the institution to reframe entrepreneurship education toward learning outcomes specifically *“around 2005 when the*

national qualification framework was instituted". She comments that the capital investment by Enterprise Ireland to *"ensure that there was an associated incubation type space on all campuses"* was a very positive development in developing the culture of entrepreneurship on campus. Participant ID also highlights the increased level of engagement between the incubation space and programmes, the innovation voucher scheme and associated increase in industry engagement, and *"even the physicality of the space on a campus"* as greatly influencing the level of entrepreneurial activity and engagement across all campus disciplines.

Participant UA states that *"the government perspective is that we're instruments of policy in terms of driving economic prosperity, both from the human capital perspective and the attributes"*. However participant UA comments that while *"the new role of universities certainly overlaps with government policy"* he is uncomfortable with governments' ever increasing view of *"universities as instruments of government policy"* despite reductions in *"the fraction of total state funding"*.

Participant UF notes a lack of vision in the national research prioritisation with excessive focus on intellectual property development over *"ideation"*. The policy drives the research agenda in the institution as *"most of the large-scale research funding which is available at the moment requires you to leverage partnerships with industry and to demonstrate short-term commercial outcomes"*.

Participant UF notes how all *"Irish universities have signed up to a compact, effectively a contract with the state in terms of performance based*

funding and this is central to government policy now". Participant UF highlights the success of "influencing the national policy, so that the national policy mirrors what your strengths are".

However, participant UF comments on the lack of correlation between the government policy surrounding entrepreneurial education and policy regarding entrepreneurial outcomes generated through technology transfer, business incubation and industry engagement. Participant UF sees policy *"developed as though they are two separate pillars where, in reality, they need to be tied together"*. Participant IC also notes how *"we had bought into the whole entrepreneurship agenda way back like in 2007 so we influenced policy which is a nice thing to do rather than reacting to it"*. Participant ID also highlights the influence of mission based performance compacts for the allocation of funding between the institution and the higher education authority. Participant UJ notes *"at a policy level in Ireland there is a misnomer that universities should be aligning themselves with industries research activity requirements at higher technology readiness levels. My attitude is we should be misaligning ourselves with it and that what industry actually wants when it comes to the university is the things they can't do very well- the early stage exploratory research"*.

(b) Government funding of higher education

Eight participants (IA, UA, UE, TA, IB, ID, UH, UJ) commented on the impact of government funding on the development of the entrepreneurial third mission within the institution.

Participant IB highlights the issue of funding as a barrier to driving the entrepreneurial strategy both across campus and beyond. He notes that assignment of funds from the HEI steering committee is competitive and while the income stream from both teaching and research is *“reasonably clear”*, unfortunately *“though there’s been a lot said about how important engagement is, the income stream from it isn’t as obvious”*.

Participant TA notes how the *“basic funding of universities which tends to be thought mostly in terms of education is actually critical equally to the research output and, therefore, to the entrepreneurial environment and because there’s been so many cutbacks, researchers can’t balance the time between teaching and research.* From a knowledge transfer perspective, participant TA sees the national government policy regarding funding of research as crucial to entrepreneurial outcomes- *“If you cut-off that or you deplete that then by definition we’ll have less ideas coming through, therefore, we’ll have less opportunity to exploit those ideas”*. In this regard, participant TA notes *“everything gets tied and everything is tied together”*. Participant UH concurs with this perspective, noting that entrepreneurial activity is limited by funding and the constant drive to do *“more for less”*.

Interestingly, participant UJ notes *“now 50-70% research funding coming from the state requires some level of cofunding from industry, requiring academia to build a whole set of partnerships with industry. In some ways it has gone too far because it has provided almost too much power to industry to define the ideas it feels should be supported and not”*.

Participant IA comments *that “as a private college, we don’t have the*

resources, the knowledge, the expertise to incubate student projects as the institution does not have state funding to cross subsidise incubation and/or innovation”.

(c) Public sector contracts of employment

One participant (IB) highlighted the impact of how public sector contracts of employment significantly impacted the entrepreneurial strategy of their academic institution. This theme was alluded to but not directly discussed by other participants. Participant IB said that the restrictive nature of the tenure system and the *“public sector culture of custom and practice and collective bargaining”* means that any activity outside the core of teaching and research is done as *“grace and favour”*. Also, participant IB noted the activity of these *“champions”* is not recognised or rewarded *“in a tangible way”* and currently not possible to *“develop as a legitimate career pathway”*.

4.3.4 Theme 4: How the impact of industry engagement (is driving the success of entrepreneurial activities on campus)

Eight participants (TA,UE,UH,UI,IB,IC,IA,UJ) commented on university industry collaboration and engagement. This collaboration is identified as impacting universities and industry singularly and also as impacting both simultaneously. Figure 4.2 captures the comments by participants in this research both on the impact of industry engagement on universities, and also

how direct industry university collaboration can be of benefit to industry and indeed of mutual benefit.

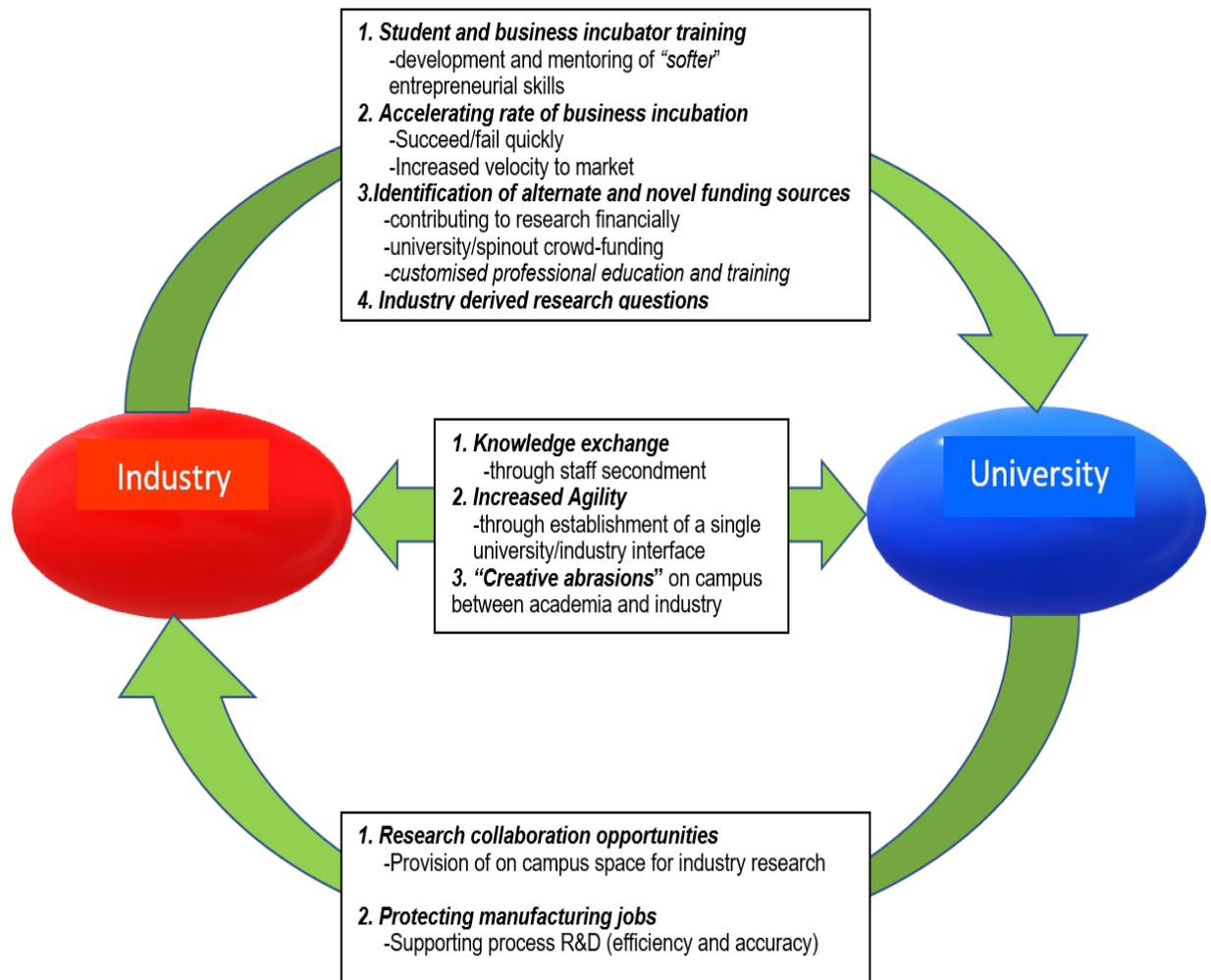


Figure 4.2: Benefit of university industry collaboration

Participant TA notes how external companies are now engaged on campus “getting involved not just with the research and academic training, and they’re getting involved in the student training as well.” Participant TA sees the added value of engagement with industry in terms of development and

mentoring of “softer” entrepreneurial skills but also through contributing to research financially and with their own ideas. Participant TA feels that mentoring of start-ups is a critical success factor in student start up incubation as *“your biggest protection for your business and for developing your business is velocity- getting to market quickly”*.

Participant UE comments *“the interest really now is not just impact. It’s about accelerating that impact. How quickly can you fail things, or how quickly can you succeed with things, and we’ve done quite a lot of, a lot of time investing in, seconding our staff out into industry and then bringing industry secondees into the university. Our experience then has been the best way of exchanging knowledge is through our people, and how you transfer people around, or exchange people is a good way of transferring knowledge.”* Participant UE also noted how entrepreneurial engagement with industry resulted in the university management identifying new and novel funding sources. Participant UE identified how the university has co-canvassed with spinout companies to generate investment through crowd funding models noting that he *“didn’t know any other university that has co-invested alongside the crowd.”* The university has also begun approaching knowledge exchange opportunities with a *“customer driven market approach”* through collaboration with other academic institutions and potential customers. Participant UE feels that this has greatly accelerated the time to market for these spinout companies.

Participant UH comments *“There’s a big demand for companies trying to develop new product, to come and live... Do the initial work on this actually on campus. That’s kind of a new development that is very challenging and*

finding the space for it is difficult.” Participant UH opines that organisations, where the focus of the activity is around production and manufacturing, are seeing *“high value in being able to bounce ideas off people who might have a different perspective on their discipline that they have themselves”*.

Participant UH also highlights how the university is protecting manufacturing jobs from migrating to low cost economies through facilitating industrial and academic collaboration into how manufacturing can *“make their processes more efficient and also more accurate”*.

Participant UI stressed how engagement with industry helps researchers *“to develop the skillsets that are needed, it helps them to understand how to do better research or how to identify opportunity for exploitation”*. He comments that in order for research to be applicable to industry *“I’ve come to the view that, you know, what I did very early on was to spend a lot of time with industry understanding their own technology roadmap because then I can map more easily .. and the approaches can be mapped immediately into industry, but you’ve got to understand where industry is going. You’ve got to understand their technology roadmaps. You’ve got to understand the bottlenecks, either the technological bottlenecks or the kind of environmental bottleneck”*.

Participant IB comments on how the academic institution and industry partners have benefited from establishing a centralised point of contact for industry engagement across all departments. He said *“we would certainly have had people who have an almost territorial sense of this is my contact with this company, and it’s really good for my department and so on and I’m not sure I want to dilute it- I want to do my own engagement- and we’ve*

pushed very hard to stop that. The company doesn't see the difference and they don't see that they should have to now build a second relationship."

Participant IC notes how the academic institute has developed a single *"commercial interface between the institute and industry and business. "and is "continually engaging with industry". She notes "there's not much point in not being agile. If you can't respond to their needs they don't come knocking on your door, you know, likewise industry has particular requirements in terms of their skills and even though we have a five year programmatic review you have to be in touch to see well what is their requirements now. I mean you have to be agile in the twenty-first century because everything moves at such a pace".*

Participant IA notes how the academic institution has developed its ability to behave entrepreneurially due to the need *"to generate fee paying opportunities from students."* He comments *"we go to the market and bring programmes to the market that industry and also any students in employments may want"*. He notes how the institution has developed the entrepreneurial capability to *"look for opportunities, having those conversations and responding in an agile way"*. Participant IA notes how the college has developed the capability *"to anticipate what the emerging trends are and get our programmes to the market that will match those emerging trends.. Another example would be professional education and training and responding to those customised needs"*. Participant IA feels this agility – *"to be part of your supply chain is something no other institution is talking about"* in Irish education.

Significantly, participant UJ has seen an evolution in the attitude of the academy regarding engagement with industry from one which saw *“the university corrupting its ideals to deliver some value back for the economy to one of academics realising that the problems that industry are setting them in some ways are far more challenging and interesting than some of the problems that they wanted to focus on themselves”*.

4.3.5 Theme 5: Engagement with external ecosystem

All of the participants commented on engaging with the external ecosystem. This engagement comprised local and national public authorities, alumni, industry and societal engagement with local and regional communities.

Participant UA notes the need for the entrepreneurial university to be an engaged university- *“engaging with enterprise, engaging with local and central government and engaging with civil society”*. Participant UA feels that quadruple helix engagement, co-creation and co-definition leads to clearer articulation of problem statements. He comments *“I think it’s that notion of co-creation, co-definition of problems, co-creation of solutions is, and the recognition that innovation itself best happens in convergent spaces at interfaces between different perspectives, so the quadruple helix and that engaged university, I think is critical to it”*.

Participant UA also comments that in creating partnerships and alliances with other universities at an international level, the university is *“better off with a small number of deep international partnerships than a large*

number of shallow ones". Participant TA concurs, commenting *"we look at many, but we have relationships with few, because time being what it is and the fact that you're clashing, you tend to develop the relationship with a handful"*.

The importance of geographical location on the nature of external alliances was noted by three participants. It is noteworthy each of these participants were from outside of the major urban centre in Ireland, Dublin, which accounts for 40% of the population of the state and over 45% of Ireland's GDP (Source: Dublin chamber of commerce (2019)). Each of the participants (IC, UC and UI) note the importance to the strategic mission of their institutions of regional development, the development of alliances with local industry and government stakeholders and indeed community engagement.

Participant TA comments that *"Ireland is a comparatively smaller ecosystem, and therefore, those [triple/quadruple helix] elements should work tighter together to develop quickly, clear policies, with rapid execution of those policies. The universities are absolutely pivotal for that"*.

Participant IB feels that *"by definition, the entrepreneurial HEI should be very externally facing"*. He sees external engagement for the HEI in terms of primarily industry engagement but also the development of *"knowledge for the benefit of the broader society"* and *"specifically lower socio-economic groups"*.

Participant UB comments on the importance of engagement with the local ecosystem. He comments *"We're an institution which seeks to be routed*

in our community, seeks to offer opportunity, and seeks to be accessible, and that's a continuum from the physical. We have an activity, where students will go and solve a problem either singularly or in groups...a community problem". Participant UB notes how much of this social entrepreneurship derives from the *"administrative staff responsible for access and community engagement"*.

Participant UC bemoaned a lack of meaningful peer to peer senior leadership engagement between industry and universities. He explained *"Our experience is very mixed. I am astonished by how little real dialogue there is between enterprise and academia in Ireland. I never had a conversation with a senior industrial person on curricula"..* Participant UC notes how he also sees strong relationships with industry siloed to particular departments but that *"organisation to organistaion relationships are very weak"*. He comments *"that relationships between Dublin universities and major enterprise are weak, and I sense that they are stronger in the regions. You've got all these choices and then you really don't form a deep relationship with any of them"*.

Participant ID commented *"We have an increasingly active engagement with our alumni. We tap into them all the time because we have to keep current and relevant"*.

Participant UD noted *"There's a very strong commitment for working at the interface between the university, government and business. I think they tend to be somewhat siloed though"*. Participant UE stated *"we've done quite a lot of seconding our staff out into industry, and then bringing industry secondees into the university. Our experience then has been the best way of*

exchanging knowledge is by maybe through our people, and how you transfer people around, or exchange people”.

Participant UF considers the entrepreneurial university as having a role as *“a repository of information and skills”* for the wider entrepreneurial ecosystem. She explains that *“there needs to be a lot of linkages between the people in the institution who’ve got particular skills and the people in the innovation eco system in the region who need to link into the people in the university who are driving innovation. They also need to link into the people in the university who have the expertise that they want, and they’re two different groups of people”*. Participant UF however feels the technology transfer office needs to be resourced and empowered *“to talk to the academics who have particular expertise and see if you can match them up”* with the opportunity.

Participant UG opines that *“entrepreneurs need organisation... universities put far too much emphasis on not understanding it’s the eco system we create which is as critical to entrepreneurship as the individual who takes advantage of it, and one without the other will never work”*. Participant UG suggests that if a university is to promote entrepreneurship it has to *“ensure “the infrastructure (“incubator units, technology transfer offices, activities supporting intellectual property protection, venture capital, all that...”) is available so that the individual can take advantage of it”*.

Participant UH , an advocate of a broad undergraduate education, comments *“alliances are very important and will be a much stronger feature of the higher education sector in the future”*. He suggests that universities *“can provide a broad education to students while hiring people in your*

research specialties by collaborating with an institution that has different research specialties”.

Participant UI comments *“that if the other organisations that you engage with are not entrepreneurial, if they are more bureaucratic then that can impact on the ability of you to engage with those organisations in a more entrepreneurial way”.*

Participant IA did not specifically mention entrepreneurial engagement with the external ecosystem. While this appears an outlier, the participant did comment *“we differentiate ourselves, we are showing an entrepreneurial mind-set by going out there and looking for opportunities where we can actually get traction and respond quicker than our competitors with something that students learn as the market need”.* This does imply engaging with regional stakeholders in an entrepreneurial fashion.

Participant UJ stresses the need to understand *“the context of the macro ecosystem in which universities now operate and more importantly what is expected of universities within that ecosystem”.*

4.3.6 Theme 6: Developing organisational capacity and capabilities to deliver the university third mission

Twelve of the participants (UA,TA, IB, UB, IC, UC, UD, UF, UG, UH, UI. UJ) commented on issues related to the development of organisational capacity and capabilities to deliver the university third mission. Interestingly, participant UI found that how entrepreneurship is defined greatly influenced

the intellectual debate in the institution regarding the development of a more entrepreneurial ethos. He commented that “[defining the entrepreneurial ethos in terms of] *identifying a problem, and finding a solution for it opened that debate.. that is not about helping industry to become richer but it’s about changing the way we engage with our society*”. The principal enablers to campus entrepreneurial organisational capacity and capabilities identified within this research are (a) development of support infrastructure, (b) role of senior management in enabling the entrepreneurial third mission, and (c) development of an entrepreneurial mindset. Minor themes relating to the value of external engagement, strategic recruitment policy and peer to peer networking were also identified.

(a) Development of support infrastructure

Four of the participants (TA, IB, IC, UB) commented on the development of physical infrastructure as an enabler of the organisational capacity and capabilities supportive of entrepreneurship across campus.

Participant TA notes the need for a support infrastructure to support early stage spin out companies develop the innovation into a business. He comments “*outside the core innovation of the idea, and answering solution to the problem, you’re in the domain of entrepreneurship*”. Noting how technical innovators are “*normally quite focused*”, the participant highlights one of the critical success factors in successful university spinouts as creating the support infrastructure within the university which “*recycles successful entrepreneurs back in, bringing mentors in, bringing experts in and filling out that team*”. Participant TA further opines “*you depend on a technical team to*

all of a sudden become a team that covers marketing, which is why so many fail”.

Participant IB feels that critical to the success of the entrepreneurial third mission, the university needs to “*move its internal structures and work practices*” to actively facilitate these creative abrasions between industry and students and academics from diverse backgrounds. He feels the development of a dedicated on-campus centre for entrepreneurship creates “*that eco system where companies, research groups, academic departments can cooperate, and collaborate*”.

Participant IC notes the incorporation of “*the technology transfer offices and incubator facilities into the academic programmes*” as greatly enabling the entrepreneurial culture.

Participant UB highlights the development of physical infrastructure local to the campus , including an off campus business incubator and development of a science and technology park as supportive of achieving “*the balance between indigenous entrepreneurship and the genuine attraction for direct investment*”. Participant UB also notes how much of the universities socially entrepreneurial activity derives from “*the administrative staff responsible for access and community engagement*”. He notes how the lack of a formal administrative building, resulting in administrative staff being “*embedded*” with academia, as being supportive of a common entrepreneurial culture.

(b) Role of senior management in enabling entrepreneurial third mission

Five participants (UA, UB, IC, UC, UH) highlighted the importance of senior management in supporting and enabling the development of organisational capacity and capabilities across the academic institution.

Participant UA commented *“I think the role of the role of the president is very ambassadorial in creating that connectivity, you know, globally engaged, and global means everything from local, regional, national, fully global . The degree of buy-in of the deans and their translation of the strategy locally into their faculty is a crucially important part of how this permeates the university”*.

Participant UB opined with regard to the role of senior management in enabling the entrepreneurial capabilities within the academic institution *“a lot of what of you’re doing in managing higher education is creating and resourcing the appropriate environment for things”*.

Participant IC commentes on the importance that development of entrepreneurial capabilities within the university *“didn’t become like a project, or an initiative”*. To achieve this, the institution developed a strategy of *“bottom-up and top-down approach meeting”* by creating *“a cross faculty entrepreneurship working group”*.

Participant UC comments *“I think the fundamental step for university moving from a traditional model to a more entrepreneurial model is changes in governance, management and resource allocation and resource flows,*

and information flows". He comments further *"One needs to as the leadership of the university to cede a certain amount of control out of certain ways of being in practice, to have departments in essence realise that they have control over their own destiny. That they have the capacity to do things and frankly that there are consequences of them not doing things"*.

Participant UH is not actually familiar with the term *"entrepreneurial university"* but very much feels that that *"entrepreneurial thinking should be at the heart and soul of the experience of staff and students in universities"*. Participant UH sees the role of the president as a leader and a creator of the environment where it is *"easy for people to be entrepreneurial or innovative in terms of the systems that apply in the university"*. He feels the role of the university president is to *"create an environment in which the people who work here and who study here have the minimum barriers to being innovative and expressing their entrepreneurial tendencies, and at the other end of the equation to celebrate their achievements"*.

(c) Development of an entrepreneurial mindset

Four participants (IC, UG, UH, UI) commented on how development of a positive attitude toward entrepreneurial activity is important in the development of an entrepreneurial culture. Participant IC opines that a critical attribute of an entrepreneurial university *"is more than size, it's an attitude"*. Participant UG, noting that *"entrepreneurship is as much about the support as it is about the individual"*, highlights the *"attitude among students and staff"* as a key enabler for generating positive entrepreneurial outcomes. Participant UH commented *"we have graduate attributes that we're trying to*

instil into our students and every module has to demonstrate to the university as part of the internal accreditation process the achievement of those graduate attributes". These attributes capture elements inherent in the student critical to development of an entrepreneurial mindset. Participant UI noted that "an academic guards jealously his autonomy and an entrepreneurial culture conflicts with the idea of autonomy and independence because in an entrepreneurial culture then you've got to set targets and you have to measure performance". He commented that the "evolution" of the entrepreneurial culture across the institution "started at the edges (the high performing research units) and evolved into the centre".

(d) Minor themes in the development of organisational capacity and capabilities to deliver the university third mission

A number of minor themes were also identified as enablers of the development of organisational capacity and capabilities. Participants TA and UG commented on the value of engagement with industry in the development of the entrepreneurial culture of the university. Participant TA noted that support for "*student start-up programme – bringing people in from outside, mentors, mixing the people with your technical people and having money to formalise that is very, very important*". He stressed the importance of mentoring for student startups as "*your biggest protection for your business and for developing your business is velocity- getting to market quickly*".

In relation to the development of entrepreneurial graduates, Participant UG discussed the need for engagement in "*real world activities*". According to

participant UG, this is achieved through both *“providing supports, and mentoring for young undergraduates who want to develop ideas into businesses”* and *“a volunteering programme that gives them opportunity to see how communities function”*

Participant IB highlighted the value of a recruitment policy of employing academics with *“considerable industrial experience who understand the external environment in a more intimate way”*.

Participant IC highlighted on the value of identifying entrepreneurship champions within the academy. She noted *“We actually found academic champions in each of the departments. So I would say a lot of the cultural change happened because of peer-to-peer networking and engagement rather than this top-down diktat that entrepreneurship is now a strategic theme”*.

Participant UJ considered three factors which are inhibiting the development of a more entrepreneurial culture across the university. Firstly, the interviewee notes the challenge of *“problem recognition”* and a lack of staff across the faculties who understand the importance of entrepreneurial engagement with the wider ecosystem. He comments further - *“the second problem is there is only a handful of people within the university who have had extensive experience of talking to industry regularly. The third problem really is that universities as a whole are becoming overly reliant on industry as a stakeholder, and if that is handled badly, you can lose the qualities and capabilities that make you attractive to the companies. But if you fail to*

understand the role we now play as a university, you also make yourself irrelevant”.

4.3.7 Theme 7: Measurable factors which enable the entrepreneurial third mission

A further theme which presented in the participant interviews is the need for development of measurable criteria for the evaluation of the success of the entrepreneurial third mission within academic institutions. Five of the participants (TA, UB, IC, UF, and UJ) commented specifically on this and proposed criteria for consideration as metrics.

Participant TA notes *“most people will initially focus on the raw economics numbers but some of those non economic but measurable scenarios are as important to see that things are improving”*. He proposes *“in start-ups, the quality measures would be things like velocity to investment because when somebody from the outside world puts money into your company, somebody else is saying there’s quality in your company. That’s easily measured and may be initially a slightly fuzzy metric but it becomes a harder and harder metric over time”*. Further to this, participant TA comments *“surveys, longitudinal especially, have a great way of measuring attitude and how attitude changes”*. Participant TA looks to the question *“do you see entrepreneurs coming back into your environment, recycling back into the system because they believe in the system, or they tell you its very positive?”* as an interesting measure of the success of university entrepreneurial engagement. Similarly, participant UF proposes *“you need to measure*

whether people, because they've come out of an environment which is encouraging that kind of engagement, whether they bend back in afterwards is really important but you've to allow your measurement over a long enough period of time".

Participant UB emphasises the value in metrics which capture engagement with entrepreneurial activity across campus. He cites as a possible metric *"how many students take a module in entrepreneurship in different areas, participation in new business start-up competitions, etc"*.

Similarly, participant UF proposes tracking *"the proportion of your staff who are engaging in entrepreneurship as opposed to being straightforward academics and how many would have on their website page- this is my entrepreneurial activity. If it's valued by the institution over time you should see that growing up without any intervention"*.

Regarding external engagement, participant UF suggests *"what's really worth tracking is repeat engagements. If a company works with a research team, and say if it's jointly grant funded by Enterprise Ireland to facilitate the initial engagement, beyond that initial funding where it's trying to facilitate it, if that relationship moves into being fully funded by the industry, it's telling you its really valuable relationship.. So following-up on those leverage grants, and seeing do those relationships continue beyond state leverage, and are they becoming fully funded by the institution? Are the scale of those engagements growing? Where's that relationship now? The proportion of them that survive is really important. Then, you know, you're*

doing something really special so it's matching relationships rather than just licences and IP".

Participant IC commented regarding the entrepreneurial strategy *"one of the areas we think we're weakest is actually measuring impact- we feel it's hard to measure what the impact is. We attempted looking at our social and economic impact but again the social aspect we had to do just through interviews, consultations and general feedback. It's very hard to capture that soft bit".*

Participant UB cautions with regard to metrics *"but if you emphasise one too much then you're only about that and the access routes, the potential and career ready graduates, and new company formation are part of the same continuum, and we want to get that across".*

Similarly, participant UF notes regarding technology transfer offices – *"their performance is completely measured on narrow metrics and if you're being measured by x, you develop x, even if y would be better for the institution or for the region. So, that measurement of metrics is constraining behaviour".*

Further, participant UF comments *"the bit that's missing out of the system at the moment, and it badly needed to be picked up. If you look at most of our, many of our best relationships between the university and the external community they do not appear on the metrics that we report".*

Participant UJ proposes *"longitudinally capturing in the success stories that show how having these world class researchers involved in*

research and innovation drives these interconnected relationships which result in success seen in jobs, employment and social developments”.

4.4 Summary

Chapter 4 captures the voice of the participants and the themes emergent for the participant interviews. This inductive research attempts to capture how the participants experienced and made sense of the phenomenon being studied. Creswell (2009) feels phenomenological research can provide meaning where research on a topic is limited. The semi-structured interview technique allowed the interviews to flow and facilitated the emergence of rich descriptions. The recorded interviews were listened to on multiple occasions by the researcher and verbatim transcripts were prepared. Once the researcher felt sufficiently close to the data, the process of summarising each interview was commenced, selecting meaningful statements, grouping these meaningful statements thematically and then finally identifying themes which were common across the interviews. Central to this chapter is the desire to ensure the data speaks for itself. Throughout the explication process it was necessary to assume the natural attitude or epoché through the bracketing out of any previous knowledge. A summary model of factors which impact execution of university third mission strategy as identified from the participant interviews is presented below (Figure 4.3).

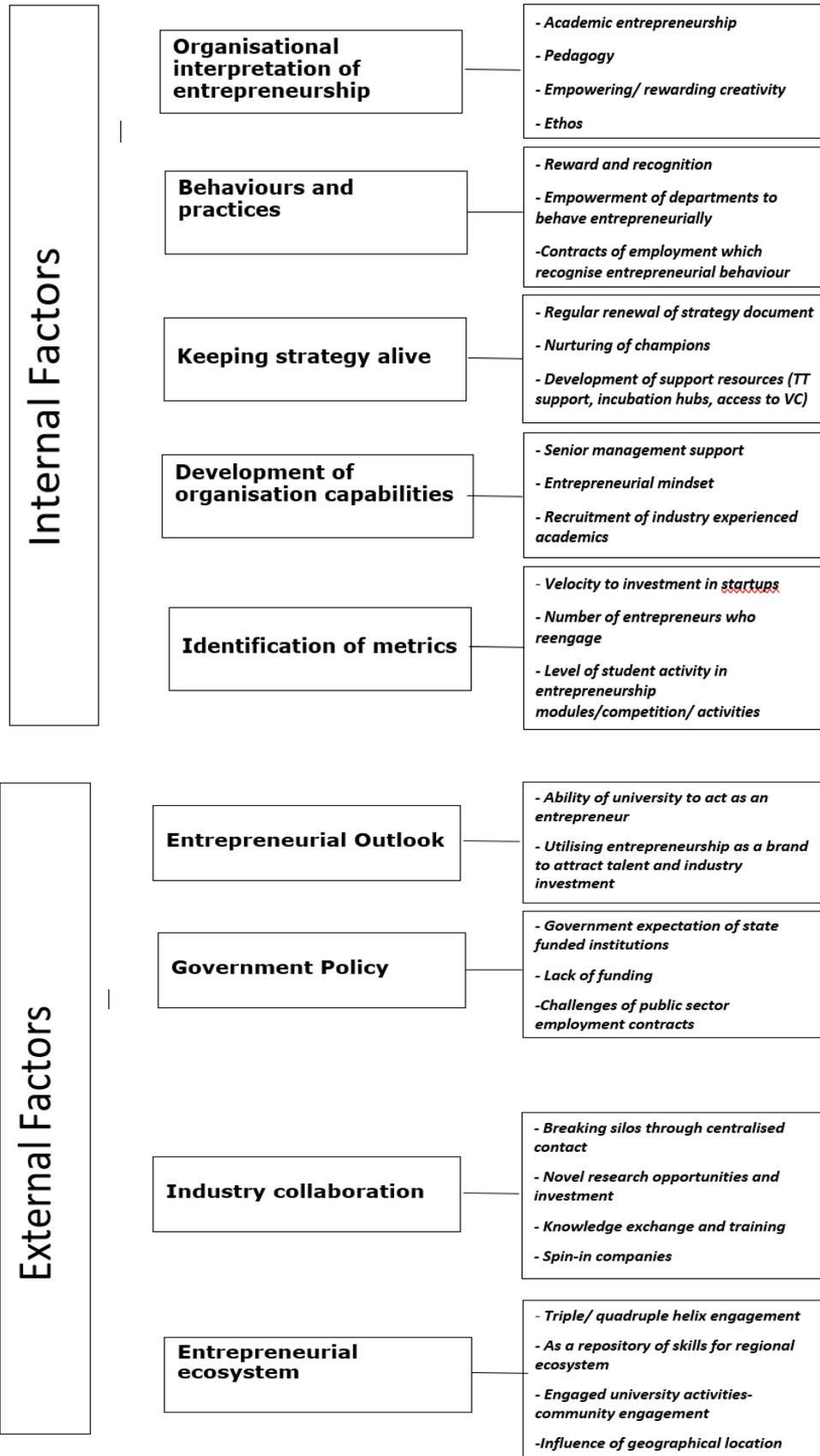


Figure 4.3: Factors which impact execution of university third mission strategy

Figure 4.4 captures the evolution of the entrepreneurial capabilities within Irish HEIs as outlined by the participants. The development from simple university-industry engagement (double helix), through evolving triple helix activity, to quadruple helix engagement including societal engagement is observed with the concomitant development of entrepreneurial capabilities and bandwidth. Chapter 5 now presents a composite summary which frames the themes with respect to the literature.

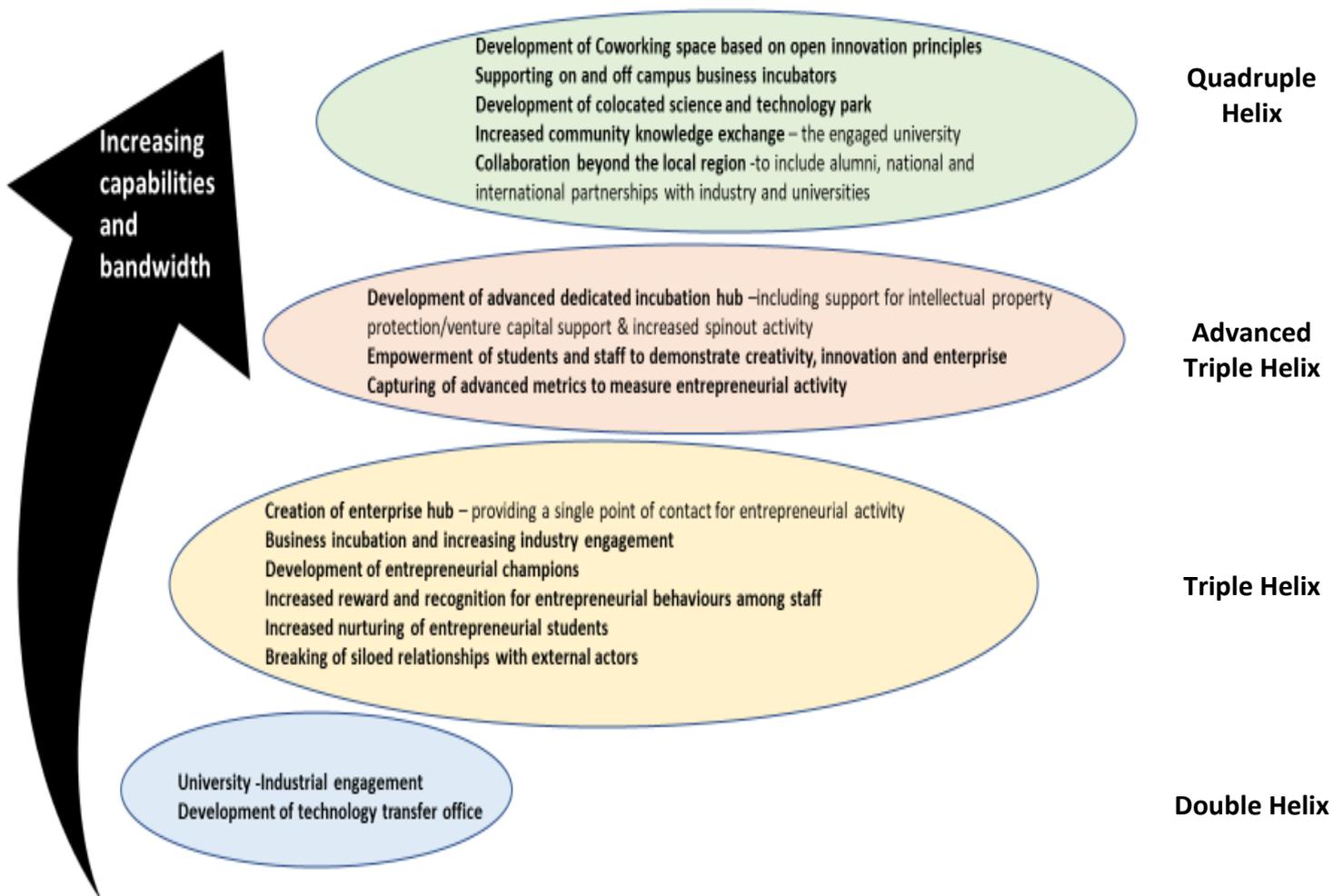


Figure 4.4: Evolution of entrepreneurial capabilities in Irish HEIs

Chapter 5

Interpretation and discussion of research themes

5.0 Introduction

The final step in the explication process of the phenomenological methodology as developed by Hycner (1999) and Groenwald (2004) involves making a composite summary which reflects the themes which emerged in the context of the academic literature. Referred to as 'enfolding literature' by Eisenhardt (1989), the composite summary is a highly important element of the methodology as it positions the data within the theoretical framework which underpinned the research. Firstly, the research findings are considered through the theoretical lens of Dynamic capabilities theory. Beyond this the principal themes which emerged through the phenomenological interviews and methodology as outlined below are considered with respect to the literature:

- *Interpreting/defining of the idea of the entrepreneurial university*
- *Enabling the entrepreneurial mission in the institution*
- *Role of government policy as a determinant of entrepreneurial strategy*
- *How the impact of industry engagement (is driving the success of entrepreneurial activities on campus)*
- *Engagement with external ecosystem*

- *Developing organisational capacity and capabilities to deliver the university*

The theme of looking for measurable factors which enable the entrepreneurial third mission was also addressed in chapter 4 but is not considered with respect to the literature in this chapter for two principal reasons. Firstly, the responses, while interesting, were as a result of a direct question from the researcher and not a theme which emerged from the participants. Secondly, the study of metrics and measurable factors is a quantitative study which sits outside the philosophical scope of this research.

5.1 Interpretation of findings through the lens of Dynamic Capabilities theory

The role of the university has evolved significantly from serving the classical missions of teaching and research. Etzkowitz (2003) notes the development from teaching college to research university (the first academic revolution) and then from research university to entrepreneurial university (the second academic revolution). In the modern socioeconomic landscape, universities now contribute significantly to the knowledge economy through their “third mission”. The modern entrepreneurial university is expected to fulfil the three missions of teaching, research and entrepreneurship simultaneously.

Universities recognize value in this third mission in that they can not only create wealth for societies, but also generate more funding for their first

two missions (Guerrero et al., 2015). Notwithstanding the slow rate of change in universities Hayter and Cahoy (2018) concur with Helfat et al. (2007) that the management of strategy, capabilities and resources, are applicable not just to for-profit organisations, but also to universities given that all organisations must adapt to changing environments. The tensions which occur as a consequence of the university having to balance the demands of teaching, research and now entrepreneurial activities creates a strategic challenge (Ambos et al., 2008). To this point, Leih and Teece (2016) posit that a focus on the strategic management of a university “is not just a matter of favouring commercial and entrepreneurial values over academic and research values”. Rather, they argue that the values are complimentary rather than substitutional. Teece (2016) reminds us that Cohen and March (1974) referred to university management as “organised anarchy” and noted that the “garbage can” model of decision making was in need of “ a new theory of management”. However, only a small number of theoretical frameworks have been applied to consider strategic management of universities with the dynamic capabilities framework an especially useful tool (Siegel and Leih, 2018). Dynamic capabilities are a key element of a management strategy that involves “calibrating opportunities and diagnosing threats, directing (and redirecting) resources according to a policy or plan of action, and possibly also reshaping organizational structures and systems so that they create and address technological opportunities and competitive threats” (Teece, 2012, p.1398).

In defining dynamic capabilities , Teece et al (1997, p.518) note “the competitive advantage of firms lies with its managerial and organizational

processes, shaped by its (specific) asset position, and the paths available to it". The role of senior management teams and managerial decision making in developing dynamic capabilities is also increasingly recognised in the literature (Augier and Teece, 2009; Teece, 2007; Ambrosini et al. 2009). Dynamic capabilities theorists highlight the importance of senior management strategically modifying and indeed redesigning the internal organisation to meet the challenges of changing external environments (Ambrosini et al., 2009). Hayter and Cahoy (2018) note that dynamic capabilities are applicable to all organisations subject to environmental flux, as the rate of change is subjective to individual managers.

The role of senior university leadership, considered through the dynamic capabilities lens, looks to the senior leaders to (sense) consistently monitor internal and external opportunities and competitive threats, (seize) coordinate resources to address these challenges and (transform) align organizational systems and structures. Teece (2014) positions this "asset orchestration" at the core of dynamic capabilities, considering the ability of an organisation to transform as a measure of its ability to make use of dynamic capabilities. However Kezar and Lester (2009) notes that meaningful change in universities normally only occurs with grassroots leadership from a broad range of academic staff while Teece (2012, p.1399) highlights the organizational risk if "the sensing, creative, interpretive, and learning functions are left to the cognitive capacities of a few individuals".

This study highlights the important role of university leadership in academic and administrative functions in the development of university dynamic capabilities. Participant UA highlights the role of the university

president in the dynamic capabilities of sensing internal and external (“innovation and entrepreneurial”) activities; and the roles of executive deans in seizing (“translation of entrepreneurial strategy”) and transforming (through the transformation of “mindsets” and translation “of knowledge”). Participant UA sees the dynamic capability of sensing and “assimilating external knowledge” as a crucial from the perspective of university strategy and the implementation of the strategy document. Hayter and Cahoy (2018) note the importance of both internal and external sensing in order to meet the challenges of an evolving external environment. Participant UB comments “it’s essential that universities adapt their practices with the leadership of the university prepared to cede a certain amount of control out of certain ways of being in practice. A lot of bringing about a change in culture is about changes in governance, management and resource allocation and resource flows, and information flows even”. Participant UA, in the development of the university five year strategic plan comments “I took a different approach and I came with a skeleton of a strategic plan and a vision I went round every unit and every school in the university. We took feedback and we modified it in response or added to it and then we went out to the various stakeholders like our enterprise advisory board and alumni organisations”.

Participant ID highlights how the sensing capability has been successfully developed both through informal and formal engagement. The participant believes the smaller size of the institution facilitates informal, “by conversation”, engagement with industry to understand needs and corresponding gaps in academic programmes. The institution is also increasingly actively engaged with alumni. More formal sensing engagement

is through formal entrepreneurial education networks and the directorate for creativity, research and innovation which was established to engage the collaborative research, innovation, and technology transfer agendas.

Leih and Teece (2016) comment that dynamic capabilities must be built as they cannot be bought. To this end, participant UA comments “words on a mission statement, words in a strategy are insufficient so it has to be a kind of a lived behaviour in the university itself. We’ve introduced an annual award for innovation, with a separate award for academics, students and for administrative and professional staff. We introduced for the first time the concept of a rolling planning function, and we bring the report on achievement and the suggested modifications to governing authority each year now”.

Kezar and Lester (2009) note how constructive change rarely occurs in colleges and universities without grassroots leadership from a broad range of academic staff. Participants IC and ID highlight the meeting of the top down and bottom up approaches in their success in sensing and seizing the culture of entrepreneurship across the institution. Participant IC notes how the initiative by senior leadership of the inclusion of the technology transfer offices and incubator facilities into the academic programmes has also facilitated the development of the entrepreneurial culture and learning across all departments. She feels the real strength of the institutions entrepreneurial capabilities are those developed – not bought – transforming capabilities. The institution embedded its entrepreneurial capabilities within “existing structures, existing departments, existing schools and existing places”.

Participant UG stresses the need for university leadership to themselves be entrepreneurial in order to sense these entrepreneurial opportunities.

The research findings are also considered with regard to the role of absorptive capacity. Teece (2009, p.28) notes that for organisations to develop their dynamic capabilities, they must reduce prejudices against the adoption of external ideas and “hone their absorptive capacity through learning activities and skill accumulation”. This prejudice has been discussed in terms of “not invented here” (NIH) syndrome (Katz and Allen, 1982). The Not- Invented-Here (NIH) syndrome is defined as “the tendency of a group to believe it possesses a monopoly of knowledge in its field, leading to rejection of new ideas from outsiders to the likely detriment of its performance” (Katz and Allen, 1982, p 7). Zahra and George (2002) expanded the concept of absorptive capacity from its original definition (Cohen and Levinthal, 1990) to define it as “a set of organizational routines and processes by which organisations acquire, assimilate, transform and exploit knowledge to produce a dynamic organizational capability”. Their definition considers absorptive capacity in terms of potential absorptive capacity and realised absorptive capacity. Potential absorptive capacity refers to the ability of the university to identify, acquire and assimilate externally generated knowledge. Realised absorptive capacity refers to the ability of organisations to transforming internal structures and processes to facilitate the combining of “existing knowledge and the newly acquired and assimilated knowledge” and successfully exploit this new knowledge.

In this study, a number of interviewees noted the need to develop the absorptive capacity of their university. Participant UA comments “an

entrepreneurial university needs to be an engaged university and engaging with the various stakeholders to allow us to be innovative and get that clear articulation of problem statements. For academia it is engaging with enterprise, engaging with local and central government and engaging with civil society. I think its that notion of co-creation, co-definition of problems, co-creation of solutions and the recognition that innovation itself best happens in convergent spaces at interfaces between different perspectives, so the quadruple helix and engaged university is critical to it”.

Participant TA notes the value of developing potential absorptive capacity, “to inform and guide the educational research, to develop the entrepreneurial skills, but actually if they’re involved early enough where they’re giving inputs and support in terms of education and in terms of research, they can add value to the research by their own ideas, by their money”.

Interview participants UD and UJ highlighted how the absorptive capacity elements of assimilation and transformation are being impeded through the effects of departmental siloing. The silo effect refers to the lack of communication and information sharing between different academic and administrative departments in the university. The silo effect is seen to impact the development of entrepreneurial capabilities both internally and in terms of external engagement and knowledge transfer. Pathway two of Clark’s (1998) seminal model of transformation to entrepreneurial universities calls for an expanded developmental periphery to facilitate engagement across ‘old university boundaries’ to develop networks beyond traditional academic silos. Internal to the university, the impact of the silo effect is commented upon by a number of contributors. Brennan et al. (2007, p69), in their study

of academic entrepreneurship across the island of Ireland noted “inter-discipline rivalry and the need to ‘span’ discipline-based faculty knowledge silos”. The impact of the silo-thinking as a consequence of hiring and reward and recognition practices is seen to reinforce faculty isolation and discourage cross university collaboration and entrepreneurship (Morris et al., 2014). Further, cross campus entrepreneurship education and the development of understanding of the value of entrepreneurship for both personal and socioeconomic development is greatly inhibited by departmental siloing (Katz et al., 2014). In order to overcome internal silo effects, Taylor (2012, p.291) looks to Clark (1998) proposing traditional academic departmental structures must be “overlaid with overlapping matrices of interdisciplinary networks that look across the traditional academic silos”. Brix et al. (2013) also support this view noting the American national academies (2004) recommendation to encourage a matrix management strategy to break down traditional academic departmental silos. Within this research, the important role of administrative staff in supporting entrepreneurial initiatives across campus and breaking the silo effect is highlighted. Participant UB looks to the success of having administrative staff “*embedded*” with academia, due to the decision to remove the single large administration building, in building a more collaborative and entrepreneurial cross campus culture. Participant UF foregrounds the reward and recognition of both administrative and academic staff supported by entrepreneurship champions at the highest managerial level to dismantle internal silos. More broadly, Dombrowski (2007) notes the value of the development of safe spaces where people from differing silos and hierarchy levels can meet and develop “communities of practice”. The

Eden centre for innovation and entrepreneurship at Maynooth University serves as an exemplar within Irish universities of this idea (maynoothuniversity.ie/eden). The impact of the silo effect on external engagement and knowledge transfer is also commented upon by participants in this research. Participant UC, for example, notes how relationships with industry tend to be siloed to particular departments and particular academics to the detriment of “organisation to organisation” relationships. Participant UD comments “there’s a very strong commitment for working at the interface between the university, government and business. Very definitely. I think they tend to be somewhat siloed though. I know that we do a lot at the business school but I couldn’t say for sure what in detail is going on in the science, engineering and technology faculties”. Participant UJ comments “many companies have a strategic relationship with the university, and we have a strategic relationship with companies, but we don’t behave as such and in many cases we don’t even recognise it. In a company like [X], there is at least a dozen strands of engagement with the university, but they are siloed in their engagement strategy and we were siloed in our reciprocal strategy in terms of how we received it”. To this end, Participant IB proposes an “*outside in*” approach to external engagement with the university with collaboration with the external ecosystem through a single point of contact for rather than through multiple siloed engagements. The role of administrative staff in community and external engagement is also observed.

Central to the development of the universities dynamic capabilities, is the development of the organisational capability to engage effectively with the external quadruple helix elements of industry, government and society.

Arnkil et al (2010) define the quadruple helix as an innovation cooperation model or innovation environment in which users, industry, universities and public authorities cooperate in order to produce innovations. A number of interview participants framed this engagement in terms of the open innovation paradigm.

Participant UI commented “we developed an open innovation model and this model is based very much about defining the relationship between the various stakeholders- industry, government departments, local authorities and the educational establishment”. Further to this, participant UA opines: “an entrepreneurial university needs to be an engaged university and engaging with the various stakeholders allow us to be innovative and get that clear articulation of problem statements and for academia it is engaging with enterprise, engaging with local and central government and engaging with civil society”. Similarly, participant UH has noted a surge in popularity within the past five years in an open innovation collaboration model, where companies locate their research & development team on campus. He notes that manufacturing organisations are seeing “high value in being able to bounce ideas off people who might have a different perspective on their discipline that they have themselves”. Morris et al. (2011) note how the development of an entrepreneurial environment which facilitates these ‘creative abrasions’ between industry and students and academics from diverse backgrounds has greatly enhanced both the quality and quantity of collaborative engagements with the regional ecosystem. Similarly, participant IB highlights the strategic success of the open innovation model: “creating that eco system where companies, research groups, academic departments

bump against each other and can cooperate, and collaborate in a whole range of different ways towards various goals”.

However, participant UI comments: “one of the things that was clear was that if the other organisations that you engage with are not entrepreneurial, if they are more bureaucratic, then that can impact on the ability of you to engage with those organisations in a more entrepreneurial way”. In this vein, Newey (2010) notes how “path dependent prior related knowledge underpins the absorptive capacity of an actor to perceive the value offered by another, perceive how it can further extend the developing knowledge and then develop its own value proposition in the hope of gaining a desired return on the learning and knowledge creation investments”.

Leih and Teece (2016) comment on how dynamic capabilities must be built as they cannot be bought. Helfat et al. (2007) tell us that strong dynamic capabilities ensure the university possesses “evolutionary fitness” or the dynamic capability to evolve its resources to meet new external challenges. In large organisations such as universities, the development of transforming dynamic capabilities is much easier in a culture open to change. The development of an ‘attitude’ supportive of change across both staff and students is noted by a number of participants as an important lever of change within universities. For example, participant UD notes how the university academic staff demonstrated considerable ‘ambidexterity’ (O’Reilly & Tushman, 2004) in the development of sensing and transforming capabilities through a focused centre for entrepreneurship where senior academics and management “promote entrepreneurship and entrepreneurial learning in the sense of mind set development, work at that interface

between the university and business, get involved in commercialisation activities of research and innovation, and develop innovative teaching material” . Ambidexterity refers to the ability of the university to simultaneously explore and exploit information. O’Reilly & Tushman (2004), in looking to position ambidexterity as a dynamic capability argue it proffers on organisations the considerable advantage of being able to continuously adapt over time. Dynamic capabilities theory emphasizes the importance of the capability to appropriately adapt, integrate and reconfigure organizational skills and resources to match changing environments (Eisenhardt & Martin, 2000).

To conclude, the increasing rate in change in the environment in which HEIs operate has put increased focus on the management of their strategy, capabilities and resources and further on the importance of the development of their dynamic capabilities. This research identifies a role, not just for senior leadership in the development of these dynamic capabilities, but also in the development of a meeting of top down and bottom up approaches. Further, the importance developing the absorptive capacity of the HEI and the challenging of departmental siloing and also NIH syndrome are highlighted, where the support of administrative staff is also recognised.

5.2 Interpreting/defining of the idea of the entrepreneurial university

To the extant literature, this thesis adds the interpretation of entrepreneurship as a factor influencing the evolution of an entrepreneurial university. This research concurs with the opinion of some contributors, as expressed within the literature review, that entrepreneurship study suffers

from a lack of consensus on a definition (Gartner, 2001; Mars, 2010). Indeed, the lack of consensus on, as participant UD noted, “what entrepreneurship means and what it means to be entrepreneurial”, must be considered one of the principal contributors to the plurality of definitions of the entrepreneurial university. The OECD (2012) noted how “difficult and contraversial” it has proven to find concensus across the European union on a single definition of the entrepenurial university. Gibb (2012) comments in this regard “there are many different ‘typologies’ of universities, with different views of ‘excellence’ and each with different strategic agendas, some with a strong industry, technology, and occupational focus”. Indeed, perhaps the leading contributors to this academic conversation, Guerrero and Urbano (2012), acknowledge the lack of consensus on the use of a specific definition of the entrepreneurial university. Markuerkiaga et al. (2014) in their comprehensive literature review of factors relating to the entrepreneurial university note that the entrepreneurial university is defined by a set of characteristics that together create this phenomenon. However, they do not mention interpretation of entrepreneurship as a factor within the theoretical framework of the entrepreneurial university. The findings of this research call for the interpretation and definition of entrepreneurship in terms of the role of the university to be considered a factor.

Martin et al. (2012), in adopting an evolutionary perspective note how varied entrepreneurial university “species” have co-evolved, each with differing prioritisation of the three missions of teaching , research and contributing to the economy and society. Audretsch (2012) feels that perhaps the confusion and concern about the university losing its way reveals

confusion concerning its role and mission in society and in the economy. Since the second world war, the university has evolved from a mandate and role characterized as the Humboldt model, with a primary emphasis on freedom and independence of scholarly inquiry and “knowledge for its own sake”, to being a source of knowledge that is requisite for economic growth and a strong economic performance. This research argues that consensus on the definition of entrepreneurship within the entrepreneurial university paradigm would provide much needed exactitude to the academic conversation. The literature review in this thesis looked to entrepreneurship literature for clarity. To this end, I propose the Mars & Rios-Aguilar (2009) definition to guide a further academic discourse. As noted in the literature review, Mars & Rios-Aguilar (2009) synthesise the Schumpeterian and Kirtznerian perspectives on entrepreneurship to define entrepreneurship as “a process of creating and sustaining economic and/or social value through the development and implementation of creative and innovative strategies and solutions that require the identification of opportunity that results from economic (dis)equilibrium, risk- taking and mitigation, and resource allocation and mobilization”.

Further, the evolution of the role of the university was defined by all interview participants in terms of enhanced interaction within the triple helix of universities, government and industry. However, it is noteworthy only one of the interview participants places the entrepreneurial university within the conceptual framework of the quadruple helix in recognition of the role of civil society in national systems of innovation. As noted in the literature review, the quadruple helix defines innovation at a national level in terms of the role

of users being of equal importance to government, universities and industry (Afonso, 2012).

To summarise, the findings of this research call for the clarity in the interpretation and definition of entrepreneurship to be considered a factor required to promote the entrepreneurial university paradigm. Further, this research points to the importance of defining the entrepreneurial university in terms of its engagement and interaction with actors within the triple and indeed quadruple helices.

5.3 Enabling the entrepreneurial mission in the institution

The entrepreneurial university models proposed by Guerrero and Urbano (2010), Kirby (2011) and Gibb (2012) all recognise the importance of the attitude of the university community as an enabler of the entrepreneurial mission in universities. There has, however, been little research on the entrepreneurial objectives of academic staff. Louis et al. (1989) identified faculty culture as the principal predictor of entrepreneurial activity in academia. Clark (1998) in defining the entrepreneurial university foregrounded the need for an organisational culture which develops an entrepreneurial attitude. Bramwell and Wolfe (2008) highlighted the inestimable benefit of nurturing an entrepreneurial mindset among faculty and students. Guerrero and Urbano (2013) look to the influence of social relationships and subjective norms as an influencer of entrepreneurial behaviour at the individual level. They feel that the perceptions and attitudes of “reference people” (Ajzen, 2002) may act as a driver for individual

academics to act entrepreneurially. Gibb (2012) highlights the need to develop reward structures for academics engaged in entrepreneurial activity. This concurs with the findings of this research where one third of participants gave emphasis to the need to recognise entrepreneurial behaviour and achievement as an enabler of the entrepreneurial third mission. Further, all research participants who highlighted the need for reward and recognition were either based in strong technological based institutions or directly engaged in the development of the entrepreneurial strategy for their institution.

Some commentary in the academic literature refer to the evolution of entrepreneurial strategy in terms of the entrepreneurial jigsaw. Meyer & Xia (2012) advise that leaders of young entrepreneurial organisations must always keep in mind the big picture; “they must ensure that all the pieces of the entrepreneurial jigsaw actually work together”. Looking more specifically at the evolution of entrepreneurial culture in European universities, Davies (2001) notes “the leader is in effect creating an entrepreneurial culture by assembling a jigsaw”. This jigsaw metaphor, suggestive of the number of many elements that need to be brought together in order to deliver on the entrepreneurial university agenda, also features in the language of the participants in this research. Participant UG identifies four elements of the entrepreneurial jigsaw required for an entrepreneurial strategy to be successful;

- the entrepreneur must understand the entrepreneurial ecosystem and how each organisation contributes to the success of entrepreneurial ventures

- a demand for the innovative product or service
- an appropriately skilled labour pool
- finance available to support the venture

Sporn (2001) notes how universities wanting to become more entrepreneurial develop strategy to extend their dynamic capabilities to adapt to external opportunities and challenges and internally encourage entrepreneurial activity at all levels. The literature review captures the commitment to entrepreneurship within many university mission statements through activities such as knowledge sharing or technology transfer, supporting spin-out development from primary research, engagement socially or economically with the wider community, the development of entrepreneurial graduates and the sourcing of non-public funding streams (Gibbs, 2012). Blackwell and Blackwell (2006) highlight the need for all department heads to integrate the responsibility for the above activities across their departments, coupled with a relevant organisational learning and development program to deliver this entrepreneurial mission. This concurs with the experience of contributors to this research, particularly comment from participant UA, that the degree of buy-in of the faculty deans and their translation of the strategy locally into their faculty is a crucially important part of how the entrepreneurial strategy permeates the university. Further Kirby et al. (2011) and Gibb, Haskins and Robertson (2103) support the findings in this research that to keep the entrepreneurial mission alive, the university would benefit from the entrepreneurial educating of university senior management coupled with the identification of champions for the agenda at

departmental level. However, contributors to this research noted the need to keep these champions joined up in order to be effective, as these champions “burn out due to lack of resources or from being isolated”. This is a significant challenge, which many contributors to the literature note, as university departments are traditionally very siloed, much to the detriment of entrepreneurially minded students and staff (Pineiro and Stensaker, 2013; Etzkowitz et al., 2012; Morris et al., 2012).

In order to support the entrepreneurial strategy, universities typically engage in varied support activities including the creation of dedicated centres for entrepreneurship activity, entrepreneurial education programmes, technology transfer support, incubators and the recognition and incentivisation of entrepreneurial activity. Contributors to this research highlighted the need for both the creation of these physical resources and recognition of entrepreneurial activity as legitimate work practice. The effect of these support measures on the entrepreneurial intentions within universities, while only foregrounded in a few studies, have been shown to affect the desire and feasibility to become an entrepreneur. Interestingly, Guerrero and Urbano (2013), while noting a significantly positive effect of these university policies, highlight the influence on academics start up intentions is significantly higher in technological rather than broad-based universities.

In summary, the “entrepreneurial jigsaw” is seen as an effective metaphor to capture the many elements which need to come together to enable the university entrepreneurial strategy to be successful. This research identifies the support of the entrepreneurial strategy by department heads,

the education of senior leaders in entrepreneurial strategy, the identification and support of entrepreneurship champions, and the development of physical resources supportive of the entrepreneurial vision, as important pieces in this “jigsaw” and enablers of the entrepreneurial third mission. Further, the findings of this research align with that of Guerrero and Urbano (2013) in suggesting that the impact of a strategy which rewards and recognises entrepreneurial activity is higher in technological rather than broad-based universities.

5.4 Role of government policy as a determinant of entrepreneurial strategy

In this study, the role of and effect of government policy within higher education must be framed within the context of the global financial crisis and the severity of its effects on the Irish economy. The economic crisis of 2007 predicated the worst recession in modern Irish history, resulting in severe funding cuts and lack of resource provision by government at a time of unprecedented demand for higher education among the population. In Ireland, a series of reforms and austerity measures were imposed on the higher education sector as required under the (December, 2010) memorandum of understanding within the EC-IMF-ECB “Troika” bailout. This resulted in a reduction in exchequer funding to higher education of circa 25% from 2007 to 2011, with overall funding per student (core grant, student contribution, etc) reduced by almost 20% in the period (Hazelkorn, 2014). Concomantly, student numbers are steadily increasing in Ireland. Coolahan (1981) noted there were only 3,200 students enrolled at five universities in

Ireland at the start of the 20th century. This number reached 170,000 by 2014 and is anticipated to rise to over 250,000 by 2020 (Harkin and Hazelkorn, 2014).

The national development plan (2000-2006) saw a move toward funding research in Irish HEIs with a view to improving economic growth (Zhang et al., 2014). The Innovation task force (2010) placed applied university research central to Irish industrial policy. Moreover, against the backdrop of the “bailout”, the higher education authority (HEA) prioritised the development of entrepreneurial ecosystems and alliances among universities “to develop a coherent and sustainable system of higher education to meet the economic and social needs of the country, within its broad ambition to create an export driven knowledge economy” (HEA (2013) in Harkin and Hazelkorn, 2014) . The 2011 published *national strategy for higher education to 2030* (Hunt Report) positioned HEIs central to national innovation arguing for further connectivity with industry and society (Zhang et al., 2014). Further, at EU level, the Bologna declaration (2003) depicts learning as an inherently productive activity, through which students accumulate and generate knowledge for personal and social benefit (Keeling, 2006). The EU launched the Lisbon strategy in 2000 with the goal of transforming the European Union (EU) to a knowledge based society by 2010. The “Oslo Agenda for Entrepreneurship Education in Europe” (2006). was the next EU-wide initiative to promote entrepreneurship education and the development of an entrepreneurial EU society. Specifically, the Oslo Agenda described their Objective D10 as “Higher education establishments should integrate entrepreneurship across different subjects of their study programmes; All

faculties/disciplines should develop opportunities for students at every level to experience entrepreneurship” (EC, 2006).

Positioned within this environment, two thirds of interviewees in this research highlighted how government policy significantly impacted the entrepreneurial strategy of their academic institution. The role of universities was recognised as evolving towards being instruments of the national economic policy, despite the problems of reduced funding.

The positive impact of innovation offices and technology transfer offices was also noted by the interview participants within this research. All HEIs in Ireland now have access to a dedicated knowledge transfer support with eleven technology transfer offices established between 2007 -2012. Zhang et al. (2016) highlight the success of this support programme with 119 technologies licenced to industry in 2013 compared to a figure of 12 prior to the commencement of the government support.

However, this success was noted by some participants to have impacted the academic freedom of universities. Participant UF notes a lack of vision in the national research prioritisation with excessive focus on intellectual property development over “ideation” while Participant UJ commented on the excessive level of alignment by Irish universities with industry needs, instead proposing that “misaligning” with industry needs would afford greater academic freedoms while also supporting industry through exploratory research.

From the late 1980s, Irish education policy has steadily migrated from the Newman (1851) model of a university which had been the guiding mission of universities for the history of the state (Holborow, 2015). Newman

(1851) rejects education for profit and defends liberal knowledge against 'technical skill' education. Devitt (2006) feels that knowledge its own end is not a reasonable or practical strategy for a modern university. Instead he argues that the university there must have a purpose in terms of a performance or an output that benefits somebody or some entity. Certainly, as outlined, the EU higher education policy has an ultimate goal other than solely the satisfaction or fulfillment of a scholar or student, and that goal is, at least, the social and economic benefit of greater society. This view is strongly endorsed across Ireland and the UK through the education funding policy and further by the expectations of most philanthropic sponsors.

The Irish universities act (2007) contains the statement below on academic freedom:

- (1) A university, in performing its functions shall—
 - (a) have the right and responsibility to preserve and promote the traditional principles of academic freedom in the conduct of its internal and external affairs, and
 - (b) be entitled to regulate its affairs in accordance with its independent ethos and traditions and the traditional principles of academic freedom, and in doing so it shall have regard to—
 - (i) the promotion and preservation of equality of opportunity and access,
 - (ii) the effective and efficient use of resources, and
 - (iii) its obligations as to public accountability,

(2) A member of the academic staff of a university shall have the freedom, within the law, in his or her teaching, research and any other activities either in or outside the university, to question and test received wisdom, to put forward new ideas and to state controversial or unpopular opinions and shall not be disadvantaged, or subject to less favourable treatment by the university, for the exercise of that freedom.

John J Cleary (2005) identified the principle threat to academic freedom in Ireland as the control being exercised over the universities by government agencies like the HEA, which sets goals and priorities as well as controlling the flow of funds. Cleary feels that the government has systematically limited the range of choices as to what research will be undertaken (by controlling research funding) and also what is taught in the universities.

Clarke (2012) sees the demand on universities for socially useful knowledge or for applied research as being reinforced by the neoliberal ideology which view universities as 'producers of knowledge'. He sees the Catholic universities of Ireland as particularly vulnerable due to their weak tradition of academic freedom as opposed to TCD, which follows the models of Oxford and Harvard, and is owned and governed by its fellows thereby retaining its academic freedom and independence, despite being government funded.

There has been considerable evolution in the sourcing of funding within higher education, but government still has considerable influence on activity within the sector due to its continued dependency upon public

funding. Over half of the participants interviewed in this research noted the expectation on HEIs to behave entrepreneurially and promote entrepreneurial activity, albeit under a constant financial pressure to do more for less. In Ireland, the Hunt report recommends that “public investment in higher education must be aligned with national policy priorities, including widening of access, enhanced performance outcomes and greater flexibility in provision” (Hunt, 2011). Participant UE , from a university in Northern Ireland, noted how twenty percent of funding for university research is now based upon an expectation of socioeconomic “impact” from the research. This coupled with “catapult” funding which sees the UK government provide matching funding to industry contributions has created increased uncertainty in terms of university autonomy, academic freedom and the need for creating outputs with public value (Gibb et al., 2012).

Globally, the growth of neoliberalism has been seen to shift power from the public sphere to the private sphere (Chomsky, 2003) and, in doing so, it marginalised a relatively autonomous academic community (Lynch, 2006; Harland, 2009). However, Harland (2014) feels that governments and markets realise the value in liberal education, and certain liberal forms of knowledge are seen to have economic utility. Critical thought and action are required to handle knowledge in new knowledge economies, and graduates are also recruited on the basis of their critical capacities. Interestingly, Chomsky (2003) feels that disciplinary ideologies and the professions in higher education have always been antiliberal, in the sense that they tend to serve themselves and re-enforce hegemonic authority. Mercille and Murphy

(2015) argue that the neoliberal reform of higher education in Ireland has been significantly influenced by global institutions such as the EU and OECD, rather than domestic influences. The resulting transformation of Irish third level education is now marked by an increased triple helix engagement with the increased state university activity resulting in “greater monitoring of institutional activity and sustained official pressure ... to pursue explicitly economic functions” (Walsh, 2014, p.37). In this research, Participant UF highlighted how each Irish university has signed up to a compact with the HEA- “effectively a contract with the State in terms of performance-based funding”. This compact demands of universities an alignment with the ‘national priorities of government’ in return for funding. This is relevant to the entrepreneurial university in terms the autonomy of universities and the academic freedom enjoyed by research but also in terms of how all Irish universities are currently incorporating entrepreneurship into their mission . Mercille and Murphy (2015), while identifying that the word ‘enterprise’ appears 89 times in the 134 page Hunt report, recognise the benefit of the development of the entrepreneurial mission. They highlight as a potential force for good the HEA missions of “providing business incubation support for entrepreneurs and high potential start-ups, development and embedding of entrepreneurship education programmes and mainstreaming entrepreneurship into the wider student experience” (HEA, 2014: 39). However, it must be noted that much of this entrepreneurial activity must be undertaken as formally unrecognised “grace and favour” as highlighted by participant IB. Significantly, Courtois and O’Keefe (2015) note that in Ireland, permanent academic positions are gradually being replaced by casual and

part time academics. Participant UA questioned regarding the use of recognition as a lever of change “one of the key questions is how does the university show that it really values this?”. The lack of a formal reward and recognition by the HEA for entrepreneurial activity leaves this as the responsibility of the academic institution.

In conclusion, the role of and impact of government policy within higher education in Ireland must be considered through the lens of the expectation by government of further connectivity of HEIs with industry and society coupled with significant reduction in exchequer funding to HEIs and the resultant need to develop alternative funding streams. Further, government funding for HEI research is increasingly based upon the expectation of socioeconomic “impact” from the research. Contributors to this research highlighted concerns related to the impact on the academic freedom of universities with excessive focus on intellectual property development over ideation. The success of innovation offices and technology transfer offices in supporting entrepreneurial activity and engagement with the external entrepreneurial ecosystem were highlighted by the interview participants within this research. However, the lack of formal recognition for academics and administrative staff of the HEIs who engage in entrepreneurial activities was highlighted as a significant challenge.

5.5 How the impact of industry engagement is driving the success of entrepreneurial activities on campus

Universities—industry collaboration (UIC) refers to the interaction between any parts of the higher educational system and industry aiming mainly to encourage knowledge and technology exchange (Ankrah and AL-Tabbaa ,2015). Principally, this research is interested in the interaction and collaboration between universities and industry from the broad perspective of knowledge transfer and exchange rather than just the narrower perspective of knowledge exchange. Knowledge exchange focuses on the activities associated solely with technology transfer and the commercialisation of university derived intellectual property. Knowledge transfer describe all types of direct and indirect, personal and non-personal interactions between organisations and/or individuals from the firm side and the university side, directed at the exchange of knowledge within innovation processes (Schartinger et al., 2002). Ankrah and Al-Tabbaa (2015) note a significant increase in UIC across the US and the EU and attribute this to pressures both on industry, due to increasing global competitiveness and shortening product life cycles, and on universities as a consequence of the knowledge economy and the issue of funding. They identify five motivations for universities to engage in UIC:

- Necessity- as a consequence of government policy
- Reciprocity- facilitating access to industry equipment, facilities and graduate employment opportunities
- Efficiency- through access to research funding and technology transfer opportunities

- Stability- through knowledge sharing, applied research and co-publication of papers
- Legitimacy – through responding to social pressures for research to be economically relevant

Further to these, this research adds the need to accelerate time to market for spin out companies as an additional motivation for universities to collaborate with industry. Participant TA highlighted the value of entrepreneurial mentoring from industry to students engaged in spin out companies and incubator projects as it gave the business protection through getting to market in a timely fashion. Further, participant UE noted that in the UK, from a government funding perspective, a key government metric is the speed of impact of funding and that knowledge exchange through UIC both accelerates the impact thus increasing government funding but also enabled the identification of new and novel funding sources. However, from an Irish context, Zhang et al. (2015) highlight how university industry collaboration and knowledge exchange lags behind UK university activity, citing a lack of dedicated funding as the principal reason.

As noted in the literature review, D'Este and Perkmann (2011) identified four main motivating factors for academics to engage with industry: (1) commercialisation of academic research or knowledge; (2) learning through engagement with industry; (3) as a source of non-public funding; and (4) access to research equipment and materials unavailable through the academic institution.

University industry interactions take many different forms. Some authors (Link et al., (2007); D'este and Perkmann, (2011)) define these interactions

in terms of formal and informal engagement. Formal engagement include those activities typically associated with university technology transfer, and requiring legal agreement between parties, such as patenting or licencing of university derived intellectual property. While Blackman and Seagal (1991) comment on the extreme difficulty of the task of creating a complete typology of university – industry interactions, Ankrah and AL-Tabbaa (2015) offer an exhaustive list of the forms of UIC in their 2015 literature review of UIC (table 5.1).

Schartinger et al. (2002) note the importance to the absorptive capacity of firms as a critical success factor in UIC activities. However, the university must also develop its absorptive capacity, coupled with support functions such as technology transfer offices which support its ability to share knowledge created with industry (desorptive capacity). Based on the contemporaneous inward and outward knowledge transfer conducted by HEIs, as identified in the interviews within this research, this researcher proposes that UIC should be further considered through the perspective of Dahlander and Gann (2010). As noted in the literature review, Dahlander and Gann (2010) see knowledge sharing process as a form of open innovation involving inbound or outbound knowledge transfer each of which may involve a financial element. They developed a two-by-two matrix where there are two forms of inbound innovation- acquiring (pecuniary) and sourcing (non-pecuniary) and two types of outbound innovation- selling (pecuniary) and revealing (non-pecuniary).

Universities—industry collaboration (UIC) is considered within this

research from the broad perspective of knowledge transfer. While Ankrah and Al-Tabbaa (2015) identify five motivations for universities to engage in UIC, this research adds the need to accelerate time to market for spin out companies as an additional motivation for universities to collaborate with industry. The value of entrepreneurial mentoring from industry to students engaged in spin out companies is identified as being particularly useful in this regard. Further, knowledge exchange through UIC is noted within this research as both accelerating the socioeconomic impact of the research, thus increasing its attractiveness for government funding but also as an enabler of the identification of new and novel funding sources. Finally, this researcher proposes that the knowledge sharing process within UIC should be considered from the perspective of Dahlander and Gann (2010) as a form of open innovation involving inbound or outbound knowledge transfer.

Personal Informal Relationships

- Academic spin-offs
- Individual consultancy (paid for or free)
- Information exchange forums
- Collegial interchange, conference, and publications
- Joint or individual lectures
- Personal contact with university academic staff or industrial staff
- Co-locational arrangement

Personal Formal Relationships

- Student internships and sandwich courses
- Students' involvement in industrial projects
- Scholarships, Studentships, Fellowships and postgraduate linkages
- Joint supervision of PhDs and Masters theses
- Exchange programmes (e.g. secondment)
- Sabbaticals periods for professors
- Hiring of graduate students
- Employment of relevant scientists by industry
- Use of university or industrial facility (e.g., lab, database, etc.)

Third Party

- Institutional consultancy (university companies including Faculty Consulting)
- Liaison offices (in universities or industry)
- General Assistance Units (including technology transfer organizations)
- Government Agencies (including regional technology transfer networks)
- Industrial associations (functioning as brokers)
- Technological Brokerage Companies

Formal Targeted Agreements

- Contract research (including technical services contract)
- Patenting and Licensing Agreements (licensing of intellectual property rights)
- Cooperative research projects
- Equity holding in companies by universities or faculty members
- Exchange of research materials or Joint curriculum development:
- Joint research programmes (including Joint venture research project with a university as a research partner or Joint venture research project with a university as a subcontractor)
- Training Programmes for employees

Formal Non-Targeted Agreements

- Broad agreements for U-I collaborations
- Endowed Chairs and Advisory Boards
- Funding of university posts
- Industrially sponsored R&D in university departments
- Research grant, gifts, endowment, trusts donations (financial or equipment), general or directed to specific departments or academics

Focused Structures

- Association contracts
- Innovation/incubation centres
- Research, science and technology parks
- University—Industry Consortia
- University—Industry research cooperative research centres
- Subsidiary ownerships
- Mergers

Table 5.1: Organisational forms of university industry collaboration (Source: Ankrah and AL-Tabbaa (2015))

5.6 Engagement with external ecosystem

Drucker (1969, in Stehr, 1994, p.5), realised the central role played by knowledge in society “as the foundation of economy and social action”. Välimaa et al. (2008) describe the knowledge society as a sociological idea where the creation of new knowledge is a defining characteristic of engagement between the societal actors of industry , government, academia and civil society. Almeida (2008) notes the importance of the development of networks, within the knowledge society, in order to realise the national and regional innovation potentials. Within this framework, Miller et al. (2016) highlights how greater understanding of the capabilities of universities to transfer knowledge to the external knowledge ecosystem also offers opportunity to grow regional innovation capabilities. So, as noted in the literature review, the university is now seen as having an ever more important role in supporting innovation and facilitating regional economic development .This support is not confined to technology transfer activities and the development of spin out companies based on novel research or intellectual property developed within the university. The entrepreneurial university, through its combined missions of teaching, research and entrepreneurial activities, promotes the development of entrepreneurship capital and a culture of entrepreneurship. The report of the *Irish entrepreneurship forum* (2014) highlights the development of networks as a key driver of economic growth. However, the report states that a source of frustration for many people in the Irish entrepreneurial ecosystem has been the challenge of optimising relationships between academia and industry around the cross-fertilisation of research and commercialisation.

They feel that amongst the key actors in the entrepreneurial ecosystem, universities and institutes of technology should play a critical role in being 'feeders' into the entrepreneurial pipeline. To date, however, they feel our HEIs have not been a big factor in developing and supporting startup activity. Indeed this supports the suggestion by Arnkil et al. (2010) that the presence of a university within a region with a local government supportive of innovation is not a guarantee that knowledge transfer activities will be successful. Interestingly, (Lundvall et al., 2011) found that smaller countries typically have higher absorptive capacity for new technology used elsewhere - something they have in common with developing countries. In this research, Participant TA feels that Ireland needs to capitalise on being a small economy and use it as a source of competitive advantage. He comments "those quadruple helix elements should work tighter together because, if we can't have scale, you got to use agility and the ability of those four to work together to develop quickly, clear policies, and then execution of those policies is our only advantage". All the participants interviewed within this research commented on the commitment to external engagement. However, there was variation in the understanding of the nature of this engagement from civic engagement to industrial engagement within a triple helix framework to quadruple helix engagement. Goddard (2009) sees the development of university knowledge networks in terms of the engaged civic university. He argues that publicly funded universities have a civic responsibility of social engagement- "the engaged civic university provides opportunities for the society of which it forms part.. it is managed in a way that ensures it participates fully in the region". Participant IB defined external

engagement of the university in terms of benefitting the broader society, specifically lower socioeconomic groups with participants UA and UB noting the importance of the development of local networks and civic engagement. While there is a recognition of the importance of engagement between HEIs and the external ecosystem, a number of interviewees in this research challenged the readiness of Irish HEIs to engage with industry. Participant UC, a university president, commented on his “astonishment” at the lack of meaningful dialogue between industry and academia in Ireland. He noted how there are some strong academic to industry “siloes” relationships but that strategic university to organisation relationships are weak. Broadly, the research participants pointed to a lack of resourcing of technology transfer offices and related support infrastructure as a reason for the lack of this high level engagement. It is noteworthy that the readiness of industry to absorb novel and innovative knowledge disseminating from Irish research universities was also challenged by interviewees within this research. Interviewee UF stressed the need to develop the correct “linkages” between industry and universities to facilitate collaboration and knowledge sharing. Participant UI commented that industry itself needs to be more outward facing and entrepreneurial as excessive bureaucracy can inhibit knowledge sharing.

In its most basic facets, regional competitiveness may be defined as the success regions and cities attain in ongoing mutual competition. This competitive success can be defined from the point of view of actions and results in national and international markets or as regards the capacity to attract financial and human capital resources (Audretsch et al., 2009). Smith

& Bagchi-Sen (2010) note that successful regional development is very much influenced by the development of regional networks (between universities–industry–government) in conjunction with specific local activities (for example, local technology transfers, the development of human capital and networking). The regional innovation concept is based on an interactive set of private and public interests, formal institutions and other entities that operate in accordance with organisational and institutional agreements and establish relationships leading to the generation and dissemination of knowledge. The development of policy supportive of regional innovation involves analysing the existence of actors (institutions, groups, universities, industries, ...) regional competences, and the nature of these interactions in order to provide the local and state authorities with tools for defining policies able to boost real competitiveness (Huahai et al., 2011). In the academic sphere, there is a vast body of literature on the economic impact of universities, whether at the regional level or the national level, and establishing the contribution made by research and development towards gross domestic product. According to some authors, these studies need to advance still further and integrate the dynamic impact of universities on regions as regards all activities ongoing, including, but not exclusively, research and development (Martin, 1998). Consistent to this interpretation, a series of academic studies has recognised that the triple helix cooperation between the three institutional spheres (university – industry – state) is fundamental to improving regional and national innovation systems (Etzkowitz, 2003a; Etzkowitz & Leydesdorff, 2000; Smith & Bagchi-Sen, 2010; Huahai et al., 2011). Muller (2006) highlights a number of studies

which link the geography and relative proximity of universities and industry as a determinant of the success of knowledge spillover with formal and informal interpersonal contact also noted as a key determinant. In this research, the geographical location of the university was highlighted as influencing the ability of universities to engage in regional development. Participant UC opined that, from speaking to other HEI presidents, the geographical location is influential on the level of enterprise engagement with relationships between universities and industry more shallow in Dublin, where you have four universities and a number of research producing HEIs in close proximity, than with the regional universities. He attributes this to the forming of leadership bonds between industry and academic institutions. Regionally, he feels that it is “intuitive” for industry to partner with the local HEI and develop deep relationships but he suspects that the choice of institutions in Dublin leads to many shallow relationships.

Qian and Acs (2013) knowledge spillover theory of entrepreneurship notes that entrepreneurial activity based on knowledge spillover depends both on the creation of novel ideas but also more importantly on entrepreneurial absorptive capacity that allows entrepreneurs to understand new knowledge, recognise its value, and commercialize it. Each actor within the entrepreneurial ecosystem must work to ensure knowledge produced is exploited meaningfully. Participant UI identified the need for all elements of the entrepreneurial ecosystem to be themselves entrepreneurial for effective knowledge spillover and exploitation. He comments, “So industry, government departments, local authorities and the educational establishment, so one of the things that was clear was that if the other

organisations that you engage with are not entrepreneurial, if they are more bureaucratic then that can impact on the ability of you to engage with those organisations in a more entrepreneurial way”.

Miller et al. (2016) identify five factors, namely human centric factors, organisational factors, knowledge characteristics, power relationships and network characteristics, which facilitate knowledge transfer through improved absorptive capacity of the university and improved absorptive capacity of the external ecosystem. The findings of this research appeared to align with the core literature with interviewees in general noting the positive influence of the technology transfer offices in facilitating the transformation and exploitation of university research. Participant TA stressed entrepreneurial mentoring of start ups as crucial to their success, commenting “your biggest protection for your business and for developing your business is velocity- getting to market quickly”.

According to Yawson (2009), the Triple Helix of state, university and industry is missing an essential fourth helix, the public. Education policy across Europe now acknowledges the need to frame knowledge and information flows within the quadruple helix paradigm (Miller et al., 2014). The quadruple helix of innovation theory is a development and continuation of the triple helix theory. Afonso (2013) sees national economic development in terms of the four helices of academia, government, firms and civil society and the clustering of these talents. A number of different conceptions of the quadruple helix have been proposed (Afonso, (2013); Arnkil et al. (2010); Carayannis and Campbell, (2009)) with some close in conception to the triple helix while

others are fundamentally different. However, all variants of the quadruple helix do contain a fourth “helix” of contributors to innovation.

Arnkil et al. (2010) consider “users” as the fourth helix and offer the general definition of the quadruple helix as “an innovation cooperation model or an innovation environment in which users, firms, universities and public authorities cooperate in order to produce innovations”. However they see the term “users” as being very broad in scope (figure 5.1).

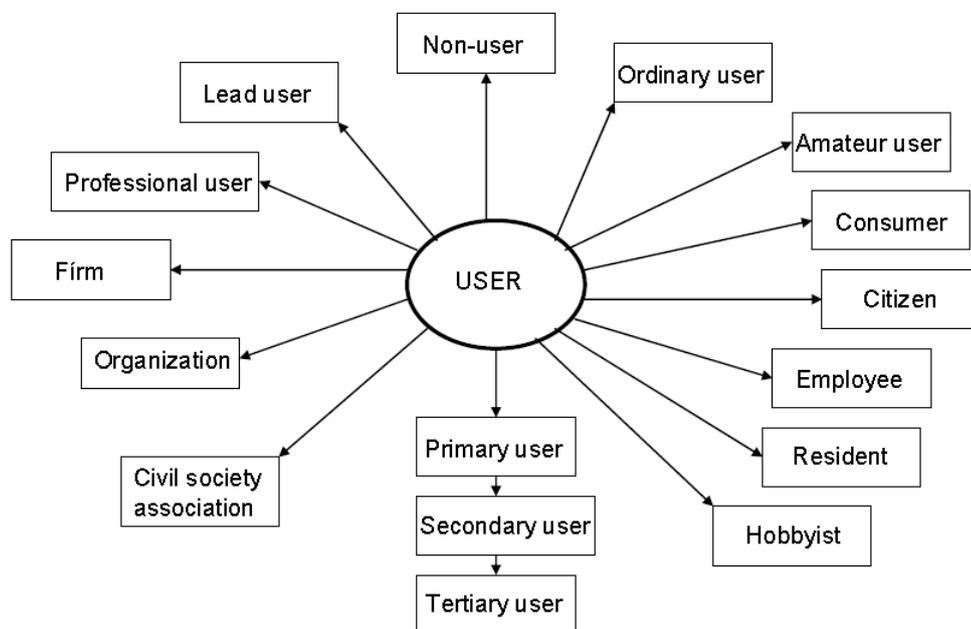


Figure 5.1: Different user groups in quadruple helix (Arnkil et al., 2010)

It must be noted that only two of the interviewees in this research directly mentioned quadruple helix engagement. Firstly, was the president of what would be recognised as Ireland’s most enterprise engaged university commented on the need for for entrepreneurial universities to be “engaging with enterprise, engaging with local and central government and engaging with civil society”. Beyond this, participant TA, a director of commercialisation noted how all quadruple helix elements must work together in the

development and execution of policy. Interestingly the VP for research for the university perceived to be the second most commercially focused in Ireland (Zhang et al., 2015) did comment in 2016 (www.ul.ie/research/blog) “At UL, we are particularly focused on the quadruple helix model of innovation whereby our researchers/academics are closely linked with industry, community and government driving innovation”. It would be fair to comment that all of the other HEIs interviewed can be seen to be at varying stages on the journey from being a traditional, scholarly institutions to being much broader and strategic and engaged. This finding concurs with McAdam et al. (2018) who found the university type, mission and indeed the reward mechanisms for academics to be significant and impactful on the university level quadruple helix engagement. Indeed McAdam et al. (2018, p.1060) further opines “the engagement of quadruple helix stakeholders in commercialisation processes requires considerable resources which is a key challenge for academics”, a point which is very salient in light of the funding constraints Irish third level institutions operate within (Hazelkorn ,2014).

In summary, the participants in this research understood the nature of external engagement in many different ways, including both civic and industrial engagement across both triple and quadruple helix frameworks. However, while numerous university- industry engagements occur, this research points to the rather siloed nature of these relationships, excessive bureaucracy within industry, and a lack of strategic high level engagement between industry and academia in Ireland. These strategic engagements are seen as necessary to support deep collaboration and knowledge sharing. The geographical location of the university was also noted as influencing the

ability of universities to engage in regional development, with typically deeper relationships forming between industry and regional HEIs than in major urban centres where industry is seen as more inclined toward more shallow relationships with many.

5.7 Developing organisational capacity and capabilities to deliver the university third mission

Etzkowitz (2013) positions universities within the triple helix of innovation as 'natural incubators'. Scott (2014) considers the evolution of the entrepreneurial turn in universities as an institutional change largely driven by societal expectation of an evolution in the role of the university.

Audretsch (2014) notes how the mission of the entrepreneurial university has evolved from one of supporting outward technology transfer and incubation of startups to also providing leadership in the development of societal entrepreneurial capital. Pugh (2018) notes that while universities exist along a spectrum from the traditional research university to the entrepreneurial and engaged university, there is growing recognition of the need for universities to develop entrepreneurial capabilities and structures.

The idea of a firm's architecture, "the sum structural characteristics forming the architecture of the firm" (Tidd, 2001, p.178), has been used to describe the management of innovation within the private sector.

Entrepreneurial architecture, coined by Burns (2005) considers the internal organisation networks and indeed external collaborative ecosystems including upstream and downstream supply chain partners with the ambition of

introducing entrepreneurial change. The idea of entrepreneurial architecture was introduced to the entrepreneurial university by Nelles and Vorley (2009, p. 289), describing it as consisting of the “institutional, communicative, coordinating and cultural elements of an organisation oriented towards innovation”. Here, entrepreneurial architecture describes organisational level changes supportive of the development of “entrepreneurial entities” which facilitate the third mission of universities (Foss and Gibson, 2015).

Entrepreneurial architecture provides a useful theoretical lens through which to consider the development of the organisational capabilities of the university to deliver the university third mission. Nelles and Vorley (2011) use the entrepreneurial architecture metaphor to capture the internal elements which collectively frame the entrepreneurial mission within universities. They argue that for a university to successfully incorporate third mission activities into its “architecture”, these five elements (structures, strategies, systems, leadership, and culture) must each look to integrate entrepreneurial activity into university routines and norms. There is emphasis on structural and physical elements (table 5.1) and an institutional wide approach (Martin et al., 2018). A central tenet of entrepreneurial architecture is the interconnectedness coupled with the equal importance of each of the five elements. In fact , the development of the entrepreneurial third mission in universities is considered to be dependent upon how successfully entrepreneurial architecture is incorporated into the university .

Structures	Physical infrastructure – technology transfer offices, incubators, technology parks...
Strategies	Strategies are embodied in institutional aims and are elaborated in plans, incentive structures and policy.
Systems	Networks of communication between individuals and departments and the configuration of linkages between structures and administration
Leadership	The leadership component emphasizes the “qualification and orientation” of key influencers within the organization, including administrators, boards of directors, department heads and researchers, rather than their role as change agents (Nelles and Vorley, 2010).
Culture	Attitudes and assumptions across the institution, departments and individuals towards engagement with the entrepreneurial third mission.

Table 5.2: Definition of elements of entrepreneurial architecture (Nelles and Vorley (2010); Martin et al. (2018))

The development of an infrastructure supportive of the entrepreneurial third mission was a recurrent theme in the interviews for this research. Nelles and Vorley (2010, p.170) comment that “entrepreneurial architecture emphasises the importance of structures embedded in coordinated systems guided by visionary leaders as agents of a coherent entrepreneurial strategy and within an environment that supports and sustains innovation”. Therefore, within the entrepreneurial architecture paradigm, structures supportive of the third mission should include those elements supportive of the development of a culture of entrepreneurship and innovation on campus as well as those engaged in technology transfer . As noted previously all HEIs in Ireland have dedicated support from technology transfer offices since 2007 (Zhang et al., 2016). Participant UG feels a priority of entrepreneurial universities is the creation of a structure (“incubator units, technology transfer offices, activities supporting intellectual property protection, venture capital”)

which enables entrepreneurs access the entrepreneurial ecosystem. Nelles and Vorley (2010) stress the criticality of how well embedded these structures are into the internal university systems. Interestingly, in this research, participant IC noted the value of incorporating modules delivered by the technology transfer offices and incubator facilities into the academic programmes. Katz et al. (2014) note that the development of a structure supportive of the improvement of the entrepreneurial and creative skillsets of undergraduates can be done in a discipline-specific way or collaboratively among departments and administrators. As discussed in the literature review Katz et al. (2014) propose five different cross-campus structures ; focused (single-discipline), collaborative (two or more disciplines coordinating), magnet (bringing a campus to a central place for a shared entrepreneurship program), radiant (distributing resources across a campus from a central repository) and mixed (magnet and radial elements). Of the four participants who commented directly on the form of the entrepreneurial education support structures , two participants , UF and IB, favoured a radiant model, participant IC favoured a collaborative model while UB favoured a mixed model.

Five participants (UA, UB, IC, UC, UH) highlighted the importance of senior leadership in the development of entrepreneurial organisational capacity and capabilities. According to Etzkowitz (2008, p. 27), “academic leadership in the entrepreneurial university refers to the ability to formulate and implement a strategic vision; organisational capacity – to transfer knowledge and technology through patenting, licensing, incubation; entrepreneurial ethos – entrepreneurial attitude and behaviour among administration, faculty and students; and finally legal control consists of

control over physical and intellectual resources of university". Nelles and Vorley (2010) comment that the leadership component emphasizes the "qualification and orientation" of key influencers within the organization rather than their capabilities as change agents. Consistent with this, participant UA, a university president, regarded his role as "ambassadorial in creating connectivity... from local, regional, national, fully global". Participants UB, UC, and UH, also university presidents, very much defined their roles as facilitators and influencers of the entrepreneurial strategy with UH defining the role of university president as an architect who creates "an environment in which the people who work here and who study here have the minimum barriers to being innovative and expressing their entrepreneurial tendencies".

This section considers the development of the entrepreneurial capabilities within the university through the lens of entrepreneurial architecture. The development physical infrastructure supportive of entrepreneurial activities and a culture of entrepreneurship across the university is foregrounded. The value of incorporating modules delivered by the technology transfer offices into the academic programmes is also noted. The importance of senior leadership as facilitators and influencers of the entrepreneurial strategy is also highlighted.

5.8 Summary

In chapter 2, the literature review for this research discusses the evolution of the role of the university and the defines many of the key terms. This chapter built upon the research presented in the literature review and again looked to the literature to further explore and give meaning to the

themes which emerged through the phenomenological interviews. This composite summary is an important part of the phenomenological methodology. The main themes which emerged through the research were positioned with respect to the literature but also the composite summary afforded the opportunity to consider the research through the dynamic capabilities theoretical lens.

Chapter 6

Conclusion

6.0 Introduction

This research brought to bear a phenomenological approach to understanding both the lived experience and indeed the attitudes of senior university leadership across the island of Ireland to the entrepreneurial university paradigm. Conclusions were drawn based on the themes which emerged through the phenomenological explication of the interviews and through consideration of the extant literature. Further the findings were considered through the theoretical lens of strategic management literature, specifically the dynamic capabilities theory. These findings are presented in chapters 4 and 5.

The decision to choose Husserl's phenomenological methodology was born from my epistemological perspective, reflection on the extant literature and indeed this researcher's personal life experiences as reflected upon below.

Epistemology challenges the researcher to consider how to give meaning to the world (Denzin and Lincoln (2000)). Social constructionism creates and positions the meaning of ideas in how they evolve over time through social interaction. Shared meaning is understood and borne through language and communication within communities. These fundamentals of social constructionism epistemologically underpin this research. Drucker, in trying to give meaning to entrepreneurship comments "the entrepreneurial mystique? It's not magic, it's not mysterious, and it has nothing to do with the

genes. It's a discipline. And, like any discipline, it can be learned" (Drucker, 1987, p18). Fayolle (2007) and others highlight the polysemy of entrepreneurship. This polysemy regarding entrepreneurship has also been found in this research to influence the understanding of the nature and scope of the entrepreneurial university. Epistemologically, phenomenology examines the lived experience a particular phenomenon with the goal of elucidating through the rich experiences of those who experience the phenomenon from the inside. Patton captures this idea wonderfully: "If you want to know how much people weigh, use a scale... If you want to know what their weight means to them, how it affects them, how they think about it, you need to ask them questions, find out about their experiences, and hear their stories" (Patton, 1990, p13). The recent evolution of the university to include third mission activities, the objective of understanding this evolution from a strategic management perspective, and indeed my epistemology lead this researcher to consider this methodology most appropriate.

A reflection on the literature in the domain of the entrepreneurial university reveals the majority of studies propose theoretical models and frameworks and are largely quantitative in nature. A research gap was identified regarding the narratives and lived experiences of those directly involved in the development and indeed the strategic management of the evolution of universities as they incorporate entrepreneurial capabilities. Roberts et al. (2014) note that the broader field of entrepreneurship research would benefit from the new perspectives brought by a phenomenological approach. One of the goals of this research is to understand if the phenomenological methodology is a useful and worthwhile approach to make

a meaningful contribution to this burgeoning field of study. This researcher argues that the language borne insights and themes outlined in chapters 4 and 5 certainly validates the approach of phenomenological explication of verbatim interviews. I do not believe the depth and subtlety of meaning would be captured through other qualitative approaches. Indeed, social constructionism assumes that how we make sense of the world is historically and culturally specific and a product of the prevailing social and economic arrangements in that culture at that time (Burr, 2015). The methodology afforded the opportunity to the research participants in the first order and the researcher in the second order to prioritise certain themes from a historical and cultural perspective.

From a personal standpoint, this researcher had spent over 20 years in business, both as an entrepreneur and working with multinational organisations before commencing my doctoral studies. This experience has afforded great clarity with regard to my philosophical stance. This has led me to the belief that meaning is indeed shared and constructed through interactions between people. This, I believe, leads to communities of interpretation, with shared meanings generated through language. Beyond this, my experience of many years of high level business meetings has also given me the experience necessary to engage in constructive, “peer-to-peer” engagements with the interview participants, all of whom held senior positions in their respective HEIs. I found this experience invaluable in encouraging and guiding the interview participants to reveal their thoughts and experiences regarding the research topic.

In this chapter, the findings of the research are considered. Conclusions are drawn in terms of how the research addressed and answered the research questions. The contribution this study makes is considered with regard to theory and methodology. The implications for practice and recommendations for further research are addressed. Finally, the limitations to the research are identified and considered.

6.1 How the research answered the research questions

In order to develop the research field and contribute to the debates surrounding the entrepreneurial university this research sought to address how is the management of Irish universities' strategy contributing to the success of their 'third mission'. Specifically, three related research questions guided the study. It is now timely to consider how these questions have been answered.

RQ1. How do senior leaders in Irish HEIs perceive, think about and give meaning to the entrepreneurial university and the entrepreneurial third mission?

This research identifies the importance of interpretation and the meaning given by the academic community to entrepreneurship and the entrepreneurial third mission. The findings of this research highlight the plurality of interpretations by the leaders of Irish HEIs of entrepreneurship within the entrepreneurial university paradigm. The entrepreneurial third mission is defined by the participants within this research in terms of

- i. encouraging and enabling academic entrepreneurship and supporting those academics engaged in research commercialisation,
- ii. the HEI itself behaving entrepreneurially in terms of being commercially responsive to external needs and innovative in developing new funding streams,
- iii. inclusion of entrepreneurship in the pedagogy and the development of entrepreneurially minded graduates,
- iv. the development of a culture and ethos supportive of entrepreneurial activities and signalling to academics that time spent engaged in entrepreneurial activity will be recognised,
- v. engagement with triple and quadruple helix elements of the external entrepreneurial ecosystem.

It was found to be important for senior leadership to define carefully the concepts so as not to challenge the perceived academic freedoms through excessively corporate language. Further, the definition of the entrepreneurial university typically mirrored where on the evolutionary journey the academic institution is towards becoming a fully entrepreneurial and engaged university. HEI's at the less entrepreneurially evolved stage typically were engaged in activities (i) and (ii) outlined above with the more engaged and entrepreneurial HEIs increasingly engaged in each of the activities (i) to (v) above.

RQ2 How do senior leaders in Irish HEIs perceive the dynamics of the relationship between university mission and strategy and the evolution of the ‘third mission’ within their institution?

The recognition that the modern university is expected to fulfil the three missions of teaching, research and entrepreneurship simultaneously is captured in the mission and strategy statements of all HEIs across the island of Ireland. This research question considers how do the senior leaders of Irish HEIs interpret and make sense of the link between the third mission strategy and its execution. It was found necessary to allow the voice of stakeholders, such as faculty deans, to emerge in the strategy document in order to support the permeation of the entrepreneurial strategy across campus. In this regard, the need to support academic champions of the entrepreneurial strategy, both with resources and through ensuring they are not isolated, was also highlighted. Further, the need for linkages between researchers/academics and the entrepreneurial ecosystem (industry, community and government) was underlined. Indeed, the need for university leadership to themselves be entrepreneurial in order to sense the entrepreneurial opportunities presenting to the institution was also highlighted. Finally, the funding agreements and performance compacts with the Irish higher education authority within which Irish HEIs operate was also identified as influential on the execution of the entrepreneurial strategy. The linking by government of funding to national socioeconomic priorities has ensured the foregrounding of third mission activities by the academic community.

RQ3 What are the factors, internal and external, which are impacting the development of the entrepreneurial ‘third mission’ of Irish HEIs?

Chapters 4 and 5 provide a response to this question. Seven principal themes emerged as outlined which captured the response to this research question:

Interpreting/defining of the idea of the entrepreneurial university

Enabling the entrepreneurial mission in the institution

Role of government policy as a determinant of entrepreneurial strategy

How the impact of industry engagement is driving the success of entrepreneurial activities on campus

Engagement with external ecosystem

Developing organisational capacity and capabilities to deliver the university third mission

Measurable factors which enable the entrepreneurial third mission.

In keeping with the methodology, the themes were first summarised without reference to the literature to allow the voices of the participants to emerge. A composite summary which frames the themes with respect to the literature was then presented in chapter 5. These themes are captured in the framework presented in figure 6.1.

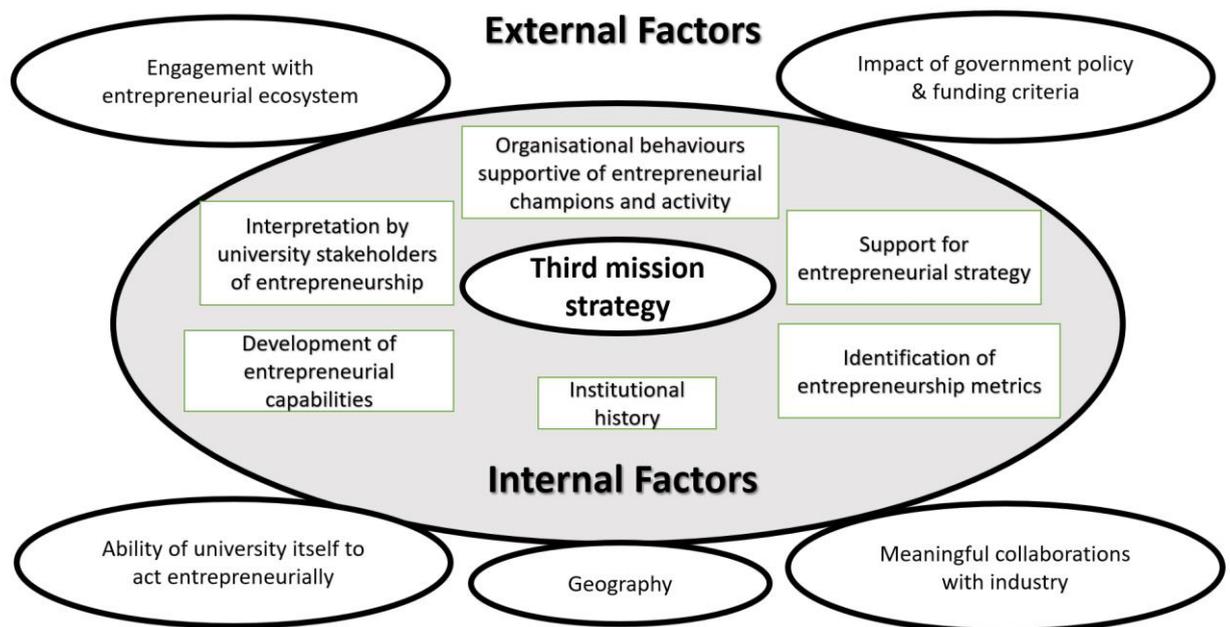


Figure 6.1: Determinants of a successful university third mission strategy

Figure 6.1 identifies the factors, internal and external, which are impacting the development of the range of entrepreneurial related activities captured under the umbrella term of the entrepreneurial ‘third mission’ of Irish HEIs. External to the university, the ability of the HEI to engage with the entrepreneurial ecosystem and the ability to develop meaningful collaborations with industry (triple helix) and the civic community (quadruple helix) is noted as impacting the knowledge exchange capability of the HEI, the definition of problem statements and indeed the development of creative abrasions and co-creation of solutions. The influence of government policy is also noted as impactful in this regard. The geography of the HEI and its relative proximity to both other HEIs and industry is considered a determinant of both the level of knowledge exchange and engagement with industry and the level of interpersonal engagements developed. The findings of this

research suggest HEIs which serve a region alone develop deeper relationships with the regional actors within its ecosystem than those HEIs, typically in larger urban centres, with other HEIs in close geographical proximity. Internal to the HEI, the importance of support for the entrepreneurial strategy and entrepreneurship champions across the campus, and indeed the development of physical resources to support the entrepreneurial activities are identified as important for the success of the entrepreneurial 'third mission' strategy. Gibb (2012, p.3) comments that "concept is key to the development of an appropriate level of shared understanding of the words entrepreneurship and enterprise". The concept and understanding within the HEI of the entrepreneurial university is noted in this research as a factor which influences the nature of entrepreneurial activity on campus. Entrepreneurial is understood by participants in this research both in terms of the HEI promoting knowledge exchange, entrepreneurship and innovation but in terms of the HEI itself acting entrepreneurially in terms of its offering and value proposition. The history of the HEI is highlighted in this research as determinant of the success of the entrepreneurial activities of the institution, with activity incoherent with the history observed as being extremely difficult. This concurs with Penrose (1995, p.xiii) that "history matters", with the growth of an organisation seen as based upon the accumulation of knowledge as the organisation evolves. The value of capturing metrics associated with entrepreneurial activity across campus was also identified. However, participants in the research also cautioned that the focus of the metrics can be constraining in that if you measure for a certain type of activity, this encourages prioritisation of that

behaviour. Further, it was observed that the conflict between metrics and performance measurement and the autonomy and traditional academic freedoms enjoyed by the academy must be managed.

6.2 The contribution this study makes to theory and practice

In order to frame the contribution of this research to theory and indeed to practice it is necessary to consider the goal of the researcher from a methodological perspective. As noted in the methodology, the aim of this phenomenological research was to achieve an understanding of the lived experience of a temporally and indeed geographically bounded sample of the academic and administrative community within higher education. It should be remembered that phenomenological research does not look to achieve empirical generalisations. Firstly, this research looked to answer the research questions and extend our understanding of the entrepreneurial university paradigm and the entrepreneurial third mission, specifically from a management perspective. Secondly, I looked to leverage the field of entrepreneurial university study to make a contribution to the extant strategic management theory of dynamic capabilities. Through the use of this theoretical lens, I hoped to both contribute directly to dynamic capabilities theory and also to use the application of this theory to further the understanding and theoretical explanation of the entrepreneurial university (Crane et al., 2016).

6.2.1 Defining theoretical contribution

Professor Anne Huff, who was a wonderful source of guidance to me during her tenure at Maynooth university, advised that scholarly research should look to make claims that are “interesting, significant and trustworthy” (Huff, 2008). However, the lack of consensus on exactly how to define theory is noted across the literature (Sutton & Staw, 1995). Whetten (1989) proposes that a theory is an interrelationship between the four elements: identification of factors, establishment of relationships, theory building on a sound framework and the generalisability of the theory. Gioia and Pitre (1990) propose that a theory is the interrelationship between concepts that explains how and/or why a phenomenon occurs. Interestingly, Whetten (1989) does not distinguish between a model and a theory.

In order to understand what constitutes a theoretical contribution, I looked in particular to *Academy of Management Review* due to the *AMR* being the preeminent journal in the field of organisational and management study. Within the *AMR*, Corley & Gioia (2011) judge theoretical contribution in terms of the originality (incremental or revelatory) of insight into a phenomenon through the advancement of knowledge in a way that demonstrates and utility (scientific or practical) as shown in figure 6.2. I believe the findings of this research contribute to the main bodies of the literature selected when considered through both prisms of originality and/or utility.

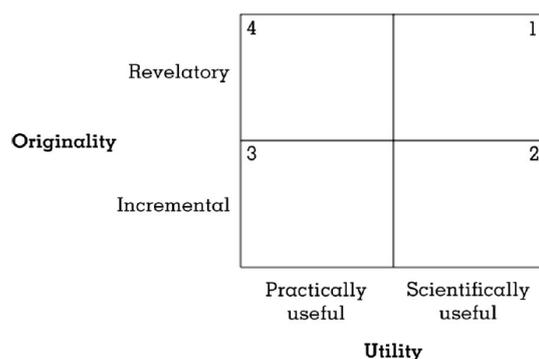


Figure 6.2: Dimensions for a theoretical contribution (Giola and Pitre, 1990)

6.2.2 Contribution to practice and utility

In the first instance the findings of this research contribute a set of factors which are significant in terms of guiding senior management of universities as they continue on their third mission journey. I believe these factors are “interesting” and of incremental originality and practical utility while remaining sensitive, as Whetton (1989, p 490) advocates, “to the competing virtues of parsimony and comprehensiveness”.

The identification of the importance of the definition of entrepreneurship, how the conversation around entrepreneurship is framed within the HEI and indeed the type of language used in the conversation is of interest as it appears overlooked in the literature to date and does not appear in any extant model of the entrepreneurial university. This research highlights that clearly defining entrepreneurship and the entrepreneurial vision for the university is of great importance in both aligning the mission and strategy with organisational level activities across the institution and in the development of organisational capital. Kaplan and Norton (2004), when considering organisations which operate in dynamic environments, define

organisational capital as the ability to mobilise and sustain the process of change management required to support the strategy. Clarity in the institutional understanding of entrepreneurship reinforces understanding of the strategy and ensures the university culture is aligned with these strategic objectives. This is of great importance in universities, where academics must both deliver internally in their department in terms of the missions of teaching and research while simultaneously delivering on the entrepreneurial third mission of the university. Indeed, a lack of clarity on the entrepreneurial mission of the university can result in perceptions by academics including threats to both academic freedoms and blue sky research.

In a similar vein, my research foregrounds the importance of keeping university stakeholders engaged with the university strategy and the strategy document. This research links successful execution of the third mission strategy to regularly updating the strategy document through regular cross campus engagement focused on incorporating the voice of stakeholders into the strategy document coupled with the identification, support and nurturing of champions of the entrepreneurial agenda. These activities both support the alignment of the academic and administrative staff with the strategic goals of the institution and the enabling of the entrepreneurial culture.

History clearly plays a role in shaping the perception to and indeed the nature of the entrepreneurial third mission. As noted by a number of research participants, entrepreneurial activity which lacks connection to the institutions history, culture, and indeed geography is extremely difficult. The nature of external engagement is also greatly influenced by these factors.

The significant influence of the evolution of government policy and indeed the influence of the government funding model on the expected socioeconomic contribution of HEIs is also of interest. The impact of the state funding for the development of technology transfer offices, with all Irish HEIs now having access to a dedicated knowledge transfer support has been shown as a very positive development. There is also now an expectation of HEIs to behave increasingly as an agent of government policy in order to secure funding. However, continuous reduction in the levels of per capita funding coupled with permanent academic positions gradually being replaced by casual and part time roles, and indeed a lack of formal recognition by government of the efforts of individual academics to support the third mission agenda has created a high level of frustration among many academics in Ireland with the government strategy.

6.2.3 Theoretical Contribution

This research looked to both apply the dynamic capabilities theory to the strategic management of universities within the entrepreneurial university paradigm and also to make a contribution to the dynamic capabilities theory. The usefulness of the theory to highlight the important role of university leadership in academic and administrative functions in the development of university dynamic capabilities is considered.

Application of theory

This research further extends and demonstrates the applicability of dynamic capabilities theory to the strategic management of the third mission within

universities. As noted by Eisenhardt & Martin (2000), the theory focuses on the ability of organisations to adapt in dynamic and changing environments. Firstly, the activities supportive of dynamic capabilities which emerged in this research are addressed. Heaton et al. (2019) offer a high-level view of dynamic capabilities in a university setting (Figure 6.3) categorized into the three groups of sensing, seizing, and transforming. This research considers dynamic capabilities and the entrepreneurial university from a similar perspective. Sensing in the entrepreneurial university refers to the ability to

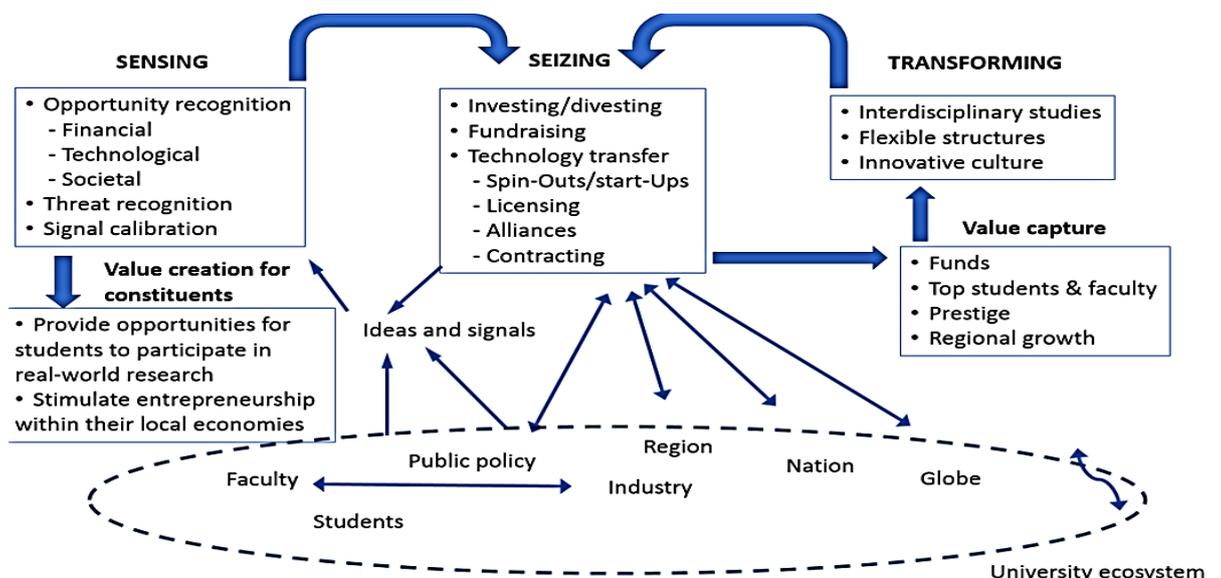


Figure 6.3: A system-level view of dynamic capabilities and campus entrepreneurship (Heaton et al., 2019)

make sense of the opportunities and threats in the external environment. In this regard, this research foregrounds the importance of clearly defining entrepreneurship within the university strategy. The importance of keeping the strategy document alive and current is also noted. This requires of the university leadership the capability of looking external to the HEI and

incorporating best practice into the strategy document. Seizing refers to the activities related to strategy execution, the prioritizing of opportunities and the conversion of these opportunities into actions. This research recognises the need to develop a culture and ethos supportive of entrepreneurship through empowering departments to behave entrepreneurially, the support and recognition of entrepreneurial and creative activities of academics, administrators and students, and the support of champions of the strategy. Further, the empowerment of departments to themselves act as entrepreneurs is identified as a behaviour supportive of the development of the university dynamic capabilities. In the dynamic capabilities framework, transforming involves what is called asset orchestration and asset repurposing and some level of continuous renewal to keep the institution aligned with its environment (Teece, 2018). This research identifies as activities supportive of the transforming dynamic capabilities of the university the development of physical infrastructure, the need to develop alternative funding methods, the breaking of siloed contact of individual academics and departments with industry, and indeed developing more meaningful engagements with external partners including alumni, universities and the local community. Heaton et al. (2019) note how the university leadership must be “well honed” to each of the elements of sensing, seizing and transforming if the academic institution is to succeed in their every more competitive environment. University leaders also must be able to act strategically, in so far as is possible, to manage the external entrepreneurial ecosystem (Teece, 2018).

Secondly, this research considers through the lens of dynamic capabilities the role of external networking and the management of the evolution of the role of the university within the triple and quadruple helices. Thirdly, efforts by academic institutions to develop their third mission capabilities through the reward and recognition of entrepreneurial behaviours across all strata in the university are appraised through the prism that dynamic capabilities must be developed as they cannot be bought (Leih and Teece, 2016). Finally, while dynamic capabilities theory is a stand-alone construct, the ability of other related research streams to illuminate my research topic through their relationship to the elements of sensing, seizing and transforming is noted. These related research streams include systems of innovations theory (triple helix and quadruple helix models), absorptive capacity, desorptive capacity, the open innovation framework, and the knowledge spillover theory of entrepreneurship.

Contribution to theory

This research has shown the importance of dynamic capabilities to the strategic management of the third mission of universities. When this research project was started, there were no examples in the literature of the application of dynamic capabilities theory to the entrepreneurial university paradigm. Leih and Teece were the first to consider the strategic management of universities through this lens as recently as 2016. The dynamic capabilities theory in a university context addresses the ability of the institution to *sense* and *seize* both internally and externally and effect the management of resources (*transform the organisation*). Teece et al. (2007) frame the theory in terms of managerial and organisational activity defined by

the assets and paths available. To date, this “asset orchestration” is considered by contributors to the field as only involving assets and resources internal to the system. Teece (2012) notes the risk to organisations “if the sensing, creative, interpretive, and learning functions are left to the cognitive capacities of a few individuals”. Helfat et al. (2007) define dynamic capabilities as “the capacity of an organization to purposefully create, extend, or modify its resource base”. In contribution to the theory, this research proposes the ability to engage with the external entrepreneurial ecosystem as a tangible asset. This researcher proposes the ability to develop sustainable strategic alliances with industry, other HEIs and indeed alumni as an asset which possesses the characteristics of VRIN. The resource-based view (RBV) notes that assets which provide sustainable competitive advantage should be valuable, rare, inimitable, and non-substitutable (VRIN). The responses of participants within this research highlighted the value of the development of an entrepreneurial ecosystem as a valuable resource. For example, Participant UG opines that the ecosystem universities create is as critical to entrepreneurship as the individual who takes advantage of it. Further, Participant ID highlighted the need for active engagement with alumni to keep the university “current and relevant”. Indeed, Participant UD highlighted the value of developing an external network for knowledge exchange with industry. He noted seconding of academics into industry, and then bringing industry secondees into the university as the institutions best form of knowledge exchange. This contribution extends the theory which to date has posited that “asset orchestration” only occurs internal to the organisation (Teece et al., 1997).

6.3 Appropriateness of methodology

In order to address the research questions, I felt it appropriate to use a methodological approach which examined the management of the entrepreneurial third mission strategy in universities from an inside-out perspective. Further, it was my intention in this research to capture the 'lived experience of' and indeed 'attitude to' of senior managers in higher education in Ireland to the entrepreneurial university phenomenon. Epistemologically, a social constructionist approach has provided insights which heretofore were lacking in the entrepreneurial university literature which is largely quantitative in nature and often lacking in theoretical structure. I believe my qualitative research approach employing a phenomenological methodology has been shown to be a valid research strategy. This approach, to this researcher's knowledge, has not been applied previously to consider the management of the entrepreneurial third mission strategy in universities. As noted in the sections above, the research strategy has uncovered contribution to both the research area and indeed the theoretical lens of dynamic capabilities theory. Beyond, while the goal of phenomenology is not the development of generalisable data, and the experience of each participant is unique, the commonality of experience of the research participants as senior leaders in higher education across the island of Ireland did result in insights with generalisable value.

Finally, one must consider if the methodology was the most appropriate for the study. Firstly, the basic goal of my research was to "grasp

of the very nature of the thing" (van Manen, 1990). This idea sits at the core of phenomenological research. Further, Creswell (2007) acknowledges the value for policy makers of using phenomenology to capture the common experiences of interest groups. The research area also proved suitable to the methodology as overcoming the challenges of bracketing is noted as one of the most difficult elements of this approach. In this study, bracketing was not particularly difficult as firstly I did not have experience of this perspective in advance of the study and, secondly, this study did not involve emotional subject matter which challenged core beliefs and assumptions of the researcher.

Other qualitative approaches were considered in advance of the study but ultimately discarded in favour of the phenomenological methodology. The case study approach was deemed unsuitable due to this researcher's desire to understand the phenomenon from the 'inside out'. Further, case study has been used widely in the literature to date to discuss the entrepreneurial university and this researcher believes that the phenomenological approach affords fresh and valuable perspective. Grounded theory research was also considered but deemed inappropriate as the goal of this approach is theory generation rather than description.

6.4 Limitations to study

A number of limitations to this research must be acknowledged. Firstly, though there are many examples in the literature of the application of phenomenology for the study of various elements of the entrepreneurial university and indeed strategic management, to my knowledge, this is this

first instance the use of phenomenological research to consider the strategic management of entrepreneurial universities. The consequential lack of academic references created a challenge for a novice researcher.

Further, the phenomenological methodology itself presents limitations. Central to the methodology is phenomenological reduction which is achieved through the researcher “bracketing” knowledge and opinion on the topic to allow the participants voice their lived experience. However, this researcher notes how bracketing proves increasingly difficult as one continues through the interview explication process. Once themes have been identified within previous interviews, it is increasingly challenging for the researcher to bracket all presupposition and allow themes emerge from each interview naturally. Secondly, there are limitations related to the accuracy of the themes and interpretations. The findings presented are this researchers’ interpretation of the research participants’ interpretations of the phenomenon being considered. However, one must also remember that the goal of this research methodology is not factual accuracy, but rather an interpretation of the phenomenon through the lived experience as presented by the participants.

One must also consider the limitation in research skill of this researcher. As the primary ‘research instrument’ (Lincoln and Guba, 1985), I was acutely aware of my role and the potential for influencing the outcomes through personal bias. Peredaryenko and Krauss (2013) feel bias is most common when the researcher’s beliefs are aligned or indeed conflicted with the research participants. I believe a genuine interest in the research topic coupled with the use of reflexivity throughout the interview through to the

explication process allowed the voice of the participants to truly emerge. As noted by Barry et al. (1999), reflexivity emphasizes an awareness of the researcher's own presence in the research process. Further, in order to hone my craft, this researcher also attended courses for doctoral candidates including crafting social research and the development of systematic literature reviews.

Finally, certain limitations must be noted with the dynamic capabilities theory. It could be argued that the idea of framing the organisational capabilities required for strategic change within the idea of sense, seize and transform considers strategic management through a rather simplistic lens. However, this researcher feels that the dynamic capabilities view of organisational renewal is more suited to the entrepreneurial university paradigm than previously employed theories such as the more static 'resource based view' (Guerrero & Urbano, 2012) due to its focus on the learning and accumulation of new skills and capabilities (Ambrosini & Bowman, 2009). Beyond this, Arend and Bromiley (2009) note that some organisations decide to change but others just change. The dynamic capabilities theory does not specifically outline whether institutions which develop their dynamic capabilities are more successful in rapidly changing environments than those who just naturally evolve. Interestingly, this researcher recently published based on a study of Irish universities that the knowledge transfer performance varies proportionately with the dynamic capabilities possessed by universities (O'Reilly & Robbins, 2018).

6.5 Suggestions for further research

This research examined how senior leaders in Irish universities interpret and make sense of the evolution from traditional institutions of teaching and research to now including the third mission to becoming entrepreneurial universities. Based on an evaluation of this thesis, I feel methodological, theoretical and practical insights can be extended to potential further research avenues.

Methodologically, this research could be extended to understand the evolution of the entrepreneurial university through capturing the lived experience of other stakeholders not considered within this research. Within the university, I believe it would be useful for scholars to consider the relationship between different entrepreneurial and creative activities and indeed different forms of entrepreneurial architecture (Nelles & Vorley, 2011) and the entrepreneurial outcomes achieved. I feel it would be particularly insightful to capture the voice of students and early stage academic entrepreneurs in this research. Beyond the walls of the university, it would be fruitful for academics to examine the lived experience of quadruple helix stakeholders and social entrepreneurs and their success in engaging and collaborating with universities. Insights on the nature of university/university collaborations within the entrepreneurial university paradigm considered through a phenomenological perspective would also be interesting. Further, the focus of this study was the relationship between university mission and strategy and the evolution of the 'third mission' within the university. Further research could apply this methodology to consider other areas important to

the third mission including knowledge transfer supports and the development of entrepreneurship education.

It could also prove worthwhile to extend the application of dynamic capabilities theory within the entrepreneurial university paradigm. This research could be extended to deep dive into the different capabilities of sensing, seizing and transforming. For example, case study research which considers strategy execution in high performing entrepreneurial universities through the dynamic capabilities lens could prove insightful. Further research could also consider how much of the evolution of the university is strategy driven and how much is because of ad hoc natural evolution. Is there strong correlation between entrepreneurial outcomes and investment in and allocation of resources? At a departmental level, the influence of faculty deans on the evolution of the third mission within academic departments would be interesting from a dynamic capabilities perspective.

This research has drawn attention to the importance of the development of and engagement with the external entrepreneurial ecosystem. Further, this research posits that the capability to engage successfully with the external entrepreneurial ecosystem can be considered a university asset which provides sustainable competitive advantage. As noted previously, the resource based view defines such assets in terms of being valuable, rare, inimitable, and non-substitutable (VRIN). I believe scholars engaged in strategic management research, and specifically dynamic capabilities theory research would be interested in further developing this idea.

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Appendix 2: the informed consent letter.

I.....agree to participate in *Noel O'Reilly's* research study.

The purpose and nature of the study has been explained to me in writing.

I am participating voluntarily.

I give permission for my interview with [*Noel O'Reilly*] to be tape-recorded.

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

I understand that I can withdraw permission to use the data within two weeks of the interview, in which case the material will be deleted.

I understand that anonymity will be used in the write-up for confidentiality.

I understand that written permission may be sought from me by the researcher for use of my quotations in publications. This is to ensure that I am satisfied that the correct interpretation of the interview data has been achieved. Upon my granting of permission, extracts from my interview may be quoted in the thesis and any subsequent publications.

