

The Commercialisation Process: From Universities to SMEs



Final Year Project
Team 11

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Commissioned and sponsored by:



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Glossary

LOAs – Licensing, Options and Assignments

TTOs – Technology Transfer Offices. Includes technology parks, incubators and University Technology Transfer Offices (UTTOs)

U-I – Used to refer to university-industry

VC – Venture Capital

Chapter 1

Introduction



Chapter Overview

The following chapter presents our sponsor, the managerial problem and the research questions. It also outlines the different objectives of our stakeholders and the research approach. Finally, a structure of the report is given.

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1. Introduction

1.1. Our Sponsor – Alternate Futures

Alternate Futures was established in October 2013 and is managed by Denise Goldsworthy. This start-up management consultancy firm acts as an intermediary between opposing sides of business, from board executives to research academics (Alternate Futures, 2015). The company's mission is to deliver solutions, which promote engagement and collaboration within and between organisations. More recently, Alternate Futures has focused on developing superior services in facilitating university-industry (U-I) partnerships; ensuring that cutting edge university inventions are diffused into society.

1.2. Real World Problem

In an increasingly global and competitive environment, innovation presents one of the most effective forms of establishing competitive advantage - both at industry and national levels. Our sponsor reiterated this trend in relation to Australia's current underperformance in innovation output compared to its peers. Specifically, they identified the lack of consistency around the best practices regarding university-industry collaboration as a key issue.

1.3. Global Importance

The aforementioned problem holds great importance on a global scale, as illustrated by the Dowling Review's call for evidence on university and industry collaboration (RAE, 2015). The report underlines the importance of successfully managing U-I partnerships to achieve optimal innovation outcomes (ibid, 2015). This demonstrates how this issue is not just



apparent in Australia, but in other developed economies as well. This is reinforced by other global publications, such as the NSW Business Chamber Report (NSW, 2014), which reiterates the role of U-I partnerships have in commercialising new ideas. Furthermore, research found that innovations generated within the university sphere are rarely diffused and thus is a major untapped driver of economic growth (Pertuzé et al., 2010). This highlights the need for a better understanding of the process due to its importance as a driver of innovation and therefore economic growth.

1.4. Stakeholder Objectives

Our main aim for the present study is to generate value for our key stakeholders through providing both academic and practical contributions. These different research objectives and the respective stakeholder groups are illustrated in figure 1.



Figure 1 - Stakeholder Objectives

1.5. Core Theory

As the topic of innovation has developed over time, so too have models representing the ideal commercialisation process. There has been a trend towards a dynamic approach to



innovation, recognising the various channels, both formal and informal, through which commercialisation can be achieved (Perkmann et al., 2013). Despite this progress, little attention has been dedicated to the role of SMEs when evaluating collaborative efforts between industry and universities (Lee et al., 2010; Hoffman et al., 1998). Furthermore, there is an apparent gap in the literature regarding the specific barriers and enablers to SME and university partnerships within certain geographical contexts (Perkmann et al., 2013; Hoffmann et al. 1998; Klosthen and Jones-Evans, 2000). The current real world problem falls within this gap, as there is a pressing need for more information regarding university and SME partnerships.

1.6. Research Objectives

As a highly experienced practitioner within the realm of innovation, our sponsor highlighted the complex nature of the innovation process and how it is conceptualised. The present models in innovation theory, although highly useful, do not adequately address the real-world problem. Thus, a strategic framework encompassing the complex relationships between key stakeholders is required. Such a framework would be of great managerial value to Alternate Futures, outlining actionable strategies they can suggest to clients. Thus, the below research question was formulated as the driver behind the study.

1.7. Research Question

“What measures can integral stakeholders take in order to improve commercialisation outcomes from university-SME partnerships?”



1.8. Research Methodology

In order to explore the phenomenon of university-SME partnerships and answer the above research question, a case study method and data triangulation is employed to provide a deep and insightful understanding of our research. Fifty semi-structured interviews paired with secondary analysis and replicated across two contexts, provided a rich understanding and actionable strategies for our sponsor and policy makers.

1.9. Project Overview

The initial plan was to conduct an in-depth study of barriers and enablers to university-SME partnerships in Australia. However, our sponsor requested we conduct cross-country comparison to a similarly economically developed country in order to add depth to our analysis. Therefore the UK was chosen due to its similar context, both culturally and economically. The structure of this case study approach is illustrated in Figure 2 below:



Figure 2 - Research Approach



1.10. Research Process

Figure 3 outlines the process applied in order to answer our research question:

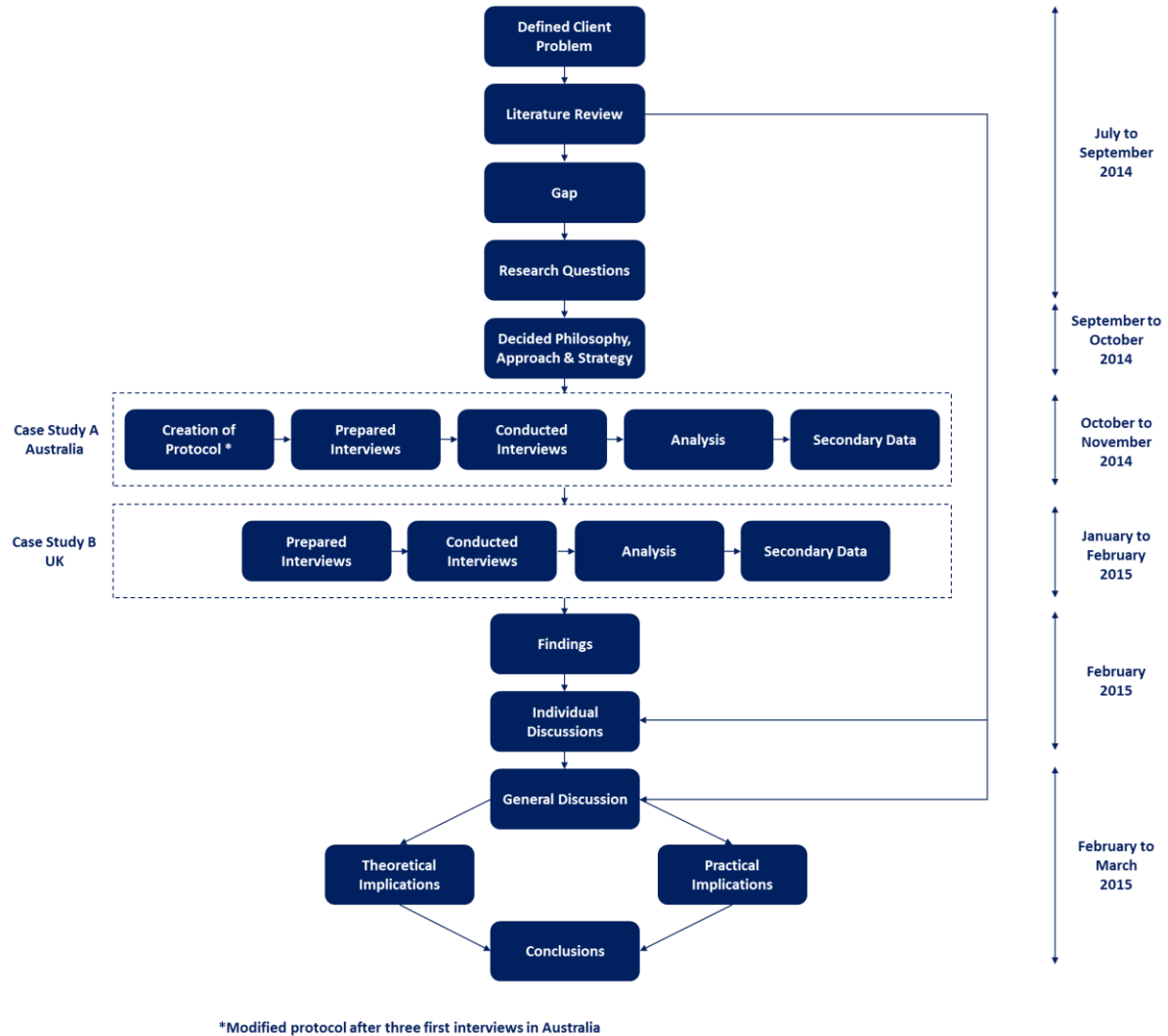


Figure 3 - Research Process



1.11. Key Findings

By following the rigorous methodology outlined in this report, a wide range of data was collected in Australia and the UK across all units of embedded analysis. Our subsequent analysis revealed the key barriers and enablers within the commercialisation process relevant to each individual case. Furthermore, paradox theory was employed to explore certain counter-intuitive findings. As a result of the analysis, separate frameworks were constructed pertaining to the context of each study. These were then aggregated into a general strategic framework, which illustrates the measures macro policy makers can take in order to mitigate potential barriers and improve commercialisation outcomes.



Chapter 2

Context



Chapter Overview

This section presents a background to innovation and its importance to society. It also highlights the importance of university-industry collaboration to innovation.

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2. Context

2.1. Innovation: The Driving Force of the Economy

Innovation has been characterised as an ‘engine of economic growth’ (Schumpeter, 1934). The rapid pace of technological change in today’s economic environment has led to major changes in the nature of competition. This has forced companies to re-assess their approach to innovation and new product development in order to keep up with the Apple, Uber and Google generation (Forbes, 2013). The rise of open innovation and increase in focus on collaboration, presents companies with a challenge as to how to manage the innovation process and its stakeholders effectively in order to reap the associated financial rewards.

2.2. Innovation and Alternate Futures

Managing collaboration and partnerships in order to generate successful innovation outcomes has become a key concern for firms and research institutions. To harness the social and financial benefits associated with innovation, stakeholders turn to consultants to provide insights on how best to manage the innovation process. In order to successfully market their services, consultants and experts are required to maintain a clear understanding of the innovation environments and its enablers and barriers.

Our sponsor, Alternate Futures, provides such consultancy services. One of their main objectives is to facilitate U-I partnerships; ensuring that cutting edge university inventions are diffused to the benefit of society. In order to strengthen their understanding of what measures affect the success of such partnerships, this study was commissioned.



2.3. Innovation: The Driving Force of the Changing World Economy

Innovation is rather complex to measure, which is why several different methods have arisen over the years, such as the Global Innovation Index (The Global Innovation Index, 2015). However, we take a simplified approach by looking at R&D spending and patent applications to gauge industry growth and size the market. Global R&D expenditures totalled an approximate \$753 billion worldwide in 2001, rising to \$1,051 billion in 2006 and to \$1,453 billion in 2011. This indicates how the rate of innovation is rapidly increasing, by almost 100.0% in a ten-year period. Currently, R&D spend is estimated to total 1,600 billion in 2014, where the weak economic climate appears to have dampened growth to 3.8% from 2013 (The World Bank, 2014).

Figure 4 shows R&D expenditure as a percentage of GDP across the globe. It clearly highlights in blue that Scandinavia, Japan and parts of the U.S. have the highest rates, followed by Europe and Australia.





Figure 4 – R&D Expenditure by Country 2010-2014

(Adapted from The World Bank, 2014)

Another metric commonly used to measure innovation development is patent filings. Since 2010 filings have been growing at an average annual growth rate of 8.3% over the past three years, reinforcing the view that the rate innovation is rapidly increasing indicating worldwide (WIPO, 2013).

2.4. Innovation Through Collaboration

Collaboration is becoming an increasingly important aspect of innovation policy, as evidenced by the aforementioned Dowling Review (RAE, 2015). Further, the NSW Business Chamber Report (2014) draws attention to the complementary resources these two parties can offer, underlining how collaborating is a more effective way of developing new ideas. The report's findings are summarised in the table below:





Figure 5 - Complementary Resources of Research and Industry

(Adapted from NSW Business Chamber Report, 2014)

The NSW Report (2014) further highlights how collaboration between industry and academics leads to improvements in productivity as well as an increase in national innovation output. Therefore, collaboration is seen as integral to the process of commercialisation, which is in line with the view of our sponsor.



2.5. Managerial Relevance of Study

In addition to extending the current innovation literature, our study holds relevance for Alternate Futures, university leadership as well as policy makers.

2.5.1. Relevance for Alternate Futures

This study will benefit Alternative Futures by systematically mapping the views of integral stakeholders in a strategic framework. The present study will allow Alternate Futures to:

- Better match their services and solutions to suit the needs of key stakeholders in university-SME partnerships
- Identify areas for potential service and solution development based on any unrealised stakeholder needs uncovered by the study
- Strengthen their understanding of the process and therefore be able to provide more accurate and specific advice to clients

2.5.2. Relevance for Policy Makers

This report also bears relevance to policy makers, as they directly influence the process. The present study will allow policy makers to:

- Highlight policies which may act as barriers to the process
- Further understand the impact that their policies have on the different stakeholders
- Receive feedback on which policies are perceived to enable the process



2.5.3. Relevance for Universities

As universities are a key stakeholder to the process, some aspects of the present study will bear relevance to them and allow them to:

- Re-assess whether the current environment and facilitation provided for commercialisation is congruent with stakeholder expectations
- Identify whether there is potential to improve commercialisation outcomes through the discovery of relevant enablers and barriers to the process
- Identify actionable strategies to improve the commercialisation process



Chapter 3

Literature Review



Chapter Overview

This chapter highlights the relevant literature and identifies a research gap. A conceptual framework explains the structure of the literature review and outlines how our research question was formed.

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3. Literature Review

3.1. Conceptual Framework

The conceptual framework (Figure 6) outlines the structure of our literature review, leading to the formation of a research question.

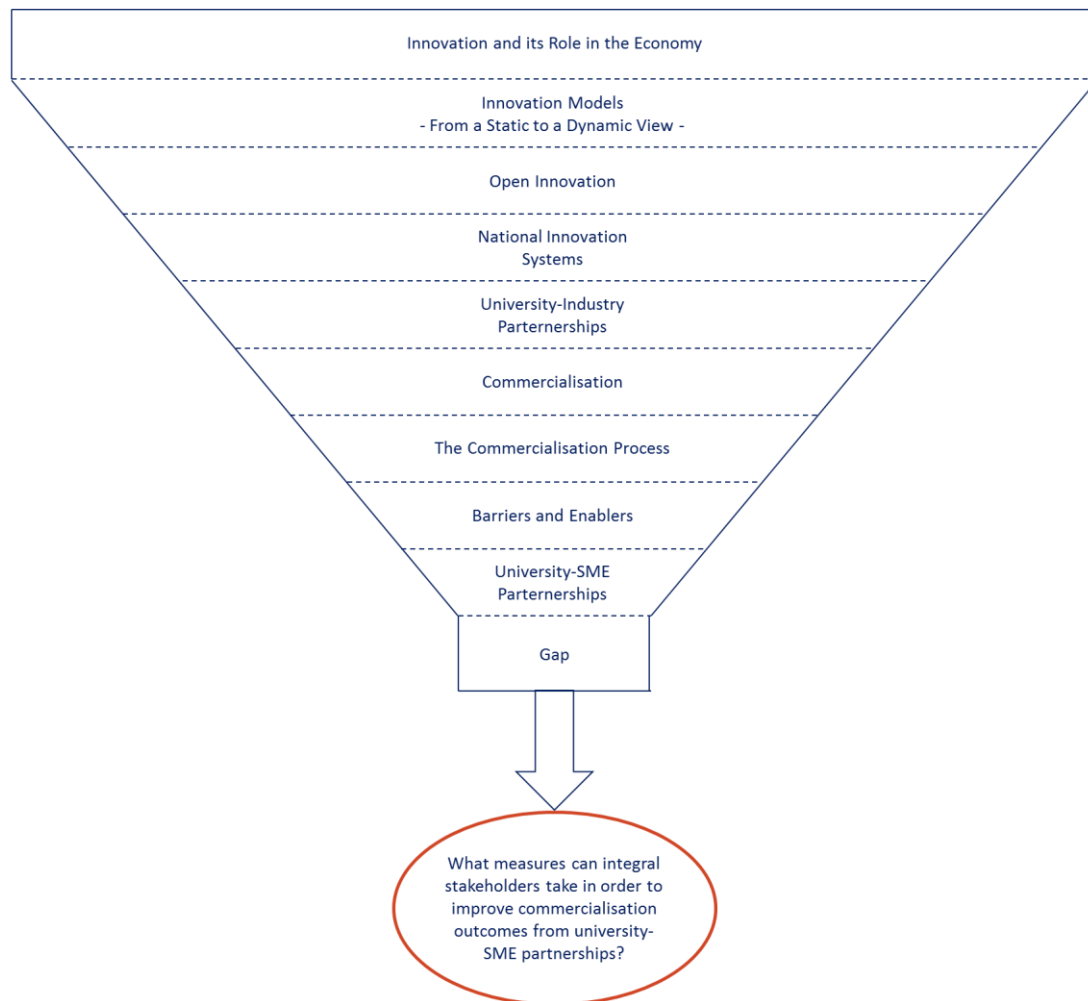


Figure 6 – Conceptual Framework



3.2. Defining Innovation

Schumpeter (1934) defined innovation as the development of new combinations of productive resources. In extant literature, innovation has been distinguished according to whether it is radical (disruptive) or incremental (Schumpeter, 1934; Christensen, 1997) in nature. The literature has mainly focused on the former, resulting in the view that innovation primarily occurs in high tech firms and R&D establishments (Fagerberg, Mowery and Nelson, 2006). Moreover, early literature focused mostly on tangible innovation in terms of either product or process in the manufacturing industry (ibid, 2006). Other types, such as organisational and service oriented innovation were ignored. Nonetheless, as the field of innovation has evolved, researchers have begun to break out of the narrow fences established by earlier generations (Martin, 2013). Current innovation literature focuses more on organisational innovation (Lam, 2004) as well as service innovation (Miles, 2004; Djellai 2010).

Furthermore, recent literature contends that the cumulative impact of incremental innovation is just as great, or even greater, than that of radical innovations (Fagerberg, Mowery and Nelson, 2006). The definition of innovation has also evolved concurrently, as illustrated by the study by Edison et al., (2013). After comprehensively analysing over forty divergent definitions of innovation, the paper proposed the following: "Innovation is: production or adoption, assimilation, and exploitation of a value-added novelty in economic and social spheres; renewal and enlargement of products, services, and markets; development of new methods of production; and establishment of new management systems. It is both a process and an outcome." (Edison et al., 2013 p.19). For the purposes of



the present study, this definition is applied as it provides the opportunity for investigating a broader view of innovation.

3.3. The Development of Literature

Since the emergence of the theoretical field of innovation in the 1960s, there have been several important contributions to the field. Illustrated in the below timeline (Figure 7) are some of the most significant contributions to innovation theory. These articles have been chosen on a basis of citations, impact and relevance to our study.

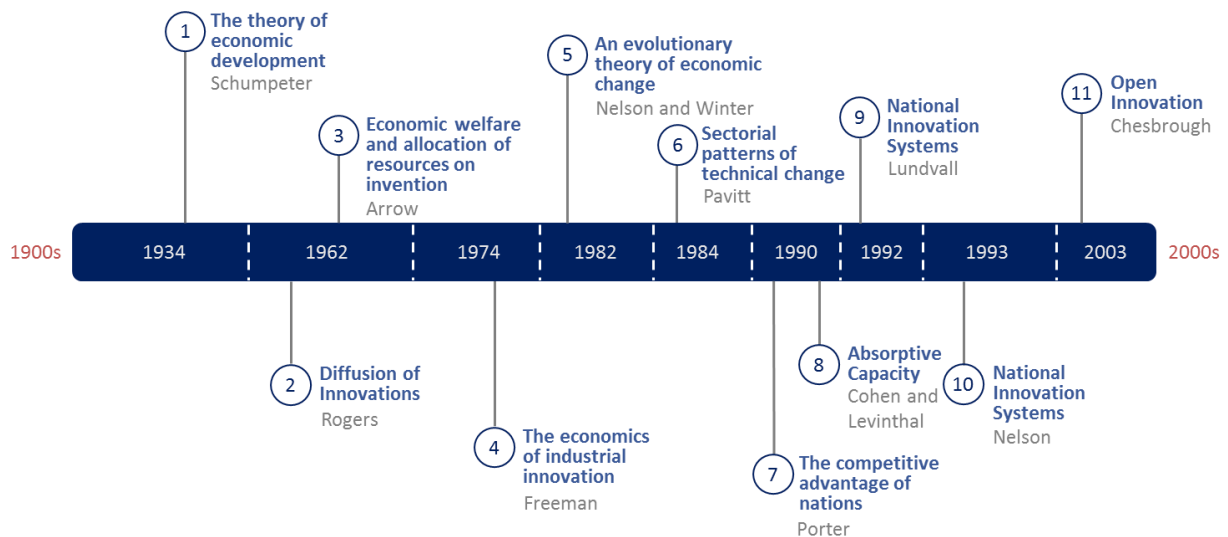


Figure 7 - The Core Literature on Innovation

We recognise the importance of these works and their significant impact on innovation studies. Thus, for the purposes of this project we have summarised the contributions of the above works in the below figure 8, as they will provide an important basis for and part of our further discussion.



- 1 Schumpeter's (1934) classic text "The Theory of Economic Development" portrayed innovation as a dynamic force that generates continuous transformation of economic, social, institutional structures (McCraw, 2007).
- 2 Rogers (1962) showed that technology diffusion in a social system follows an S-curve where change is slow at first, then peaks and slows down as a product reaches maturity. Rogers held that people adopt new innovations at different rates.
- 3 Arrow (1962) describes the economic problems facing invention, knowledge production being the main problem. Under-investment in invention is highlighted as a major issue in the modern economy, which occurs even under ideal conditions.
- 4 In 1974 Freeman published "The Economics of Industrial Innovation", which was the definitive innovation textbook for the next 30 years. The book clarified the role of innovation in modern society, emphasising the role of strategy and uncertainty.
- 5 Nelson and Winter (1982) produced a theory of how firm's innovation strategies and actions are shaped. Innovation becomes routine and embedded in organisational memory. Inspiration for the field of knowledge-based firms.
- 6 Pavitt's (1984) "Taxonomy" categorizes large, industrial firms along trajectories of technological change. The taxonomy aims to classify innovation modes according to various sectoral groups and the knowledge flow between them.
- 7 Porter's (1990) "Competitive Advantage of Nations" explains how a country's productivity depends on its innovative performance, which is shaped by interaction between demand, related industries, factor conditions competition.
- 8 Cohen and Levinthal (1990) argued the importance for firms to cultivate the capacity for absorbing outside knowledge, referred to as "absorptive capacity". Firms must recognise the value of new information, assimilate it and apply it commercially.
- 9 & 10 Lundvall (1992) and Nelson (1993) used the term "national system of innovation" to characterise the systemic interdependencies within a given country. The framework emphasises the need to study the interactions between the various factors that influence a country's innovation and growth performance.
- 11 In (2003) Chesbrough argued that a new innovation paradigm of "Open Innovation" is emerging. Firms should strategically leverage internal and external sources of ideas and takes them to market through multiple paths.

Figure 8 – The Core Literature on Innovation. Summary of Articles

3.4. Innovation and its Role in the Economy

A key question within the realm of industrial organisation is how markets and firms should organise themselves in order to produce optimal economic performance. The notion that technological progress or innovation facilitates economic growth was established long before economists became preoccupied with quantifying the impact of innovation (Ricardo; Mill; Marx, n.d.). Later, the significant contributions of innovation to economic growth have been recognised in the economic literature both theoretically (Solow, 1956; Romer, 1986) and empirically (Nadiri, 1993; Mansfield, 1972). Technological competition is a crucial driving



force in economic development (Schumpeter, 1934; Smith, 1776); the argument being that if a firm generates an important innovation, it will be amply rewarded by a high levels of profits (Schumpeter, 1934). Innovation introduces novelty into the economic sphere and if the novelty ceases, the economy will be stuck in a stationary state with low growth (Metcalf, 1998).

3.5. Innovation Theory - From a Static to a Dynamic View

Following the vast recognition of innovation as an engine of economic growth (Solow, 1956) and early work on the characterisation of innovation (Schumpeter, 1947; Usher, 1954), a debate emerged in the 1960s as to whether the direction and rate of technological change is more heavily influenced by changes in market demand or by advances in science (Nemet, 2009). Subsequently, in the 1970s-1980s, a debate arose as to whether the linear models of innovation were representative of the complex economic environment of the time (Nelson and Winter, 1982). This led to the emergence of non-linear, dynamic models of innovation. These developments illustrate the move from a static to a dynamic view of the innovation process in the literature, providing a vital theoretical basis for the present study.

3.5.1. The Static View of Innovation

Science Push:

From a neoclassical point of view, technology is a means of changing the factors of production (Chau and Tam, 2000). The direction and pace of innovation is determined by breakthroughs in the underlying scientific base (Schumpeter, 1934), where user needs hold a minor role in the process (Philips, 1966). The core of the science and technology push argument is that



advances in scientific understanding determine the direction and rate of innovation (Nemet, 2009). Figure 9 below illustrates the innovation process from a technology push perspective.



Figure 9 - “Technology Push Innovation Process”

Market Pull:

On the contrary, several studies in the 1960s maintained that market demand drives the rate and direction of innovation (Chau and Tam, 2000), where demand steers firms towards identifying solutions to particular problems (Rosenberg, 1969). Identification of latent demand (Schmookler, 1962; 1966), shifts in factor prices (Hicks, 1932) and new markets (Vernon, 1966) all affect the extent to which innovation investments are successful. Figure 10 below illustrates the innovation process from a market pull perspective.



Figure 10 - “Market Pull Innovation Process”

However, the above linear models of innovation have been doubted empirically (Nelson, 1981; Fagerberg, 1988; Amable and Boyer, 1995). The theories had “neither the breadth nor the strength to provide much guidance regarding the variables that are plausible to change” (Nelson and Winter, 1977 p.38). The model is dependent on innovation emerging from scientific research, which is flattering from a scientific perspective, but naive and simplistic in portraying the process in reality (Rosenberg, 1994). However, the role of both market need



and science in innovation still holds great significance to the innovation process (Chau and Tam, 2000). The latter is emphasised by the substantial recent attention attributed to the importance of research institutions (Mansfield, 1991; Rosenberg and Nelson, 1994; Markman et al., 2005; Perkmann et al., 2013).

3.5.2. The Dynamic View of Innovation

It has been proven that the innovation process is not one of static character, but one of “dynamic capabilities” (Katkalo et al., 2010 p.680). From the early 1970s to the mid-1980s, a number of empirical studies of the innovation process were published (Cooper, 1980; Langrish et al., 1972; Myers and Marquis, 1969; Rothwell et al., 1974; Rubenstein et al., 1976; Szakasits, 1974; Utterback, 1975). This meant that it was now possible to model the innovation process based on systematic studies of various cases, countries and sectors. Through an evolutionary economics lens (Nelson and Winter, 1982), non-linear models of the innovation process were developed. This perspective proclaimed that firms based their decision making on routines established over time, by reappraisals and modifications - an evolutionary process.

Based on the interactive effect between variables, the models involve feedback loops between the market, research institutions, invention and the various steps in the innovation process (Kline and Rosenberg, 1986). These models emphasised the unpredictable nature of the innovation process as well as its inherent uncertainties (Rosenberg, 1990). Further they stressed the dynamic impact of innovation clusters, instead of focusing on single innovations (Freeman, 1982; Storper, 1992). Within these approaches, the firm was viewed as an



organisation of learning embedded in an institutional context (Freeman and Lundvall, 1988). The focus on interactivity and knowledge among various actors gave rise to the notion of innovation systems (Lundvall, 1992; Nelson, 1993). This new paradigm drew attention to organisational and institutional developments and their role in facilitating innovation. The innovation process was thus seen as both path dependent (Arthur, 1994) as well as location specific (Porter, 1990).

Various concepts of ‘interactive’ innovation have been put forward to understand the non-linear, iterative and multi-agent character of innovation processes (Kline 1985; Freeman and Lundvall, 1988; von Hippel 1987). Some of the more famous models are the coupling model, which introduces feedback loops, as well as the integration model which introduces the concept of parallel development (Rothwell and Zegveld, 1985). However, current innovation theory is experiencing a shift towards a fifth generation innovation process, which is one of Systems Integration and Networking (SIN) (Rothwell, 1994). The model focuses on integration, flexibility, networking and parallel information processing (ibid, 1994). Firms aim to create strong, vertical inter-firm linkages, as well as external horizontal linkages. An example of the SIN innovation process is illustrated in figure 11 below:



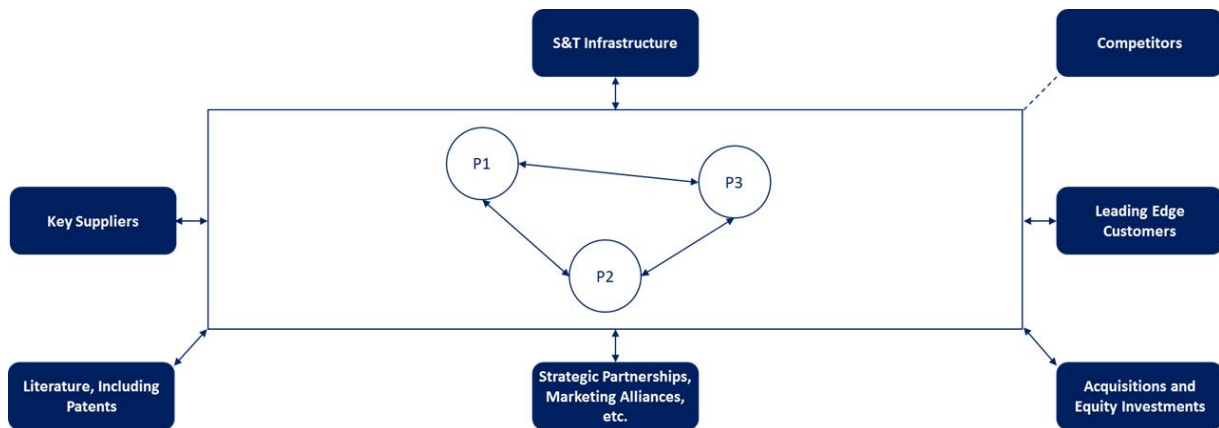


Figure 11 - "5th Generation SIN Model"

(Adapted from Rothwell, 1994)

In summary, innovation studies rests on the rejection of the neoclassical view and the linear model (Rosenberg, 1994). The evolutionary critique of the static view brought forth by Nelson and Winter (1982) resulted in wider literature, often empirical in character, studying the innovation process and its dynamics. Consequently, this resulted in a more dynamic view of the innovation process, one in which external partners, networking and collaboration lie at the core.

3.6. Open Innovation

Open innovation is defined as efficiently taking advantage of external knowledge that is developed outside company borders (Karkkainen et al, 2010). Open innovation started as a research interest field for scholars in technology and innovation management in the 1980s, due to the inability of companies such as Xerox and Lucent to appropriate value from its R&D facilities (Gassmann et al., 2010). Open innovation has been associated with a multitude of



advantages, such as direct cost benefits (Mowery, 1983), economies of scale (Henderson and Cockburn, 1996), increased expertise, new competencies (Powell et al. 2005) as well as increased innovative performance of firms (Laursen and Salter, 2005).

Despite the popularity of the topic, the benefits of open innovation remain ambiguous (Dahlander and Gann, 2010). Common issues such as the fear of disclosure due to opportunistic behaviour can lead to: market failure (Arrow, 1962), high costs of transferring technology (Gambardella, Giuri, & Luzzi, 2007; Dahlander and Gann, 2010) and a lack of collaboration (Lichtenthaler and Ernst, 2007). Moreover, another considerable limitation of the open innovation model is an increase in the risk of intellectual property spillovers, making it arduous to protect (Dahlander and Gann, 2010). The latter issue has been addressed through the notion of absorptive capacity (Cohen and Levinthal, 1990), however it has been deemed insufficient to entirely resolve the issue of intellectual property spillovers (Tsai, 2001).

Regardless of aforementioned limitations, the concept of open innovation has become a new paradigm both widely discussed and implemented (Gassman et al., 2010). Openness can be explored in various ways: outside-in (sourcing external knowledge), inside-out (bringing internal ideas to market) and the coupled process of co-creation (Gassmann et al., 2010). The outside-in process has received significant attention from both academia and industry, leaving the inside-out and coupled process under-researched (Chesbrough, 2003). These processes focus on open source project development (Von Hippel, 1987) and the concept of co-creation with external parties such as universities (Chesbrough et al., 2006). This provides



an interesting basis for further investigation in the present study. Furthermore, a greater understanding of the context in which open innovation is effective (Huizingh, 2011) and expanding the field to SMEs (Gassman et al., 2010) has been identified as areas for future research.

3.7. National Innovation Systems

Organisations are heavily influenced in their choice of technological strategies by the conditions of their home countries (Porter, 1990). The way in which a country devotes resources to innovative activities can differ greatly, thus Nelson (1993) developed the term “National Innovation System” (NIS) to characterise these systemic interdependencies. The innovation-systems framework emphasises the need to study the various factors that affect the innovation performance of a country (Freeman and Lundvall, 1988; Lundvall, 1992). A national innovation system is a key element in a knowledge based economy, as it creates linkages and nurtures the relationships between the three most important stakeholder groups; government, academia and industry (Chung, 2002). The way in which these actors work together for the development of new knowledge and innovative output constitutes the function of a national innovation system (ibid, 2002).

The relationship between governments, industry and universities has been categorised through the Triple Helix Model (Etzkowitz and Leydesdorff, 1999), attributing significant focus on the impact of institutional forces on innovation. The Triple Helix model describes a network of relationships between universities, industry and government within innovation system (Etzkowitz and Leydesdorff, 2000). There are three versions of the model; Triple Helix I (the



Government directs U-I relationships), Triple Helix II (reduces the role of the Government) and Triple Helix III (all three institutional spheres overlap, and are not controlled by the Government) (ibid, 2000). The Triple Helix III creates a more complex system of interdependencies, which creates an intricate puzzle for policymakers to solve. This model differs from NIS (Freeman and Lundvall, 1988), which considers industry to have the leading role in innovation.

In the next section, the three identified groups of government, universities and industry (Chung, 2002) will be discussed further in the context of university-industry partnerships.

3.7.1. Role of Industry in Innovation

Firms are widely recognised as a source of innovation and economic development in society (Schumpeter, 1934; Nelson and Winter, 1982), and the importance of corporate R&D on innovation is well-established (Schumpeter, 1934). As previously identified, firms traditionally paid little attention to absorbing external knowledge for economic benefit, relying predominantly on in-house R&D (Santoro and Bierly, 2006). As firms today operate in a competitive marketplace, characterised by growing complexities and rapid technological change, they have discovered the benefits of cooperating with external parties to share the increasing risk of innovation (Becker and Dietz, 2004). During the last decade, firms have also downsized their costly R&D centres focusing more on applied research and innovation via external network relationships (Santoro and Bierly, 2006; Perkmann and Walsh, 2007). Universities have become popular external partners for firms due to the associated social and economic benefits (Cohen et al. 2002; Perkmann and Walsh, 2007). Furthermore, beneficial



government policies (tax relief and co-funding) have encouraged industry involvement with universities (Greenaway and Haynes, 2000; Cohen et al., 1998).

3.7.2. Role of Universities in Innovation

Historically, universities were mainly considered as institutions where knowledge is created through research and teaching, benefitting both society and economic growth (Mansfield, 1991; Rosenberg and Nelson, 1994). The main task of universities is to educate the population and generate new knowledge through publications (Perkmann et al., 2011). Thus their role in value creation and innovation has become an important national policy issue (Markman et al., 2005). Due to a decline in government funding, universities have become increasingly dependent on funding from the private sector (Beise and Stahl, 1999; Santoro and Bierly 2006). As a result, this has encouraged universities to develop a 'third mission' to cooperate with third parties and participate in transferring knowledge from research to industry applications (Etzkowitz et al., 2000).

3.7.3. Role of the Government in Innovation

As the main sponsor of university research, the government attributes great importance to ensuring that public funds are converted into tangible social and economic benefits (Markman et al., 2005). Governments perceive universities to be a great source of future innovation and duly invest in programmes to support research and commercial collaboration between universities and firms (Markman et al., 2008). In terms of U-I partnerships, an important policy change is the Bayh Dole act (1980), which granted universities the right to file for patents and grant licences from publically funded research (Colyvas et al., 2002).



Similarly in Europe, there was an abandonment of the “professors’ privilege”, moving away from inventors’ ownership of intellectual property towards a system of institutional ownership (Geuna and Rossi, 2011 p.1068). These policy changes increased the focus on commercialisation of university research (Siegel et al., 2003), which illustrates the impact of Government policies in incentivising research collaboration (Perkmann and Walsh, 2007; Mowery, 1998). Moreover, Government policies such as tax incentives, funding programmes and technology parks further incentivise the partnership between universities and industry (Etzkowitz et al., 2000). Thus, the Government holds great importance to university-industry partnerships, they provide an interesting basis for further investigation in the present study.

In addition to the above parties identified through the theory of National Innovation Systems, literature has identified further stakeholders that are vital to U-I partnerships, such as TTOs, incubators and science and technology parks.

3.7.4. Role of UTTOs

Governments assign high priority to fostering effective science-industry links (Debackere and Veugelers, 2005). Further, in a difficult financial environment, several universities are seeking ways to effectively manage and turn profits from scientific discoveries (Markman et al., 2005). University Technology Transfer Offices (UTTOs) are set up and funded by universities to function as a technology intermediary that ensures successful transmission of innovations from universities to industry (Markman et al., 2005). UTTOs’ main responsibilities are IP transfer, disclosing inventions and making strong connections with industry and academics in order to minimise knowledge asymmetries (Santoro and Chakrabarti, 2002; Debackere and



Veugelers, 2005). However, some UTTOs lack the skills to interact and motivate researchers to disclose their research and become an effective link (Jensen et al., 2003). Research highlights that the inefficiency of UTTOs is a product of limited support in both funding and supportive infrastructure for commercialisation from university leadership (Ankrah et al., 2013). Although the UTTO holds an important mediating role in university and industry partnerships, there are few studies investigating their role as an enabler, providing an interesting area for further investigation.

3.7.5. Role of Incubators and Science Technology Parks

In addition to UTTOs, most universities have established technology parks and incubators to encourage university owned spin-off companies (Link and Scott, 2003). This is reinforced by the fact that 62.0% of universities spend significant resources on building business incubators, as they are seen as an 'accelerator' of commercialisation efforts (Markmann et al., 2005). The emergence of science parks and incubators has initiated an academic debate as to whether these initiatives actually enhance innovative capabilities and economic performance of parties involved (Link and Scott, 2003). Little research has been conducted in relation to the commercialisation contributions of incubators and technology parks (Phan et al., 2005).

3.8. University-Industry Partnerships

U-I collaboration has received much attention from policy makers and academia due to the belief that collaboration between the two parties can become a powerful source of innovation (Ambos et al., 2008; Mansfield, 1998). As previously mentioned, industry provides universities with funding whilst universities allow companies to tap into state-of the art



research (Cyert and Goodman, 1997; Bayona Saez et al., 2002). The literature proclaims several ways in which these partnerships can be successful, particularly in the field of pharmaceuticals and engineering (Perkmann et al., 2013). For example, GlaxoSmithKline and Rolls Royce have established university technology centres and open research collaboration to generate exclusive access to novel research (Kleyn et al., 2006; Garnier, 2008; Perkmann et al., 2011). Furthermore, U-I partnerships have contributed towards improving industrial innovation in multiple industries (Mowery et al., 2001).

Firms perceive U-I partnerships as highly beneficial due to the access to emerging technological knowledge (George et al., 2000). Further, this generates technological spillovers (D'Este and Patel, 2007) and improves problem solving capabilities (D'Este and Perkmann, 2011). Universities obtain access to additional industry funding and potential licensing revenue (Lee, 2000; D'Este and Perkmann, 2011).

Although there are many successful cases of U-I partnerships, they are often difficult to achieve, time consuming and strenuous to implement (Agrawal, 2005). Thus, the magnitude of impact and the degree of knowledge transfer from university to industry remains difficult to estimate (ibid, 2005).

3.9. Commercialisation

A specific type of U-I partnerships focus on joint commercialisation of university generated research. The term commercialisation refers to cases where research from a university is exploited with the objective of reaping financial or social reward (Perkmann et al., 2013). The



topic of commercialisation has received a lot of attention both from academia and policy makers due to its socio-economic benefits (Perkmann et al, 2013; Rothaermel et al., 2007). There are multiple channels of commercialisation, which are divided into formal and informal commercialisation, both of which are important aspects to the commercialisation process (Perkmann et al., 2013).

3.9.1. Formal Commercialisation

The commercialisation of academic knowledge comes in many forms, where the most common, formal way is the patenting and licensing of university inventions to industry (Jensen and Thursby, 2001). Patenting and licensing are the most widely used commercialisation methods for research. These generate royalties which have increased manifold in recent years (Mowery and Shane, 2002). However, it is contended that the focus on patented research is not representative of the majority of technology transfers from university to industry (Agrawal and Henderson, 2001). Consequently, this misrepresents the actual impact university research has on industry. Additionally, recent literature has highlighted the increase in the engagement in academic entrepreneurship (Shane, 2004). This involves universities exploiting existing patents or unpatented knowledge to thereafter create spin-out companies (ibid, 2004). Thus, universities are moving away from their sole focus of basic research and teaching, towards becoming economic actors (Etzkowitz, 2003).

3.9.2. Informal Commercialisation

There are several other informal channels through which university research is transferred. These channels are not directly focused on financial profits and are also referred to as



academic engagement (Perkmann et al., 2013). These include collaborative research, consulting, networking and the transfer of knowledge from professors mentoring students to scientific publications (Link et al., 2007). Academics frequently engage with industry through informal channels, which can lead to ideas becoming commercially viable without intent. This highlights academic engagement as an important input factor to commercialisation (Perkmann et al., 2013). Therefore, scholars argue that the excessive focus on patented research is not representative of the majority of technology transferred from university to industry and consequently misrepresents the real impact university research has on industry (Agrawal and Henderson, 2001).

The variety of commercialisation channels adds to our study as it consolidates our presumption that there are several barriers to the commercialisation process. Thus, it will be beneficial to explore the barriers and enablers of the commercialisation process from a process view as it will provide important information on policy interventions, re-design and support mechanisms for future improvement (Szulanski, 2000).

3.9.3. The Process of University-Industry Commercialisation

Several scholars have attempted to explain the step-by-step procedure of the technology transfer process from universities to industry. The process commences with academic faculty conducting research, often without commercial intent in mind (Thursby and Kemp, 2002). If the research is deemed commercially viable by the researcher, it is confidentially disclosed to the UTTO, which evaluates the innovation for its commercial potential (Siegel et al., 2003). If the innovation is considered to have merit, the UTTO applies for a patent and proceeds to



contact private sector firms that may be interested in licensing the technology. If the innovation is licenced successfully to industry, universities receive royalty fees or seek additional funding from firms for further research development (Thursby and Kemp, 2002).

Based on the above sections, it is recognised that there are a variety of other paths in which university knowledge can be commercialised. However, to provide clarity on the process and relevant steps, a visual representation of Thursby and Kemp's (2002) description of the process is provided below.

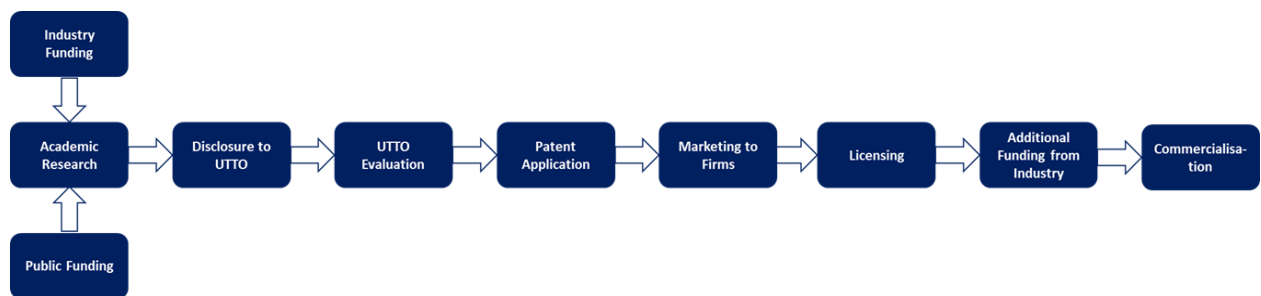


Figure 12 - Commercialisation Process

(Adapted from Thursby and Kemp, 2002)

Interestingly, there are a lot of issues inherent to the above process, as most commercialisation efforts are unsuccessful. It is estimated that only about 14.0% of ideas that enter the new product development process are successfully commercialised (Liberatone and Stylianou, 1995). Research suggests that university research rarely directly translates into new products or services (Tidd et al., 2001; Laursen and Salter, 2004), which provides an interesting basis for further investigation.



3.10. Barriers and Enablers to University-Industry Partnerships

Due to the significant economic impact of U-I links (Salter and Martin, 2001; Mansfield, 1991; Beise and Stahl, 1999), increased attention has been directed towards identifying the barriers and enablers to the process (Perkmann and Walsh, 2007; Siegel et al., 2003; Bruneel et al., 2010). The following sections will outline the relevant barriers and enablers identified within the literature. Relatively few studies have investigated the nature of the barriers to U-I commercialisation partnerships and the factors that might mitigate their impact (Bruneel et al., 2010). Given the importance attributed to supporting U-I links by policy makers, the lack of research on this topic hinders the design of effective policy and presents a gap in current literature.

3.10.1. Barriers

There are two main types of barriers to U-I partnerships: orientation and transaction-related barriers (Bruneel et al., 2010). Orientation related barriers highlight the difference in objectives between universities and industry, whilst transaction-related barriers refer to the challenges faced in the transactions between universities and industry (ibid, 2010).

Orientation Related Barriers:

Difference in Institutional Norms:

A core barrier can be found in the difference in institutional norms between universities and industry (Partha and David, 1994). University norms are universally concerned with producing economically useful knowledge to benefit society. Consequently this has resulted in a strong focus publishing academic journals as it is critical to universities' reputation and future



Government funding (Geuna et al. 2003; Siegel et al. 2003). In contrast, industry's primary motivation is obtaining and disclosing new knowledge to obtain competitive advantage in the marketplace and in turn reap abnormal profits (Partha and David 1994; Chesbrough et al., 2006). Thus, this difference in attitudes and fundamental values can create conflicts in the partnership, which has also been defined as the notion of cognitive distance (Nooteboom, 2000).

Culture:

Several scholars have identified cultural clashes between industry and universities as a significant barrier for successful commercialisation (Siegel et al., 2003; Meyer-Krahmer and Schmoch, 1998). Culture is an especially important barrier to address in terms of researchers, as their attitudes towards commercialisation is heavily influenced by university culture and policies (D'Este and Patel, 2007).

Choice of Research Topics:

Academics tend to choose research topics that are considered by peers to be ground breaking, whereas firms want to obtain research that is commercially applicable (Nelson, 2004). This can result in lack of engagement from both sides (ibid, 2004).

Time to Market:

The aspect of "time to market" has been highlighted as a barrier, as firms rely on first mover advantages, which does not match the more bureaucratic and slow-paced ways of universities (Siegel et al., 2003; Siegel et al., 2007).



Research Disclosure:

Firms prefer to keep research confidential, also referred to as 'sticky knowledge' to sustain competitive advantage. Conversely, academics prefer to generate 'leaky' knowledge that they can publish immediately to gain recognition (ibid, 2010 p.859).

Incentive Schemes and Reward Structures for Academics:

Providing appropriate incentive structures and rewards schemes for academics to engage in commercialisation activities is identified as critical to encourage commercial activity (Debackere and Veugelers, 2005). Recent studies have revealed that academics perceive university structures to be unsupportive of involvement in commercial activities (Link et al., 2007; Feldman and Desrochers, 2003). Thus, encouraging academics to view their research from a dual perspective, both in terms of publishable and entrepreneurial activities is highly important (Etzkowitz, 1998).

Transaction-Related Barriers:

Intellectual Property:

The majority of U-I collaboration has been researched in terms of the transfer of Intellectual Property (IP) (Thursby and Kemp, 2002). Universities have increasingly become economic actors motivated to capture proprietary control and ownership over academic research that has commercial potential (Siegel et al., 2003; Shane, 2004). Similarly, firms who seek to commercialise university technology wish to obtain IP rights, to ensure return on investment (Siegel et al., 1999). Thus, there is basis for conflict in the negotiation of IP, as all parties are



seeking majority ownership. Inefficient management of IP has further been found to significantly reduce the likelihood of commercialisation (Shane, 2002).

3.10.2. Enablers

In order to mitigate the aforementioned barriers, it is key to investigate enabling factors to successful U-I partnerships.

Orientation Related Enablers:

Relationships and Social Connectedness:

In the context of open innovation, relationships between university and industry drive the innovation process and correlate with increased innovative output (Perkmann and Walsh, 2007). Further, strong relationships are a key facilitator of technology transfer, as close interactions at the individual level can facilitate the flow of knowledge (Santoro and Bierly, 2006). Both large and small firms seek a more involved relationship with the academic scientists the work with (Etzkowitz, 1998).

Management of University-Industry Collaboration:

The management of U-I collaboration is an important area for future research (Perkmann and Walsh, 2007). Identifying sustainable organisational and managerial policies as a facilitator to effective U-I partnerships has been emphasised as critical (Siegel et al., 2003). UTTOs are also identified as an important enabler of U-I relationships (Muscio, 2010). Scholars suggest that having UTTO staff with experience in both management, academia and marketing will improve UTTO effectiveness (Siegel et al., 2004).



University Collaboration Experience:

Firms with previous experience engaging with the university sector have been identified as a main enabler for successful collaboration, as it facilitates the establishment of common attitudes and values (Bruneel et al., 2010). Thus, having a recurring and diverse partnership that both sides invest in, can help lower barriers. Furthermore, collaboration experience can help overcome transaction-related barriers.

Trust:

Trust is an important enabler to creating sustainable U-I links, especially as it involves the sharing of sensitive information (Santoro and Saporito, 2003). The conditions of U-I partnerships involve a high degree of uncertainty as the process involves unfamiliar external parties. As a result, there is an inherent risk opportunistic behaviour (Williamson, 1993). Thus, high levels of trust can help reduce the fears of opportunistic behaviour as it stimulates open sharing of knowledge and conflict resolution (Bradbach and Eccles, 1989; Dodgson, 1993). Trust can also enable free and uninhibited communication and control in vulnerable situations (Kale et al., 2000 cited in Santoro and Bierly, 2006).

Absorptive Capacity:

The absorptive capability of firms, and their ability to detect and apply science from universities to commercial ends (Cohen and Levinthal, 1990), is a major enabler for U-I commercialisation (Laursen and Salter, 2004). Furthermore, absorptive capacity is largely dependent on individuals within the firm who act as links with external partners. Thus,



reaching out to these individuals is an important enabler for U-I collaboration (Cohen and Levinthal, 1990).

Transaction-Related Enablers:

Funding:

Unsurprisingly, financial resources are identified as an important enabler to U-I partnerships (Thursby and Thursby, 2002) both to invention, development and market introduction (Siegel et al., 2003). The relationship between industry funding and increased commercialisation activity has been confirmed in existing literature (O'Shea et al., 2005; Gulbrandsen and Smeby, 2005). Furthermore, a sophisticated venture capital infrastructure enables commercialisation by increasing fund accessibility (Debackere and Veugelers, 2005; Florida and Kenney, 1988).

Effective IP Policies:

The effectiveness of university administration to review and establish IP policies facilitate technology transfer relationships with industry. This is a crucial facilitator to reduce the transaction-related barriers (Santoro and Bierly, 2006). The importance of innovators being actively involved in the transfer process has been identified as an important enabler (Goldfarb and Henrekson, 2002).

Universities Changing their Institutional Structures:

The view academics hold in terms of commercialisation is heavily dependent on the extent to which individual university structures seek to foster links between universities and industry



(Debackere and Veugelers, 2005). Thus, changing or adapting university structures to be more open to pursuing commercialisation in tandem with basic research, would help encourage higher levels of collaboration (Etzkowitz, 1998).

Transparency in the Process:

A factor that has received less attention in the literature is the need for a transparent infrastructure for U-I partnerships to work efficiently (Jacob et al., 2003). To enable commercialisation efforts, it is vital to ensure that academics and firms understand how the system works within universities. Furthermore, ensuring transparency regarding the assignment of IP rights is essential to the partnership, as it can help overcome the transaction-related barriers (Debackere and Veugelers, 2005).

Within the literature surrounding enablers, there is a general consensus that areas such as relational involvement (Perkmann and Walsh, 2007; Scharinger et al., 2002) and management of collaboration (Siegel et al., 2003; Muscio, 2010) are under-researched. Furthermore, it is suggested that future research should address whether university experience with collaboration impacts the success of future collaboration (Bruneel et al., 2010). Moreover, gaining views on the role of trust in this process from various stakeholder perspectives has also been called for (Santoro and Saporito, 2002).

3.11. Literature Conclusions

This section has provided a comprehensive review of the existing literature, investigating its development from a static view to a more dynamic view - focusing on collaboration between



universities and industry. Although the literature has begun to explore commercialisation with regards to university and industry relationships, little has been done with regards to SMEs (Lee et al., 2010; Hoffman et al., 1998). SMEs constitute a large percentage of total firms in most countries and contribute to economic growth, thereby constituting a vital part of Government policy (Robson and Bennett, 2000). This means that an increasingly important component of national innovation policy has not been paid due attention (ibid, 2000). In addition, there is a notable lack of information within geographical contexts, outside the US and Europe (Perkmann et al., 2013; Rothaermel, 2007).

Since this broad gap is considered beyond scope, a narrower gap was identified which focuses on the specific barriers and enablers inherent to university-SME commercial partnerships (Hoffmann et al. 1998; Beise and Stahl, 1999) in a cross-national context (Klofsten and Jones-Evans, 2000, Decter et al, 2007). Moreover, the literature has called for research focusing on specific stakeholders within the process (Nooteboom, 2009; Muscio, 2010). Based on the above, the present project aims to investigate university-SME commercial partnerships, comparing the contexts of Australia and the UK, seeking various stakeholder perspectives. This gap was chosen as it coincides well with the needs of our sponsor.

Further, it is important to acknowledge the contribution of Collier and Gray (2011), who conducted a case study to explore the barriers and enablers to university-SME partnerships in the electronics industry in Brisbane, Australia. Although their research is similar to the present study both methodologically and thematically, we are extending this study to multiple cases and industries, as well as focusing on a variety of stakeholders providing a



broader perspective. Further, the aim is to create a holistic framework through our study in order to answer the research question.

3.12. Research Question

“What measures can integral stakeholders take in order to improve commercialisation outcomes from university-SME partnerships?”

3.13. Paradox Theory

Paradox theory recognises that organisational tensions are integral to complex systems and that sustainability relies on balancing contradictory demands simultaneously (Lewis, 2000). Here, paradox is defined as “contradictory yet interrelated elements that exist simultaneously and persist over time” (Lewis, 2000 p.760). It is a technique often used by researchers to describe conflicting demands and opposing views (Sundaramurthy and Lewis, 2003). The aforementioned tensions have been summarised into three interrelated types by literature: self-referential loops, mixed messages and system contradictions (Putnam, 1986).

Paradox theory has become an increasingly popular method of evaluation within studies, as shown in recent ambidexterity research which illustrated that organisational success relies on the ability to simultaneously manage contrasting exploration and exploitation strategies. This notion is reinforced as several other studies confirm this finding (Gibson and Birkinshaw, 2004; O’Reilly and Tushman, 2008; Raisch and Birkinshaw, 2008). As the topic has received more attention by scholars, there has been a focus on furthering our understanding of



paradox theory in the form of a conceptual framework. This led to the development of a dynamic equilibrium model, which proposes constant management of paradoxes in the short-term enables long-term success (Smith and Lewis, 2011).



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Chapter 4

Methodology



Chapter Overview

This chapter will provide an outline of the choice of research philosophy, approach and methodology for the present study. The methodology section will demonstrate the justification of how we designed, collected and interpreted the data based on the research question.

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4. Methodology

4.1. Introduction

In this chapter, the first step will be to assess the philosophical approach undertaken by understanding several different paradigms and philosophical choices. Second, a decision will be made in terms of selecting a research approach that suits the project and is interlinked with the philosophical approach. Thereafter, research methods will be evaluated and justifications provided in order to comprehend the reasons guiding the methodology chosen to answer the research question. Lastly, the chapter will address data collection and validity of the results.

Figure 13 was developed to illustrate the options available in terms of methodology and ultimately show, via the green boxes, the approach chosen. The further sections will justify and explain these choices.

Research Philosophy	Research Approach	Research Method	Research Strategy	Case Study Design	Data Collection Method
Positivism	Deductive	Quantitative	Survey	Single Case	Focus Groups
Pragmatic Worldview	Abductive	Qualitative	Case Study	Multiple Case	Semi-structured Interviews
Critical Realism	Inductive		Experiment		Survey
Interpretivism			Grounded Theory		

Figure 13 – Methodology Approach Chosen

(Adapted from Saunders et al., 2012; Bryman et al., 2012; Denzin and Lincoln, 1998)



4.2. Paradigm Plurality in Management Research

A research paradigm can provide a framework to help structure a lens through which to view the world and provides relevance to the research process (McKenzie and House, 1978). There are three major interrelated concepts within the paradigm; *ontology* which is our assumptions of how the world works, *epistemology* which is what we as researchers view as acceptable knowledge and *axiology*, which is the role that our values as researchers play in affecting the choices we make (Saunders et al., 2012). As management researchers, it is important to argue and reflect upon the chosen philosophical choice and defend it in relation to the other approaches. It is important to be certain of the philosophy that best suits the research question (Guba and Lincoln, 1994).

4.3. Research Philosophy

The term research philosophy is related to the development and nature of how new knowledge is acquired (Saunders et al., 2012). Due to the nature of the research question, a pragmatic worldview is the most suitable philosophy to undertake. It enables the study to recognise several perspectives of “truth” and use both theory and practice, whilst taking a learning role to obtain a holistic picture of the research (Saunders et al., 2012). Furthermore, a pragmatic worldview provides an allowance for things that are subject to change, thus there are no ultimate truths when collecting knowledge in social sciences (Dewey, 1929). Finally, as researchers we would be able to acknowledge commitment to the topic in the study, and importance when collecting and analysing data (Ryan, 2006). Although interpretivism would be a suitable philosophy as well, the area is not novel enough to generate new theories. Due to our inexperience as researchers some extent of grounding in theory was optimal (Saunders



et al., 2012). Finally, critical realism was considered, as it is a popular philosophy to undertake in case study research. However, the performative and detailed nature of a pragmatic philosophy is deemed more suitable for our study (Easton, 2010).

4.4. Research Approach

The choice of research approach is important as it demonstrates the degree to which you use theory in your research (Saunders et al. 2012). By taking a pragmatic worldview our role as researchers is important to the study, thus a basic theoretical understanding is deemed more appropriate than starting data collection with a blank sheet (Bryman, 2012). Furthermore, due to the challenge of intertwining both empirical and observable knowledge of the various activities in the research process, an abductive approach was adopted (Dubois and Gadde, 2002). This abductive approach allowed us to revisit theory when new insights emerged and modify our original framework during the process (ibid, 2002).

4.5. Research Method

A qualitative method was chosen as it allows asking “how” and “why” questions to gain interesting in-depth answers from interviewees (Silverman, 2010 p.11) and offer multiple insights to help understand the topic better (Perkmann and Walsh, 2007). Several studies of the topic have been focused on the use of large scale surveys (Bruneel et al. 2010; Abramson et al., 1997; Cohen et al., 1994). However, relying purely on quantitative results does not account for social relationships and motivations, making it impossible to derive any conclusions to the relative importance of the findings (Perkmann and Walsh, 2007; Bruneel et al., 2010). Furthermore, as pragmatists the use of mixed methods was contemplated.



However, for pragmatists, the most essential driver for choice of method is the nature, context and consequences of your research, not merely what is most frequently used (Nastasi et al., 2010).

Thus, our aim was to perform a rigorous and in-depth qualitative study, instead of attempting to do everything at once. Still, considering the issues with researcher subjectivity and data validity related to qualitative methods (Caloghirou et al., 2001), the data is viewed cumulatively through data triangulation using multiple sources (semi-structured interviews and secondary data) to increase the validity of our study (Silverman, 2010; Dubois and Gibbert, 2010). Data triangulation is particularly useful as it allows for several levels of analysis as opposed to a pure qualitative study (Barnes and Vidgen, 2006).

4.6. Research Strategy

Having a clear research strategy is important as it illustrates researchers' action plans to answer the research question (Saunders et al., 2012). The chosen methodology was to conduct case study research. To justify this decision, it is helpful to consider the purpose of the research and the nature of the research question (Marshall and Rossman 1989). There are several methodological approaches to case research, both in terms of generating, testing and elaborating on theory (Ketokivi and Choi, 2014). The purpose of this research is in line with theory elaboration, seeking to elaborate on theory not testing or creating it (ibid, 2014). Thus, the nature of our research question is exploratory as we seek to expand upon the measures integral stakeholders can take in order to improve commercialisation outcomes from university-SME partnerships. This theory elaborating approach to case studies fits the



chosen philosophy and approach. Further it enables serendipity and openness to new findings (Alvesson and Kärreman, 2007), as well as captures complexities and dynamics of the stakeholders involved cited in (Ketokivi and Choi, 2014).

4.7. Case Study

Yin (2014) defines a case study to be the empirical investigation of a contemporary phenomenon within a real-world context, relying on multiple sources of evidence (p.16). Although the approach is argued to be situation-specific and findings being unstable over time (Dubois and Gadde, 2002), the method has gained more recognition in recent years and has been applied extensively in a range of subject areas (Yin, 2014). In the area of (managing) innovation processes, scholars such as Freeman and Harrison (1999) stated that case studies make the best methodological tool to directly examine the innovation process. It is the most viable choice if you want a rich understanding of a particular context or process (Eisenhardt, 1989), and is particularly effective when investigating open innovation practices (Huizingh, 2011). However, (Yin, 2014 p.2) argues that although case studies are considered as “soft” research, they are exceptionally hard to conduct. There are many challenges in the design, data collection and analysis of case studies such as defining the case and unit of analysis as well as setting the limitations for your case. Currently there exists no exact recipe to ensure a methodologically sound case study, thus we will follow the systematic approach provided by (Yin, 2014) to improve the rigour of the case study process.



4.8. Case Study Design

The following sub-sections explore the case design, the case selection and the unit of analysis.

4.8.1. Multiple Case Design

This study undertakes a multiple case study within two contexts (Australia and the UK), with four stakeholder groups as the units of embedded analysis (Figure 14).

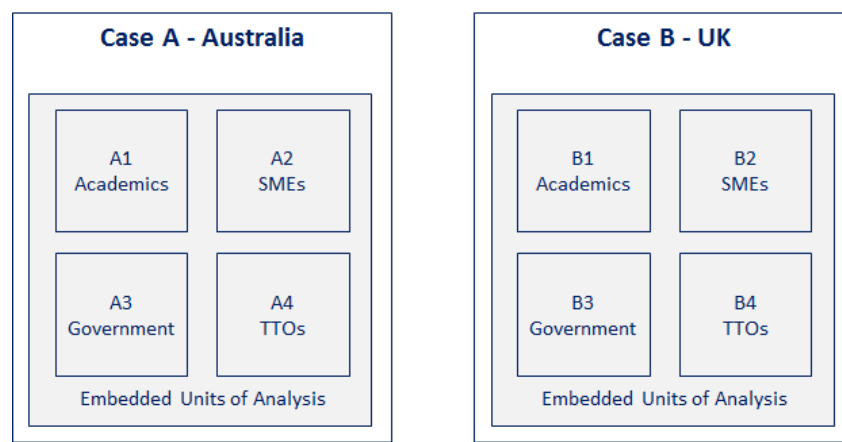


Figure 14 – Multiple Case Study

(Adapted from Yin, 2014)

Multiple case studies were chosen due to ability of literal replication, which would reap analytical benefits as comparing conclusions from each case in the final discussion. This will decrease the vulnerability and scepticism involved in doing a single case (Yin, 2014). Moreover, multiple case study research is particularly linked to exploration and discovery, which is concurrent with the purpose of our research (Patton, 1990). Embedded units of analysis were also found relevant, which means that in addition to the case, attention is also given to sub-units of the case (Yin, 2014). Considering the university-SME relationship involves



several stakeholder groups with a variety of opinions, embedded units of analysis would help focus the study and enable a more fine-grained analysis of findings (Yin, 2014).

4.8.2. Case Selection

Considering the application of multiple case study research, it is important to assess the selection of cases for our study (Yin, 2014). In case studies a replication logic is applied as opposed to sampling logic, which is traditionally used in survey research (Eisenhardt, 1989). Thus, we seek to select cases on the basis of their prospective theoretical and practical contribution to the study, and not measure the phenomena as a probability sample of a wider population (Yin, 2014). In our research question we address what measures integral stakeholders can take in order to improve commercialisation outcomes from university-SME partnerships. This led us to conducting a case study of exploratory nature with the intention to keep an open mind to new findings (Yin, 2014). However, before starting we obtained a basic view of the existing literature on what barriers and enablers of the process were under-researched (Bruneel et al., 2013) and aimed to investigate a variety of stakeholders, which helped shape our study prepositions and study rationale (Yin, 2014).

The case selection is bound with the focus of the study, which is exploring the measures integral stakeholders can take in order to improve commercialisation outcomes. It is therefore vital to justify the selection, firstly of Australia and secondly of the UK as a comparison. First, the case of Australia was interesting due to secondary data indicating that Australia is lagging behind on the innovation scene (Global Innovation Index, 2013), and there is limited research of University-SME collaboration in the Australian context (Collier et al.,



2011). Secondly, our financial sponsor had a particular interest in enabling this process through the company's consulting capabilities. Thirdly, these facts are supported by previous research criticising university management, Government policy and commercialisation support mechanisms in Australia (Harman, 2010). Finally, improved accessibility to the data was another factor that determined the chosen comparative case study of Australia and the UK (Yin, 2014).

To further our understanding of the process we decided to add the case of the UK. The UK was an interesting comparison to Australia as their context is similar. This is illustrated as both countries speak the same language, attract overseas students, similar university systems and levels of economic development (Altbach and Salmi, 2011). This comparison was also perceived as valuable from our sponsor's perspective as it provides an interesting and new insight into potential enabling activities that could be implemented in Australia.

4.8.3. Embedded Units of Analysis - Stakeholder Selection

The choices made in terms of selecting the most salient stakeholder groups, which represent the embedded units of analysis, were made through three steps. Firstly, a basic search in literature of important actors in the commercialisation process was conducted. Secondly, a lengthy group discussion was held with our sponsor. As an expert in the area, she helped identify the key groups based on her current network and feasibility of getting in touch with these actors. Lastly, using the information from the literature and the discussion we conducted a stakeholder analysis to evaluate the salience of each stakeholder based on the framework of Mitchell, Agle and Wood (1997).



Previous literature highlights stakeholder groups such as academics, university management, technology parks, firms, SMEs, incubators, students, Government officials, venture capital firms, University Technology Transfer Offices (UTTOs) (Siegel et al., 2003, Perkmann et al., 2013, Etzkowitz and Leydesdorff, 1999), which were all covered in our discussion. Thus, to identify the most significant stakeholder groups, each stakeholder's salience was evaluated based on the three key attributes: power, legitimacy and urgency to influence the process (Mitchell et al., 1997). After conducting the analysis, four stakeholder groups were identified as the most salient: (1) Academics, (2) SMEs, (3) Government and (4) TTOs. Due to the similarities that UTTOs, incubators and technology parks have we decided to group them all under one single stakeholder group – TTOs. Furthermore, these stakeholders are likely to hold opposing views, thereby providing a more in-depth analysis (Eisenhardt, 1989). The figure below illustrates the stakeholder analysis and a more detailed explanation is provided in the Appendix (See Appendix 10.7.):

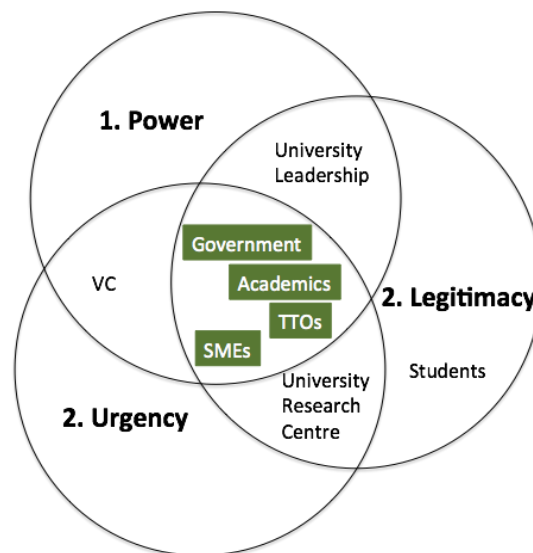


Figure 15 - Stakeholder analysis

(Adapted from Mitchell, Agle and Wood, 1997)



4.8.4. Unit of Analysis - The Commercialisation Process

The unit of analysis defines the case to be studied, and is connected to the research questions and study propositions (Yin, 2014). Although a process is often viewed longitudinally and in phases, the unit of analysis adopted in this study will provide a holistic view of the process at a specific point in time, in a cross-sectional manner. This is supported by evidence from aforementioned theories on the innovation process which state that the linear view of the innovation process is obsolete and that the phases are interwoven and complex (Nelson and Winter, 1982; Fagerberg, 1988). As this view also correlates with our findings, we deemed this suitable as our unit of analysis.

4.9. Data Collection

In this section, the objectives are to explain the implications related to a case study in terms of the data collection, the method selected for gathering the information, time horizons and validity of results.

4.9.1 Semi-structured Interviews

Due to the exploratory nature of the study and inherent focus on stakeholder groups; semi-structured interviews was deemed the most suitable method of gathering the data. Semi-structured interviews provided an appropriate method of obtaining the data required, as it enables the integration of empirical events with the data collection (Yin, 2014), as well as the discovery of emerging topics and new referrals (Gillham, 2000). Although focus groups could be suitable, this was not chosen as the interview objects are professionals, which have limited



timeframes, therefore making simultaneous groupings very difficult to administer (ibid, 2000). Furthermore, due to the opposing views of the stakeholder groups, there is a considerable risk that the results would be limited, as some stakeholders may be reluctant to share information in the presence of others (Kitzinger, 1995).

Although our study is exploratory, the interviews were semi-structured as our inexperience as researchers and lack of prior knowledge in the field would make an unstructured approach inefficient (Miles and Huberman, 1994). Thus an interview protocol (Appendix 10.9.) was established, outlining the key areas from the literature. This was tested through pilot interviews and was in line with our abductive approach. The protocol was then modified after conducting three interviews with experts in the field, by revisiting the literature and subsequently adapting it for future interviewees (Appendix 10.10.). Due to the volume of interviews and having multiple interviewers, the protocol was a necessary tool to successfully collect data as it increases homogeneity and reduces interviewer bias (Saunders et al., 2012).

The interviews were conducted by all team members, in pairs, both in person and by telephone. In order to gain a wide variety of views from experts in the field, 50 interviews were conducted (30 in Australia and 20 in the UK) ranging between 30 and 60 minutes. Further detail is illustrated in figure 17 at the end of the methodology section.

4.9.2. Time Horizon

The objective is to address the commercialisation process between Universities and SMEs at a specific point in time, making our study of cross-sectional essence. Due to the restrictive



time frame of the Final Year Project, the data was gathered over a period of two months and therefore is not of a longitudinal nature (Saunders et al., 2012).

4.10. Interview Procedure

In this section the procedure of the interviews will be discussed. This procedure was performed during the Australian study and was then replicated in the UK. However, it is important to acknowledge that the protocol creation and posterior modification was exclusive to the procedure in Australia, as then the modified protocol was used in the UK. The image below illustrates the procedure undertaken (Figure 16):

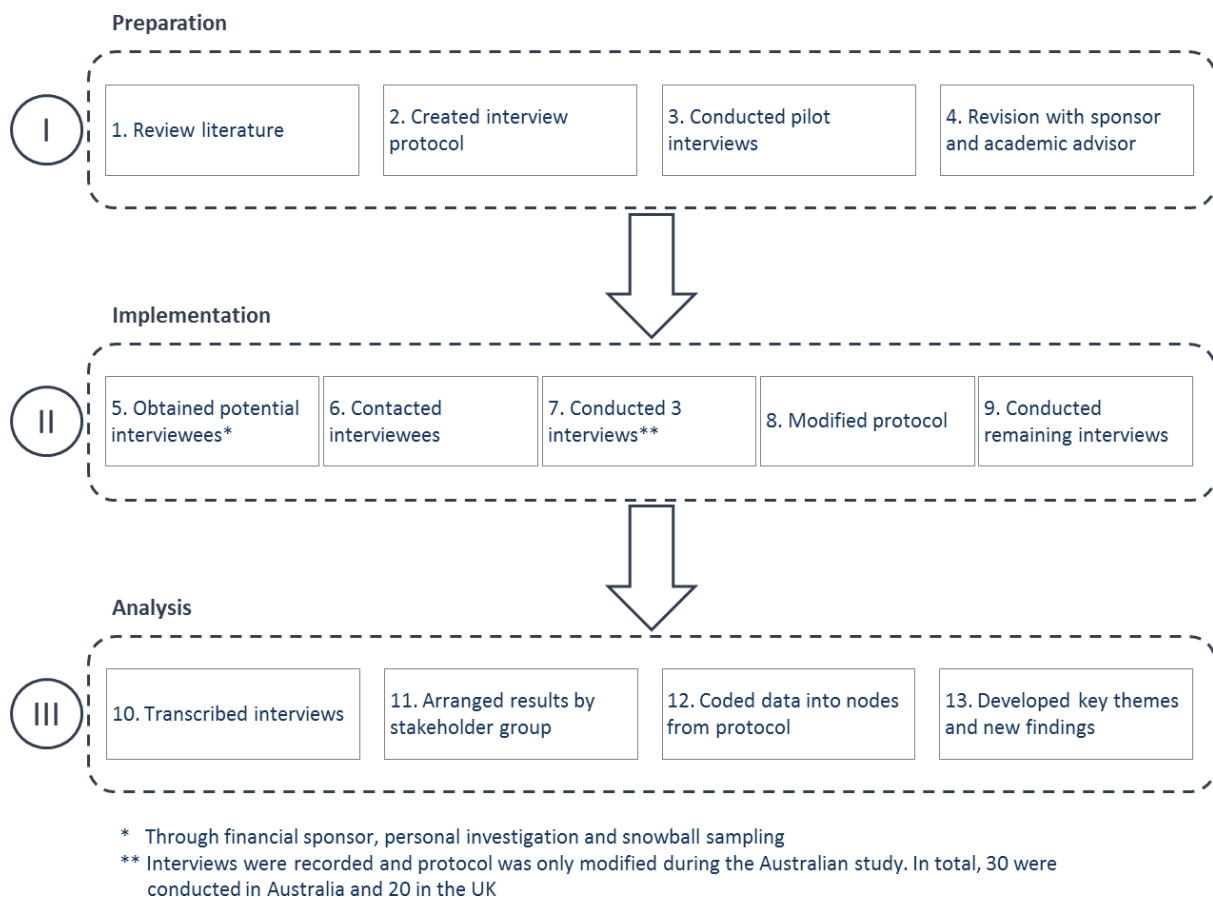


Figure 16 - Interview Procedure



4.10.1. Preparation

As mentioned above, the chosen data collection method was semi-structured interviews. This required a certain level of consistency achieved through the interview protocol (Appendix 10.10.) and conducting pilot interviews. The interview protocol was established based on key areas from the literature. It was then tested through pilot interviews and revised with our sponsor, which is in line with our abductive approach.

4.10.2. Implementation

Furthermore, in terms of sourcing experts in the field of innovation for our interviews, a combination of convenience and snowball sampling was used (Bryman, 2012). In Australia, the respondents were sourced through our project sponsor due to her extensive network of relevant stakeholders. However, contacts were also approached through referrals and personal investigation. A similar approach was then used in the UK, except initial contact was established by our academic advisor rather than our sponsor, from which snowball sampling provided further contacts.

Lastly, other relevant topics for the implementation of the interviews can be appreciated in the image below (Figure 17):



Topic	Implementation - Comments	Sources
Background research	- Proposed interview length: 30 min-1 hour - Interviewers: Two interviewers to ensure consistency throughout interviews and allow them to gain experience. - Pilot interviews: Conducted several pilot interviews to prepare - Send interview objects pre-information about the interview: Allow interview objects familiarize themselves with the topic - Thorough background research: Become familiar with the interviewees backgrounds, job position and area of expertise so that you seem credible and gain peoples trust	Gillham, 2000
Starting Interview	- Icebreaker: Activity to put the interview object at ease, also consider other types of consumer behavior strategies - Interviewee Leading: Let the interview object guide the conversation	Gillham, 2000
Location	- Most conducted at their office, in order to make interviewees comfortable and for their convenience. In some cases, the interviews were conducted on campus, but this was also a familiar setting in this case as this exclusively happened with academics - This also enabled them to provide us with documents to support their comments - As researchers the location was also relevant to us, as conducting interviews in our natural setting (campus) could raise barriers for us to forget our usual role and adopt a researcher perspective. The prior practice of interviews and protocol limited this	Saunders et al., 2012 Bryman, 2012 Alvesson, 2003
Face to Face vs. Phone	- Having telephone interviews had logistical advantages such as cost, access and speed. On the other hand, it might influence negatively building trust with the interviewee, which can affect the results. Furthermore, it has implications in terms of non-verbal communication, which might increase the difficulty of understanding the topics that are most relevant and need more questioning - Telephone interviews were only conducted when this was the only option available (i.e interview government officials that lived in other cities)	Saunders et al., 2012

Figure 17 – Methodology Implementation Detail

4.10.3. Analysis

After transcribing and understanding the content of the interviews, the qualitative software tool QSR NVivo® was used to differentiate the data by stakeholders. The next step was to code the data in nodes by combining our understanding of the content with extant literature, to clearly distinguish between topics and stakeholders (ibid, 2006). This was expanded as the analysis advanced and the results were then compared to the secondary data to corroborate the results by employing data triangulation (ibid, 2006). The secondary data was obtained mainly but not exclusively through the following sources: Australian Government Department of Industry and Science and the Higher Education Funding Council for England (HEFCE).



4.11. Validity of Results

The construct validity is related to our subjectivity as researchers, which is closely linked to the research methodology and can negatively impact the validity and reliability of the results. This was limited by using data triangulation (Barnes and Vidgen, 2006) as well as the interview protocol (Appendix 10.10.). Furthermore, in relation to external validity, the ability to make generalisations has been a source of criticism (Ellram, 1996). However, as the purpose of this study is to elaborate to theory (Ketokivi and Choi, 2014), the risk of external validity is mitigated as the results are not generalised to a population (Eisenhardt, 1989).

The reliability of the results is related to the replicability of the study and possibility to obtain the same results independent of the specific circumstances of the project (Kirk and Miller, 1986; Gibbert et al., 2008). Increased reliability was achieved through using the interview protocol (Appendix 10.10.) and through creating a collective case study database with transcripts, notes and observations (Yin, 2014). As interviewers, it was crucial to control non-verbal communication as it can negatively influence the validity and reliability of the answers due to unconscious approval or disapproval signs (Frey and Oishi, 1995). This was mitigated through conducting pilot interviews prior to the actual interviews.

Another risk is interviewee bias, which can be caused by the participants being influenced by their supervisors and therefore provide a distorted view of reality (Saunders et al., 2012). This is closely related to social desirability bias, which can arise from the respondents providing answers in line with social beliefs rather than their own beliefs (Frey and Oishi, 1995). The above concerns were limited by ensuring the anonymity of respondents at their preference



(Appendix 10.10.) (Saunders et al., 2012). Furthermore, sampling bias needs to be addressed, as we have not represented the views of all the stakeholders involved in the commercialisation process (Bryman and Bell, 2007). However, this was mitigated by conducting a large volume of interviews of the four most important stakeholder groups (Appendix 10.7.). Further, using a snowball sampling technique increased the participant quality. This could have been limited further by investigating a specific industry or technology within both countries in order to limit potential factors related to individual interviewee experiences affecting the results. Nevertheless, this was not performed in practice due to the fact that our sponsor was more interested in obtaining a holistic view of the process across several industries.

4.12. Research Ethics

Ethical considerations were necessary throughout the project and therefore need to be addressed. In relation to our sponsor, all communications were strictly confidential and were only used for the purpose of the project.

In terms of the interviewees, they were advised of the purpose of the study and its future publication on the website of our sponsor. All voice recordings were made with their prior acceptance and they were also provided with the opportunity to remain anonymous at the beginning of each interview, which was duly noted in the interview protocol (Appendix 10.10.)(Flick, 2006).



Chapter 5

Case Study A - Australia



Chapter Overview

The Australian Case presents the context of Australia, the results of the study and a subsequent discussion. Firstly, the context provides an overview of innovation and the commercialisation process in Australia. Secondly, the results from our study are presented. Finally, the discussion contrasts the results with previous literature.

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5. Case Study A - Australia

5.1. The Australian Context

5.1.1 Current Climate in Australia

Australia's research infrastructure is centred around research institutions, industry and the Government (Commonwealth of Australia, 2013).

Australia exhibits high levels of research productivity as they accounted for 3.9% of the world's research output in 2013, placing them 9th in the OECD rankings of national contributions (OECD, 2013). Furthermore, when assessing the quality of research, Australia ranks in the top 1.0% of publications worldwide measured by relative citation impact. Australia has increased their share of top-level publications, from 3.8% in 2004 to 6.7% in 2013, highlighting a high standing in this space (NSW Business Chamber, 2014).

However, research does not necessarily translate into innovation and it is at this point of knowledge transfer where Australia falls short. This is evident by their relatively poor ranking in certain innovation indicators on a global level. For instance, they rank 116th out of 142 countries when measured for innovation efficiency. Furthermore, Australia ranked 17th out of 143 countries in the Global Innovation Index in 2014, as illustrated in the figure below:



Rank	Country	Score	Percentage Rank
1	Switzerland	64.80	1.00
2	UK	62.40	0.99
3	Sweden	62.30	0.99
4	Finland	60.70	0.98
5	Netherlands	60.60	0.97
6	US	60.10	0.96
7	Singapore	59.20	0.96
8	Denmark	57.50	0.95
9	Luxembourg	56.90	0.94
10	Hong Kong (China)	56.80	0.94
11	Ireland	56.70	0.93
12	Canada	56.10	0.92
13	Germany	56.00	0.92
14	Norway	55.60	0.91
15	Israel	55.50	0.90
16	Korea (Rep.)	55.30	0.89
17	Australia	55.00	0.89
18	New Zealand	54.50	0.88
19	Iceland	54.10	0.87
20	Austria	53.40	0.87

Figure 18 - Innovation Efficiency

(Adapted from Global Innovation Index – Cornell University, INSEAD and WIPO, 2014)

As Figure 18 shows, Australia's position in the ranking is still relatively low considering it lags behind most of its peers like the UK, the US and Germany. It is understandable then, why the Australian Government have identified innovation as a key part of their economic strategy. Furthermore, Australia underperforms when compared to other OECD countries in terms of innovative performance as it is the "only country in the OECD not to have a national strategy for science, technology and innovation" (Philips, 2014). This point is substantiated by the fact that less than 50.0% of Australian businesses identify themselves as innovators. Approximately 30.0% of Australian researchers collaborate with industry, compared to 67.0% in the US. Further, only 1.5% of Australian firms developed new inventions, compared to an average of 10.0%-40.0% in other OECD countries (OECD, 2013). Therefore, there are clearly



some innovation related issues, which need to be addressed if Australia are to continue to compete worldwide and stimulate future economic growth.

5.1.2. Collaboration

Collaboration is an important factor to assess, as 92.0% of Australian business leaders believed that collaboration would drive higher levels of innovation within their organisations (NSW Business Chamber, 2014). Australia ranks last in a 33 country comparison against other similarly developed countries in the OECD collaborations study (OECD, 2013). The Department of Education states that Australia would need to improve industry research collaboration five-fold with SMEs and sixteen fold with large firms in order to achieve the average level currently held by the top five OECD countries (Commonwealth of Australia, 2013).

5.2. Australian Results

The following section collates and analyses the findings of the Australian case. Figure 19 illustrates how the results will be presented:

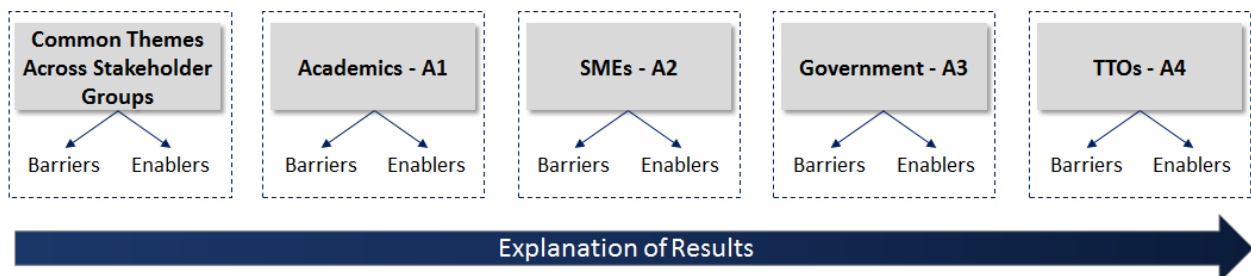


Figure 19 – Structure of the Explanation of Results



The following table shows the interviewees we had access to and groups them by embedded units of analysis: the four stakeholders.

Australia - WA - Case Study A

Academics	A1	U1	Researcher
		U2	Researcher
		U3	Researcher
		U4	Researcher
		U5	Researcher
		U6	Researcher
		U7	Researcher
		U8	Researcher
SMEs	A2	S1	Managing Director
		S2	Manager
		S3	Manager
		S4	Director
		S5	Principal
		S6	Managing Director
		S7	Founder
		S8	Executive Director
		S9	CEO
		S10	Director
Government	A3	G1	Representative
		G2	Representative
		G3	Representative
		G4	Representative
		G5	Representative
		G6	Representative
		G7	Representative
TTOs	A4	T1	TTO Representative
		T2	UTTO Representative
		T3	UTTO Representative
		T4	TTO Representative
		T5	UTTO Representative

Figure 20 – Case Study A - Interviewees

5.2.1. Common Themes Across Stakeholder Groups

Barriers:

Publish or Perish Mentality:

A lack of incentive schemes was identified as a major barrier to university-SME collaboration by all of our stakeholder groups. Both university leadership and the Government were pointed out as being responsible for this development. Respondents highlighted a funnel



vision where ranking is the top priority. A representative from a UTTO illustrates this argument:

“More and more universities are concerned about these rankings, and the rankings are done purely based on research. There's literally nothing about the quality of the teaching or anything else that goes into the determination of those lists.” (A4, T3)

Moreover, the analysis shows that respondents have an issue with participating in joint commercialisation projects due to academics being unable to publish papers simultaneously. This issue is illustrated below by an academic who links this issue to motivation to engage in commercialisation:

“SMEs or industry in general don't want project information to be available in the public domain, then there is no IP for them. So we have to wait... My CV will be empty for one year. Filing a patent, commercialising something, doesn't count at all towards the rankings of the university, so they don't want me to go in that direction.” (A1, U4)

As highlighted by this academic, engaging in the commercialisation process involves considerable risk for researchers as research will not be publicised to protect IP. Thus, involvement in commercialisation means that academics are spending their time and efforts on research that may never have a direct impact on the development of their research career. Furthermore, the respondents link the issue of incentivising joint commercialisation projects



to Government policy, as it primarily focuses on academic publications as a measurement of impact:

“So the previous Liberal Government was looking for both academic excellence and impact. And then it swung back to say “well university's about academic excellence, so drop all the impact stuff.” (A3, G3)

Researcher Attitude:

Researcher attitudes were another barrier highlighted by respondents. The data analysis indicates a further sub-set of issues, one being the lack of interest from academics concerning the commercial applications of their work. The second being that academics are reluctant to share control of their inventions when involved in a partnership with industry. The following extract highlights this barrier as mentioned by a representative of the Government:

“Industry wants and expects reports and results in return from their investments, and researchers do not want to engage with this part of the process, they just want to do research and be left alone.” (A3, G7)

This illustrates how some researchers are not commercially minded and are more interested in the fundamentals of research. Potential revenue from IP or commercialisation benefits is not something that motivates them. Moreover, a UTTO officer further emphasised this issue:



“In general, to be a really world-class academic you focus on your area and in a way you have to be quite arrogant, and really think that you're better than everybody else. To be a really top-notch researcher you have to be a bit eccentric I think.” (A4, T5)

Furthermore, several respondents highlighted the perception that academics become emotionally attached to their inventions and projects. An SME respondent mentioned that researchers view their inventions as "their babies" (A2, S3). Respondents emphasised that this level of attachment can result in various issues such as the sharing of control or fear of disclosure.

Expectations of Time Investment:

Six different respondents also identified the varying degrees of investment required for a successful partnership. Three expressed their concern that financial capital is not always adequate. One respondent representing the Government stakeholder group elaborates on this issue:

“Industry says “So I’ve paid you 50 thousand dollars, I’ll expect the answers back in 12 months’ time, good bye”. However, there also has to be a high degree of investment in terms of contribution and time given by the company. There also is a requirement that the researcher spends time in the business.” (A3, G2)

As illustrated by a Government representative, industry is often not willing to invest time in partnerships. Rather they are looking to fund it, provide minimal engagement and obtain a



solution in return. However, what researchers look for is a more collaborative process where they can work together with industry rather than working for them. Furthermore, a respondent linked this mismatch in expectations between academics and SMEs to increased risk when taking on a partnership. Respondents indicated that there is high risk attached to academics moving out of the research realm and into the commercial sphere. If expectations of time investment are not aligned from the beginning it can inhibit collaboration. This illustrates that investment has a different meaning to academics than to SMEs, as academics see investment including non-financial aspects such as time.

Enablers:

Personal Relationships:

The four stakeholder groups highlighted personal relationships as an important enabler to the commercialisation process. A representative of a UTTO, elaborates on this:

“If you can find the right person through university networks then that’s great. And without that I think you have no chance at all. Networks are great for people, you know, to see what they have to say about your ideas, “do you think it’ll work?”. That is great feedback to the researchers.” (A4, T2)

This interviewee explains that academics can benefit from university networks to build personal relationships and use them for idea validation. Furthermore, our stakeholders highlighted that personal relationships are particularly important as they overcome one of the biggest barriers to building business relationships – the lack of trust. To enable trust, it is



common to first embark on smaller projects and gradually engage in projects of larger scope. This process also allows SMEs and academics to establish ground rules that govern how they interact with each other. As trust increases between the different parties, it leads to enhanced cooperation and engagement in the process. A researcher underlined this point:

“The fact that I had already worked with Jeremy (manager of an SME) on a smaller project before, gave me the confidence that something good would come out of this partnership and together we would be able to cooperate successfully.” (A1, U3)

This quote mentions that having previously worked together, trust was already established by the time the second project was initiated.

5.2.2. Academics

Barriers:

University Favouritism in Government Funding:

Another barrier discovered through our data analysis is university favouritism in funding. This issue was highlighted in four interviews, where respondents indicated that Government funding was allocated depending on the prestige and rankings of the university, rather than evaluating each funding request on merit. A researcher expressed her view regarding this barrier below:



“Most universities don’t receive as much funding, as most of it goes to the Group of 8, the Sandstone Universities. It is harder for these, irrespective of their potential.” (A1, U1)

Furthermore, the data emphasises that respondents believed favouritism towards the highly ranked universities is due to a poor assessment of research outputs by the Government. Another researcher made the following argument:

“There’s no strong assessment of outputs. The G08 universities like UWA really know how to market themselves. They have the biggest, glossiest spin machines on the planet. So we just don’t bother competing with them.” (A1, U4)

This finding is reinforced by our secondary data analysis. The Research Grant Allocation Report illustrates that these 8 universities received 64.0% of the total research grant allocations in 2014 (Australian Government department of Education, 2015). See figure 21:



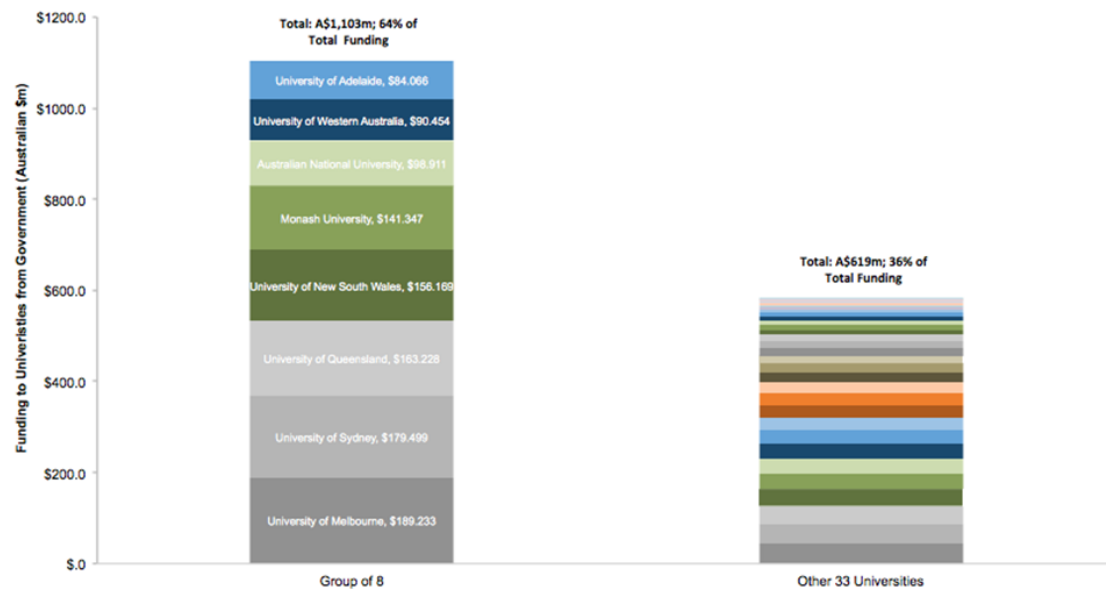


Figure 21 - 2014 Research Grant Allocation

Figure 21 shows that the GO8 received almost twice the amount of investment as the other 33 universities in Australia combined. The Government states that the allocation of these grants “are driven entirely by metrics (research income, research publications, higher degree by research (HDR) student completions, HDR student load and staff numbers)” (Research Grant Allocation Methodology, 2015). Secondary data shows that although the GO8 are receiving more funding than the other 33 universities, this is due to the fact that they are outperforming their counterparts in the Governments’ key research contribution criteria.

Enablers:

TTO’s Management of the Process:

Our data indicates that TTOs play an important role in managing the process. The data outlines how these officials can use their expertise to help in numerous technical aspects;



such as how to manage the IP effectively, access funding and test applicability of an idea in the market. A researcher expands on this point below:

“Our UTTO has been really good in providing contacts, also in terms of putting us forward for different programmes and places where we might go and pitch our technology to either potential investors or to potential customers.” (A1, U3)

Furthermore, a researcher highlighted the role of TTOs as a translator in the process. This shows that they also play an important part in facilitating communication and understanding between parties:

“So the CRCs tended to move in that direction of having the capacity to being the interpreter. To be the person who could understand the industry need and articulate that, and then translate it for the research community.” (A1, U7)

Based on the above, it is evident that TTOs hold great importance as an enabler to the university-SME commercialisation partnerships, as their previous experience can improve the communication between the parties.



5.2.3. SMEs

Barriers:

Timelines:

One respondent illustrated the importance of understanding the timescale of a project in order to successfully manage a commercial partnership. This is depicted in the below quote from an SME:

“I have worked in bureaucracies in private enterprise, and they take a long time, but it is based at another order of magnitude in terms of time when you're dealing with a university. That can be quite frustrating as a start-up or a tech development company where everything you do is very nimble and flexible.” (A2, S6)

This respondent indicates that SMEs and universities operate with different timeframes. Due to the competitive environment SMEs operate in, progress is expected to materialise quickly as opposed to the more longitudinal nature of research.

Enablers:

Government Funding:

Another key theme in facilitating commercialisation is Government intervention. This finding is expressed by one of our SME respondents:



“The process has been improving over the last few years. That is partly driven by Government policy sort of forcing universities and other research organisations like CSIRO, to interact more with industry.” (A2, S3)

Respondents emphasised the Government as an important facilitator in the process, as it can act as an enabler by providing grants and funding directly or via TTOs. As previously mentioned, funding is perceived as a barrier by a number of stakeholder groups. However, SMEs were particularly positive about the role the Government plays and how they use their resources to improve the process.

This is supported by secondary data, which shows the various Government schemes that enable the process. For example, the Government offers tax concessions of 45 cents for every dollar spent on R&D. This applies to companies with a turnover of less than \$20m, which effectively means the Government can pay 45.0% of SMEs’ research expenditure (Australian Government Taxation Office, 2012).

University Overprotection of IP:

The data demonstrates that university ownership of IP is a barrier. There is a general perception amongst respondents that universities should forfeit ownership of IP. A director of an SME expressed his thoughts regarding the importance of IP to the university-SME commercialisation partnerships, demonstrated in the quote below:



“When you do want to commercialise something, the university all of a sudden wants to own it. If you look at the universities in the US they give away the IP and let the guys in the venture go out and commercialise. They rely more on a return through almost like donations. We should apply that model here in my opinion.” (A2, S9)

Five different respondents mentioned the challenges that IP present for the commercialisation process and in particular, when universities overprotect it. There is a perception from SMEs that universities are only interested in the short-term economic benefits of IP. They state that if universities were less protective in the short run, it would result in higher economic benefits in the long-term. Another respondent from an SME supported the notion that overprotection of IP can inhibit the process, by stating the following:

“Universities have to stop trying to grab whatever they can. I think if you work for a university they immediately try to grab your IP. That doesn’t motivate a researcher to do anything with his IP. So this is really a barrier.” (A2, S2)

SMEs also mentioned that university overprotection of IP can have a negative effect on researcher motivation as they perceive that the university might be taking credit for their research. Our primary data indicates that TTOs’ performance is measured by the number of IP disclosures. Secondary data supports this, as the Australian Government key performance measures focus on areas of formal commercialisation such as invention disclosures, licensing agreements and spin-out companies (NSRC, 2013). As seen in figure 22 below:



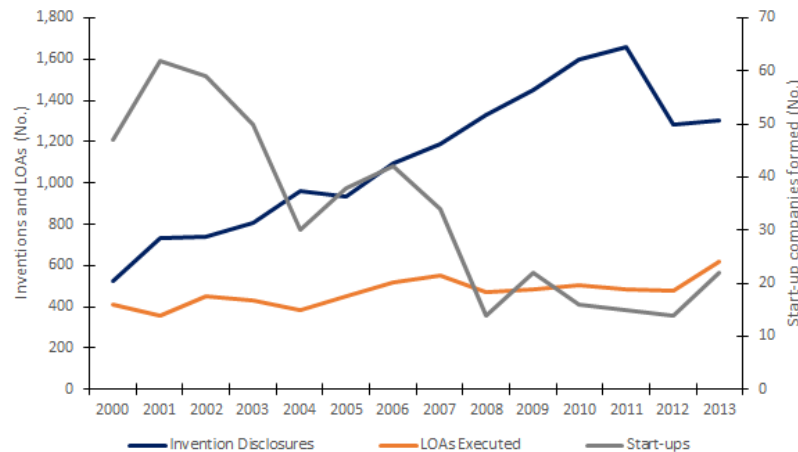


Figure 22 - Intellectual Property Activity

5.2.4. Government

Barriers:

When asked about barriers of the commercialisation process, the seven Government officials that we interviewed either refrained from mentioning any, or the ones they mentioned are already captured in the common themes section. This is a finding in itself and an area for future research.

Enablers:

Idea Validation:

A representative of the Government stated that one of the key benefits that the Government offers is a program to validate the different commercial ideas. These schemes were perceived to be particularly useful to proof the research concept, as they provide general business health checks and advice. This is illustrated by the quote below:



“There are specific grants, the Skills and Knowledge Grant, that are meant to be used to build a business plan and analyse the market, and then using that information the SMEs can apply for a proof of concept and Experienced Executive grant from Commercialisation Australia.” (A3, G3)

Another Government representative highlighted the importance “to come up with an optimistic, a realistic and a pessimistic scenario to establish for industry” (A3, G7). This multiple scenario analysis is particularly useful for industry as it helps evaluate the risk and rewards for SMEs. Furthermore, by validating the idea, it enhances the possibility of receiving funding from private equity or venture capital.

5.2.5. TTOs

Barriers:

Lack of Venture Capital in Western Australia:

Another barrier identified by our respondents, was that Western Australia (WA) has less venture capital compared to other states. This view is reinforced by the following extract from the representative of a UTTO:

“There’s not a lot of venture capital in Australia. There are one or two venture capital companies in Perth, and it’s really hard to get funding from them, which is frustrating for academics.” (A4, T1)



Respondents furthered this notion stating that the lack of VC leads to demotivation amongst researchers to participate in commercial engagements. There is a perception amongst respondents that the problem does not lie in the commercialisation potential of Australia, but rather in the lack of available capital.

This finding is corroborated by secondary data, which illustrates that during the past 5 years WA has only received \$18.4m of venture capital investment (Australia Private Equity and Venture Capital Association, 2014). This represents only 2.0% of the total VC investment in Australia – as seen in figure 23. However, Australia’s venture capital as a whole is performing well and is ranked as the 8th most attractive country to invest in (IESE, 2014). Furthermore, last year total VC investment increased by 293.0% to \$516m, which represents four years of consecutive growth in VC investment. This indicates that VC is not a national problem but rather a regional problem or a mobility issue for venture capital firms. See figure 23:



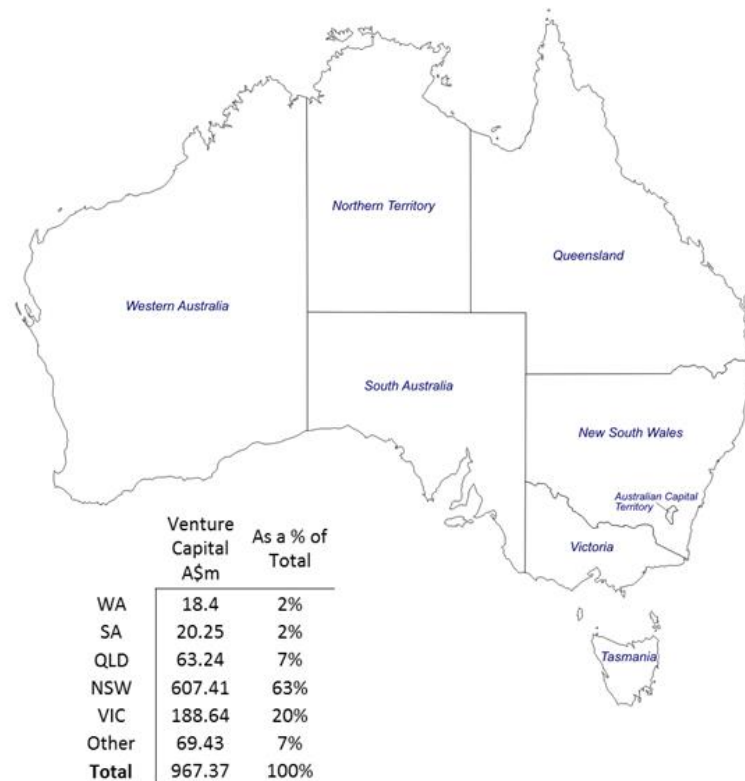


Figure 23 - Distribution of VC in Australia 2010-14

(Adapted from: Australia Private Equity and Venture Capital Association, 2014)

Decrease in Government Research Funding:

Respondents consider funding to be one of the main barriers to the university-SME commercialisation partnerships. One specific issue that was often identified, is that there is limited volume of Government funding earmarked for research in Western Australia. This is outlined in the following extract from a UTTO representative:

“Funding in the last two years has been decreasing, very much so. Western Australian Government money, especially money that would fund research, is definitely decreasing, there’s no question about it.” (A4, T3)



This is a common theme among four out of the five TTOs that we interviewed. As their resources have been decreasing, so too has the potential contribution towards the commercialisation process. Furthermore, our data analysis indicates that the decreasing funding can negatively impact researcher motivation to participate in commercialisation partnerships. Consequently, it is illustrated that a lack of funding can lead to reduced levels of academic motivation. This is reinforced by the secondary data, as the National Survey of Research Commercialisation (NSRC, 2013) reveals that research expenditure has decreased by 12.0% from 2012 to 2013.

Enablers:

TTO's Networking Events:

Respondents indicated that TTOs play an important role in enabling the commercialisation process, as they provide assistance in the form of networking events, project management and contracting services. Further, the data shows that TTOs hold an important role as a translator between the university and SME partnerships. A UTTO representative stated that *“networking events are particularly useful as they give researchers and industry an opportunity to have productive conversations”* (A3, T2). Our analysis indicates that a key reason for the success of these events, is that people attending these events are open to engaging in collaboration.



5.2.6. Summary of Findings

The following diagram summarises the main findings from our study grouped by stakeholder groups:

Common Themes Across Stakeholder Groups		Academics - A1		SMEs - A2	
Barriers:	Enablers:	Barriers:	Enablers:	Barriers:	Enablers:
• Publish or perish mentality • Researcher attitude • Expectations of time investment	• Personal relationships	• University favouritism in government funding	• TTO's management of the process	• Timelines • University marketing of expertise • University IP policy	• Government funding
		Government - A3		TTOs - A4	
Barriers:	Enablers:	Barriers:	Enablers:	Barriers:	Enablers:
			• Idea Validation	• Lack of venture capital in Australia • Decrease in government funding	• Networking events

Figure 24 – Summary of Main Findings for Case Study A

5.3. Australian Case Study Discussion

5.3.1. Introduction

The findings in the present study have highlighted a series of factors to consider when analysing the enablers and barriers to university-SME commercial partnerships. The identified issues help describe the process on a micro scale, however in order to understand their implications it would be pertinent to frame the situation from a macro perspective. From this point of view, three predominant actors are considered: the Australian Government, university leadership and the working environment. The Government is important as it is responsible for setting the national innovation policy and acts as a coordinator in terms of “visions, perspectives for the future and relevant policy instruments” (Chung, 2002 p.486).



University leadership also bears significant responsibility in the process of commercialisation, as its interpretation of Government mandates will determine the strategy of the research institution. Consequently, they will indirectly affect internal stakeholders within the university, as supported by Etzkowitz (1998). Lastly, the working environment is important, as it will shape how SMEs and academics interact with each other. Additionally, it will directly impact upon researchers' attitudes and therefore their approach to commercialisation.

5.3.2. Government

Our findings delineate how some of the key barriers and enablers were a consequence of Government policy. The most tangible form of policy is Government funding, as this has a direct impact on the amount of funds available to certain universities, determining the amount of time and resources available for research purposes. Respondents highlighted a decline in funding as a major barrier to commercialisation as it impacts motivation to participate in commercial partnerships. This was broadly in line with expectations, as the literature confirms that a decline in Government funding for R&D impacts university willingness to collaborate with industry (Cohen et al., 2002). However, there is a further subset of issues within funding, which seemingly have an important effect on the commercialisation process. The academic stakeholders identified the funding allocation system as a key area of contention. This is in line with the literature, which highlights how a lack of transparency in the funding process can act as a barrier (Jacob et al., 2003). However, subtle differences were found regarding the lack of transparency as a barrier, more specifically the perception that funds may be distributed based on university prestige as opposed to project merit. Respondents claimed this compounded the demotivating effect



declining funding has, therefore adversely affecting their willingness to participate in commercial partnerships. This extends current literature, as it provides further insight into potential issues regarding fund allocation and the transparency of the process.

Respondents further highlighted the role of the Government in setting up innovation incubators and technology parks as an enabler to commercialisation partnerships. This is consistent with extant literature, which describes the enabling role these types of Government initiatives play (Muscio, 2010; Link and Scott, 2003). The literature explains the various benefits TTOs provide such as establishing key milestones, assisting in contract negotiations and facilitating networking (Goldfarb and Henrekson, 2002; Muscio, 2010). However, our respondents attributed most importance to TTOs as facilitators of networking, implying that this function is more prevalent in our particular context. This builds upon the literature by emphasising the importance of networking, and the enabling role of TTOs within the commercialisation process.

Moreover, our findings illustrated that the Australian Government has positively influenced the process of commercialisation through the implementation of certain schemes, such as 45.0% tax concessions for R&D projects. This supports extant literature on this topic, which highlights the importance of such schemes in stimulating commercialisation (Cohen et al., 1998). However, our results attributed particular importance to schemes that assisted in idea validation such as business health checks, proof of research concept and commercial viability. This extends the literature, accounting for the importance of micro aspects of project management, which act as an important enabler in the commercialisation process.



5.3.3. University Leadership

The data highlights how Government policy has a cascading impact on leadership directives for universities. This is exemplified by the current incentive scheme implemented by university leadership. This stems from the current Government grant allocation system, encouraging publishing in elite world journals. Thus, there is an issue with university leadership not incentivising commercialisation, as it can be at the expense of publishing. This is broadly in line with the literature, which explains that unsatisfactory university reward structures have been found to hinder academics from engaging in commercial projects (Link et al., 2007). Furthermore, our respondents highlighted a so-called “publish or perish” mentality that exists amongst academics in Australia that has not previously been identified. To elaborate, academics are not only demotivated by unsatisfactory reward structures, they are becoming entrapped in a system, whereby if they fail to publish regular academic articles their careers are adversely affected. This finding extends extant literature, as it indicates that the effect of reward schemes may elicit more extreme reactions than expected. Here the cascade effect of Government policy is made clear, as first it affects university leadership targets, which in turn affects the behaviour of researchers.

Leadership can have further ramifications on the process, as respondents highlighted the role of universities as a barrier when handling IP rights. By claiming ownership of a proportion of IP when academics partner with industry, respondents state that this actually hinders the process by limiting their personal reward and therefore willingness to work with SMEs. This supports the literature, which portrays universities as economic actors seeking greater ownership of IP (Siegel et al., 2003; Shane, 2004). The nuance to our findings here though,



is that university involvement in the IP ownership process stems from leadership directives. Our results found that universities' approaches differed, as some were more inclined to claim ownership than others which simply wanted to encourage commercialisation in general. This acts as an extension to the literature, tracing the cause of university involvement to their culture and strategic vision for the institution.

5.3.4. UTTOs

The results emphasise the importance of UTTOs as an enabler in the commercialisation process. This is broadly in accordance with the literature, which outlines the important enabling role UTTOs play, facilitating relationships between academics and industry, as well as assisting in project management (Markman et al., 2005). However, a nuance to our findings is that UTTOs were seen to be more accessible than Government TTOs due to proximity of location and prior knowledge of university operations. Respondents indicated that they were more likely to interact with UTTOs as a result of these factors. This subtle notion extends the literature, providing further insight into the enabler role UTTOs play and how they are perceived as more accessible compared to typical TTOs.

5.3.5. Working Environment

In turn, the leadership of research institutions directly impacts upon the working environment of academics and as an extension, SMEs. By implementing such incentive schemes prescribed by the Government, inherent difficulties that exist in partnerships between SMEs and academics are accentuated. Respondents indicated how university reward structures resulted in a greater concentration of efforts towards academic research, further increasing the



differences in institutional norms between industry and academics. This is broadly in line with the literature on this topic, emphasising how orientation related barriers, like timeframes, inhibit the commercialisation process (Partha and David, 1994). However, the findings uncovered a nuance to existing literature; as there is a perceived risk for academics when moving out of the university sphere. It is of great importance to investigate the reasons behind this as it is an additional barrier, which inhibits researchers from engaging in commercialisation.

Literature confirms that industry funding enables commercialisation partnerships (O'Shea et al., 2005; Gulbrandsen and Smeby, 2005). Evidence in partial support of this notion was found as respondents determined industry funding to be key to successful commercialisation. However, it was discovered that the phenomenon applies to non-financial as well as financial resources. Further, respondents indicated that investment expectations did not solely concern financial implications, but also time, effort and level of involvement. This finding extends the literature, as it provides a deeper understanding of the concept of investment and its meaning in the Australian context. This is important as the lack of recognition of time investment acts as another factor in hindering the relationship between industry and researchers.

Moreover, respondents highlighted the relationship between industry and researchers as a key enabler of commercialisation partnerships. This finding is reiterated in the literature, which similarly finds relationships to be highly valuable, as they contribute a greater weight to innovative output than generic technology transfer methods (Perkmann and Walsh, 2007).



Furthermore, our findings indicate the important role of trust in building these relationships. This is also echoed in the literature, identifying trust as integral to building a successful relationship, leading to enhanced cooperation and engagement in the process (Bradbach and Eccles, 1989; Kale et al, 2000). However, the notion of incremental relationships as a precondition for trust has not previously been identified in the literature. This finding provides a more dynamic view of how to build successful relationships in the Australian context.

Besides the above points concerning how the nature of the stakeholders and their relationships impact upon the working environment there are also external factors to consider. The importance of venture capital as an enabler to the commercialisation process has been duly noted in the literature (Florida and Kenney, 1988). This notion was supported by our findings, as stakeholders attributed great importance to venture capital for successful commercialisation. However, respondents further highlighted the lack of venture capital in Western Australia as a major external barrier in relation to the work environment. In particular, respondents emphasised that this not only resulted in lower funding accessibility, but also adversely impacted motivation to participate in commercial projects. In current literature little attention is dedicated to the effects scarce venture capital has upon the commercialisation process. It is in this area where our findings extend the literature, as we found that the lack of private sector funding negatively impacted the attitudes of researchers and consequently their willingness to work with industry. It is important to realise the implications of the non-presence of venture capital as well as the positive impact of its presence.



5.3.6. Formative Conclusion

Cascading Effect

From our qualitative data it is evident that many barriers and enablers exist within the commercialisation process in Australia. In accordance with the literature, we recognise the relationships that exist between the Government, research institutions and industry as captured in the Triple Helix Model (Etzkowitz and Leydesdorff, 1999). However, our findings present a novel perspective on the influence these stakeholders have on the commercialisation process, in the form of a strategic cascade framework.

Combining the results from all stakeholder groups, it becomes apparent that to a large degree, the barriers and enablers experienced by SMEs and academics stem from Government policies. Our results reinforce this view, as decreased Government funding was identified as one of the major barriers and had clear, direct and tangible effects on several other micro factors such as researcher attitudes. Consequently, we can draw an initial tentative conclusion that the role of the Government is the most important when determining the success of a nation's innovation output.

The role of the Government has been previously noted (Chung, 2002), but this is the first time that the cascade effect has been evaluated in this context as illustrated in figure 25. This effect illustrates the root of the issues with successful university-SME commercialisation partnerships in Australia. Awareness of the derived impact Government policies have on other stakeholders is of great importance, as it can facilitate double-loop problem solving (Argyris, 1978) in this area.



The next level of analysis within the cascade framework pertains to the impact university leadership has on the commercialisation process but also on the working environment of SMEs and academics. Our discussion highlighted that this impact was important; in accordance with literature on this topic describing the multi-dimensional impact university policies have on internal stakeholders (Debackere and Veugelers, 2005). Therefore, we can form another formative conclusion that university leadership are vital to the success of the process, and therefore national innovation output.

Finally, a tentative conclusion can be made regarding the impact the working environment has on commercialisation. As this shapes the ways in which SMEs and academics interact with each other, it is a crucial step in the process. Nevertheless, the environment is largely determined by university policies, which are based on Government initiatives. Consequently, we can conclude that although the working environment plays an integral role in the process, it is not as significant as the higher tiers in the framework. This is illustrated in figure 25:



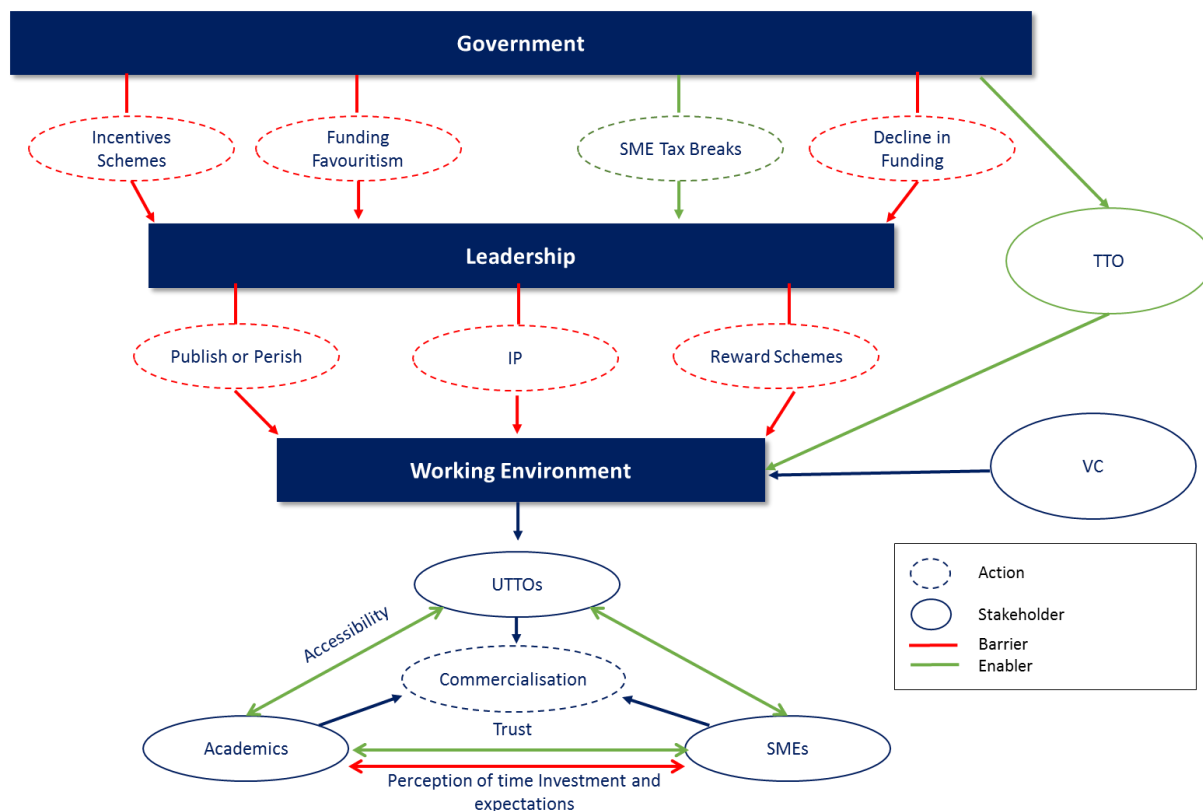


Figure 25 – Cascade Effect Australian Study

Barriers and Enablers

Whilst the barriers and enablers within commercialisation have been extensively covered in the literature (Bruneel et al., 2010; Partha and David, 1994; Geuna et al., 2003; Siegel et al., 2003), our study presents a more dynamic view of certain themes, relevant in the Australian context. This is illustrated by the table below (Figure 26):



Type	Name	Explanation
Barriers	University Favouritism	Respondents identified the funding process as lacking in transparency, and generated a perception that funding is granted based on university prestige
	Publish/Perish Mentality	Respondents identified a publish or perish mentality. Academics' reactions to unsatisfactory reward structures and multiple pressures is more extreme than proposed current literature
	Concept of Investment	Academics and SMEs have differing perceptions of the term 'funding'. SMEs usually associate the term with financial investments, whilst academics also associate it with factors such as time and effort
	University Involvement in IP	Respondents identified university involvement in IP as an inhibiting factor to commercialisation partnerships
	Timeframe Barriers	Timeframe barriers are enhanced due to the perceived risk of moving out of the university sphere
	Lack of VC	Respondents identified the lack of venture capital as having a negative impact on researcher attitudes towards commercialization
Enablers	Accessibility of UTTOs	UTTOs are perceived as more accessible than other types of TTOs
	TTOs as Networking Facilitators	Respondents highlighted the networking as a TTO's most effective function
	Incremental Relationships	Building incremental relationships was identified as a facilitator for trust

Figure 26 – New Barriers and Enablers Identified in Australian Study



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Chapter 6

Case Study B - UK



Chapter Overview

The UK Case presents the context of the UK, the results of the study and a subsequent discussion. Firstly, the context provides an overview of innovation and the commercialisation process in the UK. Secondly, the results from our study are presented. Finally, the discussion contrasts the results with previous literature.

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6. Case Study B - UK

6.1. The UK Context

6.1.1. Current Climate in UK

The research infrastructure in the UK includes the Government, universities and public and private organisations (BIS, 2013). Funding for higher education institutions is provided under a 'dual support' system, administered by two types of organisations. First, the Higher Education Funding Council for England (HEFCE) are mainly responsible for providing grants, totalling £1.6 billion, to institutions to help drive innovation (HEFCE, 2014). The second pillar of the 'dual support' system is the Research Council UK (RCUK) organisation who provide funding for specific project and programmes, averaging £3.0 billion a year (RCUK, 2015).

The research infrastructure in the UK is globally recognised for its high quality and productivity. Despite only representing 0.9% of the world's population, the UK account for 4.1% of all researchers, 9.5% for downloads of publications, 11.6% for all citations and 15.9% of the world's most highly-cited articles (BIS, 2013). These statistics reiterate the view that the UK's research infrastructure is world class. Furthermore, the UK consistently score highly across several innovation measures, indicating that they have a robust system of knowledge transfer. As an illustration, they rank 2nd out of 143 countries in the Global Innovation Index (Cornell University, INSEAD and WIPO, 2014).



6.1.2. Collaboration

The UK also exhibits high levels of collaboration between industry and research institutions as highlighted below in figure 27:

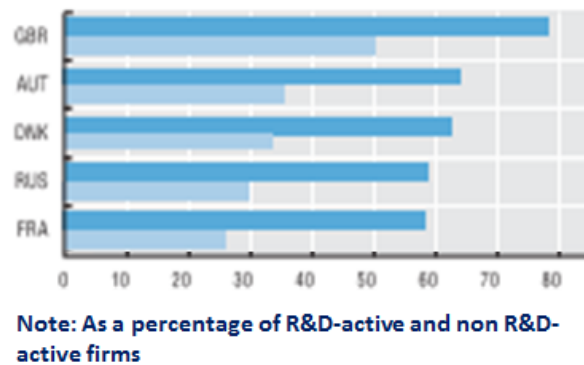


Figure 27 - Firms Engaging in Collaboration on Innovation, by R&D status, 2008-2010

(OECD, 2013)

This chart illustrates how Great Britain rank best in class out of a total of 32 countries, when measuring the number of firms engaging in collaboration on innovation by R&D status (both R&D active firms and those without these capabilities). Whilst figure 27 provides a general overview of collaboration, a more detailed view - focusing on collaboration between firms and research institutions – is required. This is provided in figure 28 below:





Figure 28 - Firms Actively Collaborating with Research Institutions (OECD, 2013).

Figure 28 highlights that the UK rank 19th out of 33, when comparing the number of firms actively collaborating with research institutions. Under this criteria, it is clear the UK are not top performers when it comes to partnering with research institutions. In fact, to reach the level of collaboration of the five highest performing OECD nations, the UK would need to increase industry-research relationships three fold.

6.2. UK Results

The following section collates and analyses the findings of the UK case.

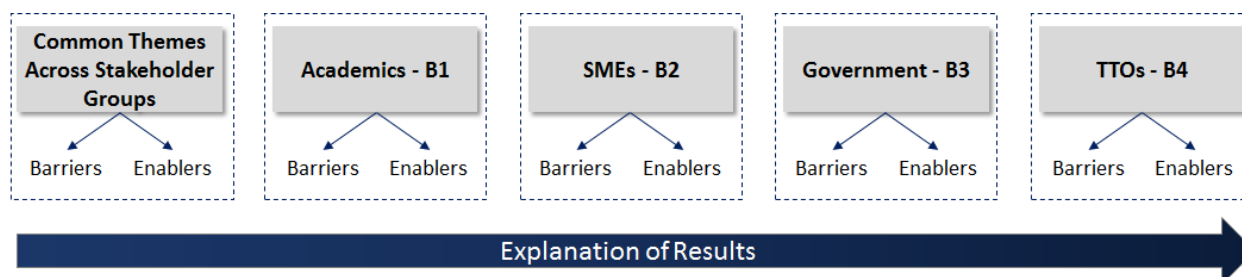


Figure 29 –Structure of the Explanation of UK results



The following table divides all the interviewees we had access to in the UK and groups them by embedded units of analysis, represented by the four stakeholders:

United Kingdom - England - Case Study B

Academics	B1	U1	Researcher
		U2	Researcher
		U3	Researcher
		U4	Researcher
		U5	Researcher
		U6	Researcher
		U7	Researcher
SMEs	B2	S1	Director
		S2	Managing Director
		S3	Director
		S4	Founder
		S5	Managing Director
		S6	Managing Director
Government	B3	G1	Representative
		G2	Executive
		G3	Executive
TTOs	B4	T1	TTO Representative
		T2	UTTO Representative
		T3	UTTO Representative
		T4	UTTO Representative

Figure 30 – Case Study B - Interviewees

6.2.1. Common Themes across Stakeholder Groups

Barriers:

Time Expectations:

Our data analysis reveals that industry and universities have different expectations in terms of timing. Four stakeholder groups shared the opinion that the main difference is that industry operates within shorter timelines than universities. This is exemplified by the observation made by a representative of a UTTO:



"Academic time horizons are usually 2-3 years, whereas SMEs have a much shorter perspective on time." (B4, T2)

SMEs were particularly vocal in stating that these timescale conflicts can affect their willingness of industry to engage in partnerships with universities. SMEs perceive that universities do not follow timescales effectively and that they often fail to report on time, creating communication and trust issues among parties.

University Culture:

Our data revealed that universities are just not set up to engage with commercial partners effectively. Universities do not always offer flexibility to engage in commercial partnerships, as they dictate that the primary focus of academics should be teaching and research. Further, there are differences within each university. This intensifies the problem for SMEs, as each university works in a different way resulting in no single best way of approaching them. As mentioned by an academic, the focus of a university can also change within different departments of the same university:

"In other departments, if you have a big project coming in with industry, the head of department will say "okay, someone else can do your teaching and cover it and you focus on this project because it can be interesting for us." Here, in my department, if you have a teaching you were committed to do, you just have to bite the bullet and do it." (B1, U4)



This quote exemplifies how even within a university, there can be various cultures. Furthermore, this quote underlines how in some departments researchers are not given the time nor scope to pursue commercial ventures. Further, our analysis revealed an old-fashioned attitude within universities. A senior lecturer elaborates on this point below:

“Some industries do not understand that we cannot push aside teaching for five weeks, work for them right now, and come back to teaching. We don’t have the opportunity to do that. Universities still think the same way as they did in the 1970s, they are very old-fashioned.” (B1, U4)

Enablers:

Trust:

Trust was a common enabler identified by all four stakeholders. They viewed it as essential in building meaningful relationships, which can evolve into commercial partnerships. Our stakeholders agreed that the process is slow and it should not be forced by external parties, as one respondent highlights below:

“You can get on with those people and you can only do that by seeing them face to face. And it’s best to have that introduction in an environment where there’s no pressure.” (B2, S3)

Furthermore, our data emphasises that without trust, IP negotiations and other barriers are elevated. The term “trust” was also linked to more effective communication between the different stakeholders. Trust was also described by an SME representative, as “the single and most valuable commodity that you cannot buy with money.” (B2, S4)



6.2.2. Academics

Barriers:

TTO's Understanding of Scientists:

Another topic that emerged from our interviews, is the perception that TTOs do not understand scientists. Academics highlighted that their primary motivation is to advance research. The promise of significant economic rewards does not drive them as it does not translate into more capital for their research. A possible explanation for this particular issue was given by an academic researcher, who highlighted that TTO staff may lack academic training:

"So, there is a disconnect between the TTOs and the Academics. The TTOs often don't have any academic training, and they don't understand the minds of academics. They have the idea that "academics are lazy", and they are very negative towards them. This can actually backfire as the academics can say "these people actually don't understand us." (B1, U3)

This academic directly links the lack of understanding of TTOs to reluctance to engage in the commercialisation process, indicating that TTOs can act as a barrier.

TTO's Focus on Formal Commercialisation:

Our data also presented another barrier to the process, as TTOs were found to focus more on formal routes of commercialisation. This was found to have a negative effect on the process, as informal channels are neglected which can greatly enhance commercialisation. A professor highlighted this issue:



“Sometimes we can help industry through consulting, or we just want to start our own spin-offs. But the TTO people don’t see that as anything for universities as it doesn’t bring in any licensing revenue.” (B1, U7)

Moreover, our analysis indicates that there is a link between commercialisation outcomes and the quality of TTOs. It was highlighted that depending on the TTO, the emphasis on formal commercialisation differs. An interviewee presented possible reasons for this and mentioned that the problem originates from TTOs’ performance mainly being measured on formal commercialisation. This is made clear in the quote below:

“There is a lack of professionals in some of the TTOs, and they are very much motivated by license income and they are measured on that so they don’t care about technology that does not have potential for license income.” (B1, U1)

However, secondary data analysis does not support this point as it shows that the key performance indicators prepared by the Government include informal commercialisation. To elaborate, collaborative research and consulting are channels of informal commercialisation that were taken into account when assessing university and industry cooperation (HEFCE, 2014). Nevertheless, the fact that Government has introduced these measures does not necessarily mean they are effectively implemented. Thus secondary data cannot confirm or deny this point.



Enablers:

Impact Assessment Policy:

According to researchers, the Government's recent focus on Impact Assessment has greatly facilitated the commercialisation of university research. This is reflected by the following quote from a professor:

"The way my output or contribution is assessed is 65% is outputs which essentially means publications, 20% is impact and 15% is on advance. This is the first time that impact is taken into account and it encourages us to go out there and engage with industry." (B1, U6)

Through this policy, academics are encouraged to write impact cases and demonstrate how the work in previous years has benefited society. This finding is especially relevant to our study, as it shows direct linkages between Government policy and researchers' willingness to engage in commercial projects. This point was elaborated upon by a different respondent who stated:

"I feel supported by higher levels of Government with the research framework impact, so there is a real translation of the benefits of research to industry and society." (B1, U3)

Evidence of this policy is exemplified in the secondary data. Figure 31 shows that there were 6,975 impact case studies published between January 2008 and July 2013. During the same time period 191,150 Research Outputs were published (Research Excellence Framework, 2014).



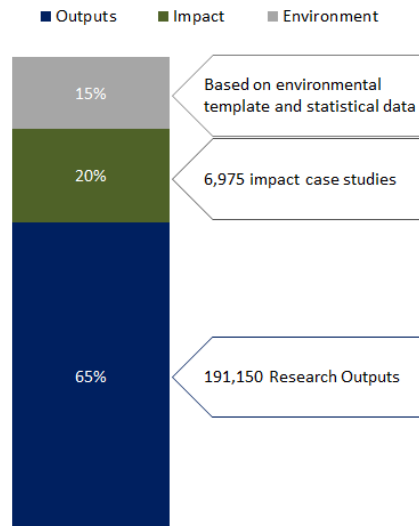


Figure 31 – Results of the Research Excellence Framework, 2014

A possible explanation for this difference in the number of publications is the fact that research outputs have a 65.0% weighting of the Research Excellence Framework versus 20.0% for impact case studies. It is important to note that 83.9% of the Impact publications received 3 or 4 star rating showing that the quality of it is outstanding in terms of reach and significance.



6.2.3. SMEs

Barriers:

Universities' IP Policies:

The IP negotiation process was identified by our UK interviewees as one of the main barriers of the commercialisation process. Two key themes that emerged as possible inhibitors to the process were overvaluation and overprotection of IP by universities. This was further supported by a Managing Director from an SME:

"What they're not pointing to, is all the pieces of IP that the universities have, that were never exploited and could have made commercial success, more than two billion dollars' worth." (B2, S5)

This particular interviewee highlighted the fact that universities want ownership of IP but are not interested in commercialising the idea. The notion that universities aim to own IP without commercial intent, is a source of frustration for SMEs involved in the process. However, as pointed out by the founder of an SME, this is a local issue that cannot be generalised to all the universities:

"There are other universities like Cambridge who have a lot more enlightened view which is so good to actually have some rights and opportunities or they won't insist on absolute ownership of the IP." (B2, S4)



Enablers:**Early Stage Agreements:**

SMEs highlight that in order to cooperate effectively with university researchers it is important to establish ground rules at the beginning of a partnership. The managing director of an SME elaborated on this:

“We need to have a lot of communication from the very beginning to make sure everybody is on the same page” (B3, G1).

Here, he emphasises that early stage agreements are vital to ensure expectations are aligned between the different parties.

6.2.4. Government

Barriers:

When asked about barriers of the commercialisation process, the three Government officials that we interviewed either refrained from mentioning any barriers, or the ones they mentioned are already captured in the common themes section. This is a finding in itself and an area for future research.



Enablers:

Absorptive Capacity:

Government participants highlighted the importance of establishing how knowledge generated from university-SME partnerships will be applied in the commercial process. One respondent stated the following:

"I have learned from our partners that before you embark on a project, you need to understand how you are going to adapt and maintain the knowledge that is created, how you will apply it within the organisation." (B3, G2)

An executive furthered the above notion, highlighting the concept of absorptive capacity and its importance in terms of utilising the knowledge generated through university-SME partnerships. This can be observed in the below quote:

"The vast majority of work which is done between universities and industry isn't utilised properly within organisations, due to the lack of the ability to absorb academic knowledge." (B3, G3)

6.2.5. TTOs

Barriers:

Communication Process:

Another barrier that emerged from our qualitative data analysis is communication between parties. A TTO representative elaborates on this issue below:



"SMEs want results as soon as possible whilst researchers need time. They don't want money, they want SME's to be directly implicated in the projects. There is clearly a communication problem between the parties." (B4, T3)

Further, there is a general sentiment amongst TTOs that SMEs believe they can buy the time of researchers. However, academics also require a time investment from SMEs. Furthermore, goals of the project are often misaligned as both parties fail to effectively communicate their desired outcomes of the project. Overall, a lack of effective communication results in a mismatch of expectations, which inhibits collaboration.

Enablers:

Teambuilding:

Respondents identified relationships as a key enabler in the commercialisation process. In addition to this, teambuilding emerged as an important topic in establishing successful partnerships. Our respondents emphasised that the success of a team is directly linked to the quality of the team. Furthermore, a TTO representative explained that the key to building a successful team is to have a broad network of contacts:

"We don't like if they take staff from the university so we try and put him in touch with industry people that have experience in his particular field so they can build their team." (B4, T4)



6.2.6. Summary of Findings

The following diagram summarises the main findings from our study grouped by stakeholder groups:

Common Themes Across Stakeholder Groups		Academics - B1		SMEs - B2	
Barriers:	Enablers:	Barriers:	Enablers:	Barriers:	Enablers:
• Timing expectations • University culture	• Trust	• TTO's understanding of scientists • TTO's focus on formal commercialisation	• Impact assessment policy	• University IP policy	• Early stage agreements
Government - B3		TTOs - B4			
Barriers:	Enablers:	Barriers:	Enablers:		
	• Absorptive capacity • Cross university cooperation	• Communication process	• Team building		

Figure 32 - Summary of Main Findings for Case Study B

6.3. UK Case Study Discussion

6.3.1. Introduction

The data analysis of the UK study produced a range of themes that both inhibit and enable industry and academic commercial partnerships. In order to better understand these topics and their importance, they will be analysed from a macro perspective using a cascade framework. Similarly to the Australian case, the roles of the Government, university leadership and the working environment will be analysed and their impact on the commercialisation process discussed in the context of the UK study.



6.3.2. Government

The UK results indicates that Government policy has a significant impact upon the commercialisation process. One important aspect of Government policy, which UK respondents stressed as a major enabler to commercialisation, is the role of funding. This supports the literature in this area, which advocates the importance of financial resources in facilitating commercial partnerships between academics and industry (Thursby and Thursby, 2002; Siegel et al., 2003). Additionally, respondents stated that Government programmes acted as an enabler for the commercialisation process. For example, HEFCE's policy of increasing funding for academic partnerships with SMEs was found to encourage researchers to pursue commercial applications in their work. This finding conforms with extant literature on this topic, which highlights the importance of federal programmes in enabling commercialisation and thus driving innovation output (Markman et al., 2008).

Lastly, respondents also referred to the Government's dual incentive scheme, where academic research is rewarded based on academic or commercial impact (Research Excellence Framework, 2014) as a key enabler in the commercialisation process. Further, the secondary data shows how the Government are striving to encourage innovation through both formal and informal channels. This is broadly in line with the literature, which describes the enabling role positive incentive schemes and an open approach to innovation channels have upon the process (Feldman and Desrochers, 2003; Debackere and Veugelers, 2005). Nevertheless, this first needs to be analysed from the university leadership perspective, as they are the decision makers who interpret and implement these policies. Furthermore, there



is an apparent disconnect between the Government and leadership, which will be discussed in the below section.

6.3.3. University Leadership

In concurrence with existing literature, our findings show that leadership within research institutions is strongly affected by Government policies regarding innovation and commercialisation (Debackere and Veugelers, 2005). Moreover, the apparent disconnect between universities and Governments could also be identified as an orientation related barrier (Bruneel et al., 2010). Within existing literature, differences in institutional norms between universities and industry have been identified (Partha and David, 1994). However, our findings extend the literature in this area, by broadening its horizon to include differences in the institutional norms and reducing the cognitive distances between Government and universities (Nooteboom, 2000). This means that orientation related barriers can hold a greater importance than what is postulated in extant literature.

Additionally, respondents highlighted the importance of university reward schemes to the commercialisation process. This is broadly in line with the literature which explains how incentive schemes will decrease academics' motivation to participate in commercialisation (Link et al., 2007). Our findings uncovered a nuance to this barrier, revealing a lack of facilitation for academic stakeholders to take on commercialisation projects in tandem with other responsibilities. This extends existing literature, illustrating an important, novel aspect of the incentive related barriers. Consequently, this highlights the importance of academics' motivation in the process.



The role of university culture as a barrier to commercialisation partnerships has previously been highlighted in the literature (D’Este and Patel, 2007). Our findings mostly concur with the literature, however respondents attributed the issues with university leadership to a specific university culture entrenched in a traditional, 1970’s mindset regarding innovation. This mindset is embodied by universities’ formal, policed approach to commercialisation. This finding extends the literature, providing a more detailed view of specific cultural challenges in the UK context. This nuance holds great importance, as this mentality has a derived impact on internal stakeholders such as UTTOs (Debackere and Veugelers, 2005), which will be explored in the following section.

Lastly, our respondents stressed a further barrier embedded within university leadership. Their handling of IP is seen to be a barrier within the process, where stakeholders believe the university to “overvalue” IP and therefore inhibit relationships between academics and industry. This is broadly in line with extant literature, which portrays universities as “economic actors”, attempting to control a proportion of academic research with commercial applicability (Etzkowitz, 1988 p.833). However, the specific barrier of over-valuation is new to the literature, and can be important to enhance the understanding of the commercialisation process.

6.3.4. UTTOs

Within the literature, UTTOs are identified as an enabler in the process of commercialisation (Goldfarb and Henrekson, 2002; Muscio, 2010). Nevertheless, our findings conflict with this view, as respondents have emphasised several areas where UTTOs are underperforming and



in reality obstructing the process of commercialisation. In particular, respondents identified UTTOs' focus on formal commercialisation channels as a key barrier. This highlights a nuance to the literature, illustrating a dual role of UTTOs as both a barrier and an enabler. This additional barrier provides greater understanding of the commercialisation process, and extends the literature in this area.

Another aspect of UTTOs under contention is an apparent disconnect with scientists. The literature states that UTTOs are key facilitators of relationships (Siegel et al., 2003). Therefore it is interesting that the academic stakeholder group highlighted how researchers and scientists are not always understood due to the complicated nature of their field. This extends the literature, as it reveals a subtle barrier when interacting with UTTOs. By not fully understanding academics, their ability to properly facilitate relationships between researchers and industry will be adversely affected

6.3.5. Working Environment

As a consequence of Government policies and university leadership directives, the working environment is directly impacted, shaping the way in which SMEs and academics interact with one another. The literature describes several orientation related barriers between these two stakeholders such as varying perceptions of timelines (Siegel et al., 2003), research disclosure (Bruneel et al., 2010) and end goal (Geuna et al. 2003; Partha and David, 1994). Our findings support this, as stakeholder expectations, such as timelines, were identified as a major barrier in the commercialisation process. However, we also found that there were differences in their relative approaches to projects, as academics are focused on the method of research, whilst



industry are more focused on the end result - irrespective of method. This finding reveals an aspect of orientation related barriers which has not been covered in detail and therefore extends the literature in this case. This improves our understanding of the differences in institutional norms and provides further insight into the barriers inhibiting commercialisation.

Since there are a number of concerning barriers which academics and industry have to overcome in order to successfully cooperate, it is not surprising that our respondents identified relationships as vital enablers to the process. This is in accordance with literature on this topic, which emphasises the importance of relationships between parties and how a successful venture depends on this aspect (Perkmann and Walsh, 2007; Santoro and Bierly, 2006). Further, trust is seen as integral to establishing a strong relationship, creating sustainable links between universities and SMEs (Santoro and Saporito, 2003). This notion was reiterated in our results, as it was essential for parties to trust each other considering the sensitivity of the data handled. Moreover, absorptive capacity was also identified as an enabler by various stakeholder groups, in concurrence with the literature (Cohen and Levinthal, 1990). However, interestingly the UK respondents stressed the importance of absorptive capacity as a precondition to trust, rather than as an enabler in itself. This means that absorptive capacity, in the context of university-SME commercial partnerships, holds greater importance as a trust facilitator than is currently proposed, thus extending current literature.



6.3.6. Formative Conclusions

The Cascade Effect:

The data supports the literature in that there are various barriers and enablers concerning academic and industry commercial partnerships. Within the discussion, it became apparent that the top-down, cascading nature of national policy is critical to achieve a successful commercialisation process. This extends current theories such as the Triple Helix Model, which attributes less influence to the Government (Etzkowitz and Leydesdorff, 1999). Grounded in this cascade framework, we can draw a tentative conclusion that the Government exert the most significant impact on the process, seeing as how their funding, program and incentive schemes affect all stakeholders.

Further, combining our qualitative data reveals the notion that academic and SME engagement in commercial partnerships is impacted by the objectives of the university leadership. This is seen through various channels: incentive schemes and reward structures, strategic focus of the institution and the effect of UTTOs. Since all of these themes originate from university leadership, a speculative conclusion can be made that leadership is an important aspect of the commercialisation process. However, in accordance with the cascade effect, university leadership is initially impacted by Government policy and therefore we conclude they do not exert as much influence on the process as the Government.

Through the cascade framework, we speculatively conclude that university leadership present the majority of barriers to the process. This is demonstrated through the apparent disconnect between the positive policies implemented by Government and how leadership have



interpreted these in line with their strategic vision. Our findings indicate this is predominantly a consequence of the traditional outlook most well-established universities have in the UK. Alternatively, the other reason that may explain this apparent disconnect between these two stakeholders, is a perception issue. Respondents may have perceived Government policies to be more beneficial and effective than they are in practice.

Finally, we can draw a preliminary conclusion that the working environment also significantly impacts the commercialisation process, but to a lesser extent than Government policies and university leadership. The underlying reason for this is that the working environment is shaped by the policies imposed by Government and leadership. However, within the working environment we found that the institutional differences between academics and industry strengthened the need for close relationships and trust between parties. This was ultimately integral to establishing a successful partnership.



The cascading effect discovered in the UK is illustrated in figure 33:

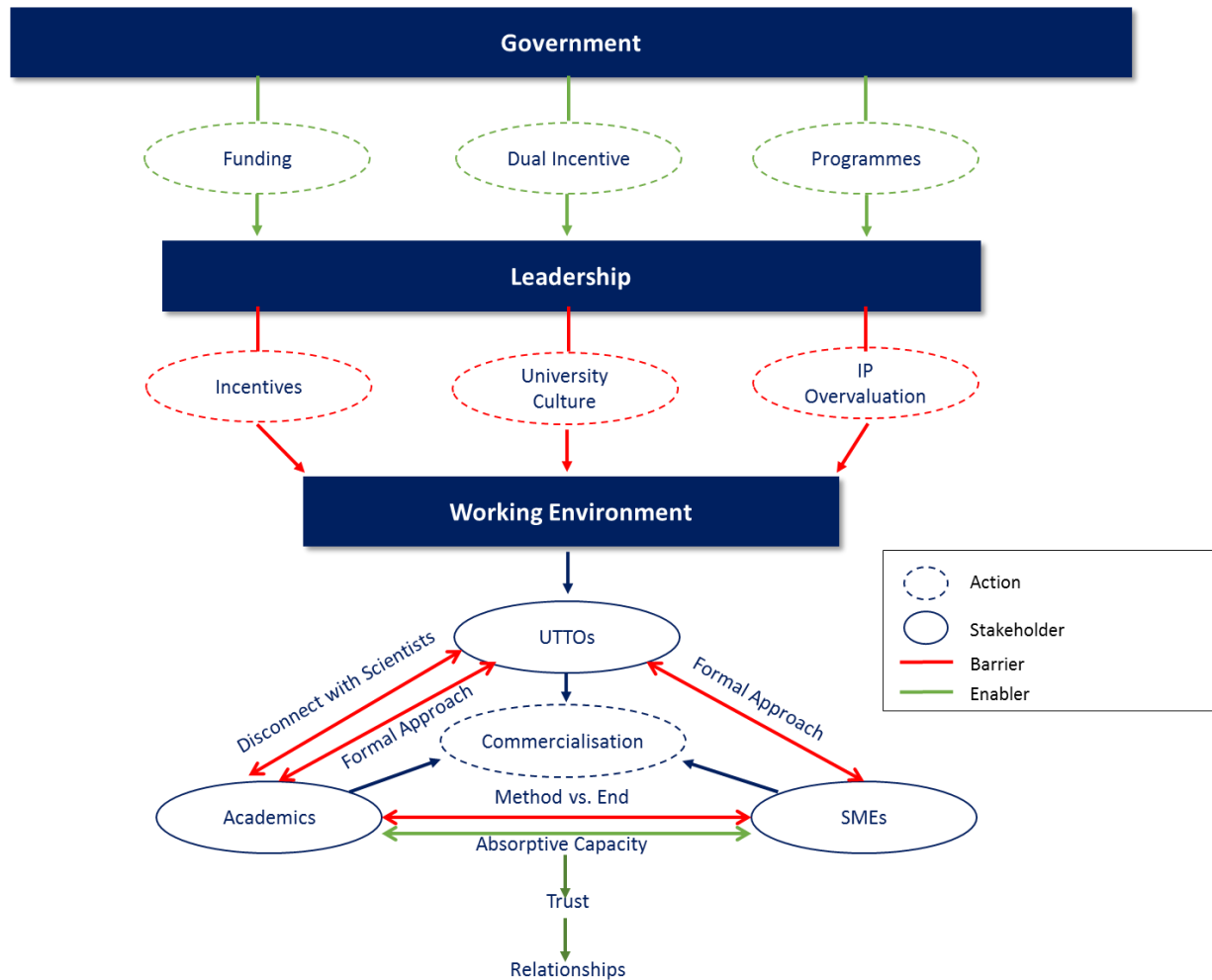


Figure 33 – Cascade Effect in the UK Study

Barriers and Enablers:

Although the concept of barriers and enablers in the university-industry partnership process is well-established in the literature (Siegel et al. 2003; Nooteboom, 2000; Link et al., 2007; Siegel et al., 2007; Perkmann and Walsh 2007), the present study develops a more dynamic view of the relevant barriers and enablers in the UK context. Combining the findings with the



discussion, rooted in literature, conclusions were made on the following unidentified barriers and enablers, illustrated by the table below (figure 34):

Type	Name	Explanation
Barriers	Lack of Facilitation	Respondents highlighted a lack of facilitation from the universities, which inhibits academics from engaging in commercialisation partnerships
	1970s Mindset	Respondents identified a 1970s mindset within the culture of university leadership. This is linked to a formal, policing approach to commercialisation
	Cognitive Distance	Has yet to be explored within the literature between governments and universities
	IP Overvaluation	Respondents highlighted that there is an issue with universities overvaluing IP, which inhibits collaboration
	UTTO Focus on Formal Commercialisation	Respondents identified that UTTOs only focus on formal channels of commercialisation and highlighted this as a barrier to the process
	UTTO Disconnect with Scientists	Respondents revealed that UTTOs can be a barrier as well as an enabler
	Result vs. Method	Respondents highlighted that academics are more interested in the method employed when embarking on a commercialisation project, whilst SMEs are mainly interested in the end result
Enabler	Absorptive Capacity as a Precondition for Trust	Respondents stated that absorptive capacity's main purpose is to facilitate trust

Figure 34 – New Barriers and Enablers Identified in the UK study



Chapter 7

Discussion



Chapter Overview

This section provides a general discussion of both the UK and the Australian cases. The similarities and differences between the two cases are discussed in a cross-case examination. Paradox theory is then employed to analyse counter-intuitive findings. Finally, the limitations of the study are presented.

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7. Overall Discussion

7.1. Cross Examination of Emergent Themes

Commercialisation is an important aspect of national innovation policy (Perkmann and Walsh, 2007; Mowery, 1998) and the two separate case studies in Australia and the UK have identified numerous factors, which both enable and hinder the process. Having discussed the results of the findings as independent of one another in the previous sections, the focus here shifts towards a cross-case examination.

7.2. Differences

Funding:

The literature delineates how important funding is to enabling relationships (Thursby and Thursby, 2002) and how it stimulates invention, development and market introduction (Siegel et al., 2003). Interestingly, there appears to be a difference in opinions regarding funding in the Australian case study compared to the UK. Funding was mentioned as a key enabler in the UK case study, where HEFCE play an important role in distributing funds across the academic sphere (HEFCE, 2015). However, the reverse was true in the Australia case study where there is a strong sentiment that funding is actually a barrier when researchers are looking to partner with industry. Moreover, in the case study conducted in Australia, there is a perception that funds are not distributed fairly, contributing to demotivating respondents to engage in commercial partnerships. Interestingly this concern was not raised in the UK case study, indicating the allocation process was more transparent and not seen to inhibit attitudes towards commercialisation. This difference in perception of the allocation process,



accentuates our earlier finding in Case Study A which proposed the subsequent effects an unclear allocation system has upon stakeholder attitudes.

Incentive Schemes:

Effective incentive structures and reward schemes have been identified in the literature as critical to encourage commercialisation (Debackere and Veugelers, 2005). This is broadly in line with our results, which indicated incentive schemes had an important impact. However, respondents offered juxtaposing views on whether incentive schemes positively or negatively affected the process. In Australia, there has been a shift away from practical impact towards a focus on world elite journal publications (Research Grant Allocation Methodology, 2015). Conversely, the UK rewards commercial and academic impact (Research Excellence Framework, 2014), which respondents identified as a key enabler in the commercialisation process. This contrast in opinions actually helps underline the importance of incentive schemes, as in one case they have negative impacts and in the other they have positive effects. This lends credibility to the extension in literature found in Case Study A - pertaining to the negative attitudes that may arise (“publish or perish” mentality) as a result of ineffective incentive schemes.

University Culture:

The results indicate that university culture is an important factor in the commercialisation process, which is broadly in accordance with extant literature (Meyer-Krahmer and Schmoch, 1998; Siegel et al., 2003; D’Este and Patel, 2007). Nonetheless, cultures were perceived to be starkly different between the two cases. It was considered to be more conservative and



traditional in the UK case study – rooted in a 1970s mindset, whereas it was perceived to be more open and creative in the Australian case study. Interestingly though, the UK is performing better with regards to innovation output than Australia (OECD, 2013). This would suggest that university culture does not necessarily have a large impact on the success of commercialisation process in general. This brings an important nuance to existing literature on university culture and commercialisation partnerships, indicating that university culture might have a limited impact on macro innovation performance.

Role of TTOs:

The literature outlines how TTOs enable the process of commercialisation by facilitating relationships, linking academics with industry and assisting in project management (Siegel et al., 2003; Muscio, 2010). In Case Study A, our respondents support this finding, as they emphasise how TTOs and UTTOs played a vital role in fostering collaboration between academics and industry. Interestingly, the opposite was found in Case Study B, as respondents stated the formal approach of UTTOs was inhibiting their effectiveness. This indicates that the TTO approach to commercialisation has a significant impact on the process as a whole. This subtle finding extends the literature by drawing attention to the impact TTO strategy has upon the process, rather than how their typical functions affect commercialisation.

7.3. Similarities

Relationships:

Despite the many differences between the two cases, there were also several similarities regarding the commercialisation process. In accordance with the literature, both cases



highlighted relationships as an important enabler (Perkmann and Walsh, 2007). There are many facets of relationships which define their success, such as trust. The importance of trust has been stressed in the literature, and is key to building and maintaining sustainable relationships between academics and industry, especially as commercialisation involves the sharing of sensitive information (Santoro and Saporito, 2003). This notion is reiterated in both cases, as respondents emphasised that due to the secretive nature of their work it's of great importance that trust is present between parties in order to limit opportunistic behaviour (Bradbach and Eccles, 1989; Dodgson, 1993). Moreover, the concept of trust is extended within the UK case study, where it is seen as a precursor to absorptive capacity which in turn is essential in building successful relationships. However, in the Australian case study the notion of incremental development of relationships was identified as the main precondition to trust. This illustrates that although the overall importance of trust is apparent in both cases, the way in which this is achieved or the purpose it serves can differ. This extends the literature, providing a more dynamic view of trust than previously identified.

University Claim on Intellectual Property:

The literature also recognises that universities are increasingly displaying characteristics of “economic actors”, in that they want more ownership over potential commercial research (Etzkowitz, 1998 p.833). This was identified as a key barrier to commercialisation in both cases, as respondents in the UK indicated that the overvaluation and overprotection of IP by universities was inhibiting commercial ventures by complicating the relationships. This issue was reiterated in the Australian case, as academics were concerned that universities were over-protecting IP, complicating the negotiations with industry and therefore hindering



industry collaboration. The fact that this barrier was identified in both cases, reinforces our earlier point that over-valuation of IP is an additional barrier within the process of commercialisation. This further highlights how our findings extend the literature in this regard.

Stakeholder Expectations:

In line with the literature on this topic, both cases stressed how differences in stakeholder expectations acted as an orientation related barrier to commercialisation (Bruneel et al., 2010). In particular, the inherent differences between industry and academics were highlighted, which is consistent with the literature on the variety institutional norms of each set of stakeholders (Partha and David, 1994). In accordance with our findings, timeline issues were apparent in both cases. However, the reasoning behind these timeline issues were portrayed differently in the two cases. In the Australian case study, it was stressed that due to the risks involved when partnering with industry, academics require greater time investments from SMEs. The UK case study grounded the timeline issues in more practical terms such as lack of facilitation for academics to assume other responsibilities than research and teaching. This adds depth to current literature as it illustrates that although the importance of these timeline barriers were apparent in both cases, that there are important nuances as to what triggers this barrier.

7.4. Paradox Framework

One way in which to further extend this cross case examination is to examine the results through a paradox lens, as researchers often use this technique to describe conflicting



demand and opposing views (Sundaramurthy and Lewis, 2003). This may help in identifying what paradoxical tensions exist and what implications these have on the commercialisation process. Recent ambidexterity research provides a relevant example of how we aim to analyse counter-intuitive findings through the paradox lens. Several studies in this area illustrated how organisations' success depends on the ability to simultaneously manage contrasting demands (Gibson and Birkinshaw, 2004; O'Reilly and Tushman, 2008; Raisch and Birkinshaw, 2008). Therefore, we aim to adopt a similar approach to identify juxtaposing strategies and how they may be vital for long-term commercial success.

Government Policies:

As discussed in the UK and Australian case studies, the Government is responsible for setting national policy and therefore affects all the other stakeholders (Chung, 2002). In the case of Australia, Government policy appears to be contradictory in nature on certain levels. On one hand, it promotes commercialisation through the unique Government offices it has established, which are designed to facilitate the process. Conversely, it has also inhibited the process by cutting university funding in recent years. This, conjoined with incentives provided for quality of research rather than industry impact, has resulted in a decreased focus on commercialisation within research institutions. In accordance with paradox literature, this can be classified as a self-referential loop, as it is an example of a contradiction within the process (Putnam, 1986). This provides a different perspective on the current issues concerning Government policies, thereby extending the literature by applying paradox theory.



Considering the UK case, Government policy was not perceived to be contradictory and was generally viewed as conducive to the process. To elaborate, they were able to simultaneously address funding, incentive schemes and specially designed organisations like the Research Councils to enable the commercialisation process. This is broadly in line with paradox literature, which highlights that when organisations are able to achieve dynamic equilibrium, they achieve long-term success (Smith and Lewis, 2011). On the other hand, in the Australian case study, the Government is perceived to struggle to balance the pursuit of academic excellence through world elite publications and encouraging collaboration between industry and academics. This delineates the relevance of the dynamic equilibrium model in relation to the commercialisation process. Therefore, an extension to the existing literature can be made, as it has been illustrated that the dynamic equilibrium model can be applied when evaluating Government policy in relation to the commercialisation process.

University Leadership:

Another aspect of the cascading framework that was surprising, is that university leadership did not necessarily follow the guidelines provided by Government. In accordance with the paradox framework literature, this can be seen as a system contradiction (Putnam, 1986). Here, there are values entrenched within university leadership which seem to be causing this counter-intuitive relationship with the Government. In the UK case study, despite the positive policies established by the Government, university leadership actually appears to hinder the process by focusing on formal types of commercialisation. As previously stated, this limits the potential number of commercial projects and neglects a significant number of academic engagements, which could have commercial applications in the future. So there is a



systematic flaw in the process, as theoretically the university should be aligning their objectives with the Government, in order to encourage higher levels of commercialisation. This system contradiction between Government and university leadership extends current literature, as it has yet to be evaluated in the context of university-industry partnerships. This is an example of a tactical approach to innovation (Tidd et al., 2001) - focusing solely on formal channels, rather than a broader portfolio perspective to commercialisation accounting for informal channels as well.

The opposite is true in the Australian case study, where the Government has provided mixed messages regarding commercialisation through conflicting policies. To elaborate, certain organisations like the CSIRO have promoted commercialisation, whilst the current incentive scheme limits the scope for commercial projects. This is broadly in accordance with paradox literature, which describes such conflicting organisational tensions as “system contradictions” (Putnam, 1986). However, within the context of commercialisation, this paradoxical system contradiction has not been covered. Therefore, this finding extends the literature and provides a different angle of understanding regarding the setting of Government policies.

The fact that this paradoxical finding is prevalent in both case studies, but on opposite ends of the spectrum, is extremely interesting. This not only highlights the importance of leadership on a macro-scale, but also that the commercialisation process is flawed. Therefore, by analysing this issue through the paradox framework, we have drawn new links between stakeholders. This novel approach to analysing the interactions between universities and Government, is an extension on the literature in this area.



Technology Transfer Offices:

One final paradoxical finding that was identified relates to the role of TTOs. As the literature states, these are important enablers in the process of commercialisation (Goldfarb and Henrekson, 2002; Muscio, 2010). However, in the UK case study, our qualitative data suggests that TTOs can act as a barrier in the process. This is counter-intuitive considering they are established specifically to assist in linking academics with industry. A significant reason for this appears to originate from university leadership and their focus on formal commercialisation, as UTTOs have aligned their targets with the institution strategic directives. In accordance with paradox literature, this appears to be a self-referential loop as there is a contradiction embedded within the process, as TTOs are not enabling commercialisation (Putnam, 1986). This extends the literature, as this paradoxical nature of TTOs is not considered by scholars and enhances our understanding of the commercialisation process.

On the other hand, UTTOs in the Australian case were identified as a major enabler by respondents across several stakeholder groups. However, some respondents highlighted certain nuances, such as low accessibility, which inhibits the effectiveness of UTTOs. Consequently, whilst UTTOs clearly enable the process, the fact that they are not accessible limits their ability as a facilitator between industry and academics. In accordance with paradox theory, this is another example of a self-referential loop, as there is an apparent contradiction regarding the concept of TTOs (Putnam, 1986). This novel finding extends the literature surrounding TTOs as previously they were seen to act predominantly as an enabler, with limited research having been done on potential areas where they can act as a barrier.



7.5. Limitations

In this section, the potential limitations of the study will be presented and discussed. Several of these were inherent to the scope of our study, others were due to external factors outside of our control.

7.5.1. Data Sample

The scope of our sample for the semi-structured interviews was limited to Western Australia and South-West England. Although both these regions are hotbeds for SMEs, they do not provide an accurate representation of the population as a whole. In Australia, the firms were highly sector specific due to the nature of the surrounding landscape. This limited our results in making conclusions applicable to the entire country. Similarly, SMEs in the South-West region in England were very technology focused, further limiting the applicability of our findings to the rest of the UK. However, as the purpose for our study does not include generalising to a population, it is not believed that this limitation has compromised the validity of our results.

7.5.2. Time Constraints

Due to limited time in Australia, the amount of data collection possible was confined. This meant that theoretical saturation was not reached, limiting the validity of our Australian results. Similarly in the UK, due to time constraints the data collected was restricted. Likewise, this meant theoretical saturation was not met, limiting the validity of the UK data. Due to the structure of the academic year, time constraints had a greater impact on the UK study. Moreover, because our data was specific to certain regions, the validity of the results could be limited due to homogenous experiences and contexts of the stakeholders interviewed.



7.5.3. Case Study Methodology

A popular criticism of case studies is their lack of generalisability. Due to the nature of the research conducted, the results cannot be used as proof to verify or refute, with certainty, any previous stream of thought. Further, the findings cannot generalise to populations, but rather contribute to theory and suggest areas for further investigation. Therefore the results are limited by the context in which they were collated. Furthermore, due to the qualitative nature of our study, our data may be limited due to various biases. This may affect the validity of the results by distorting truths. However, we have restricted the impact of this risk through a rigorous methodology.



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Chapter 8

Conclusion



Chapter Overview

The following chapter presents the overarching conclusions of the study as well as its theoretical and practical implications. This includes a strategic framework to explain the commercialisation process. The chapter concludes by recommending areas for future research.

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8. Conclusion

The purpose of our research was to gain an in-depth understanding of the commercialisation process within Australia and the UK and design a framework that describes the optimal process. Through employing a rigorous methodology a wide range of data was collected from key stakeholders. This, in combination with sound qualitative analysis, ensured the research purpose was successfully achieved.

In line with our sponsor, we have identified that the Australian system is underperforming relative to its peers. Our dual case study approach, allowed for separate in-depth research into the situation of Australia and the UK and ultimately for a cross-case examination to highlight key findings.

Our strategic cascade framework describes the relationships between major policy makers and influencers in the commercialisation process. Not only does this help distinguish between macro-level decision-makers, but also illustrates what enablers and barriers are inherent to the process at each level of analysis. Ultimately, the working environment stage shows how commercialisation arises through the collaboration between several key stakeholders, previously identified in the study.

Therefore, the study has not only created an optimal framework with regards to commercialisation but also provided an indication to national policy makers as to how to improve the process. In general, this research is current, relevant and addresses vital political



developments across the globe regarding innovation performance and national innovation systems.

8.1. Theoretical Implications

Our research has provided a novel contribution to the academic literature, in the form of our strategic cascade framework combining the findings from our two conducted case studies. This shows the interdependent relationships between stakeholders, as well as indicating what measures each stakeholder can take in order to improve commercialisation outputs.

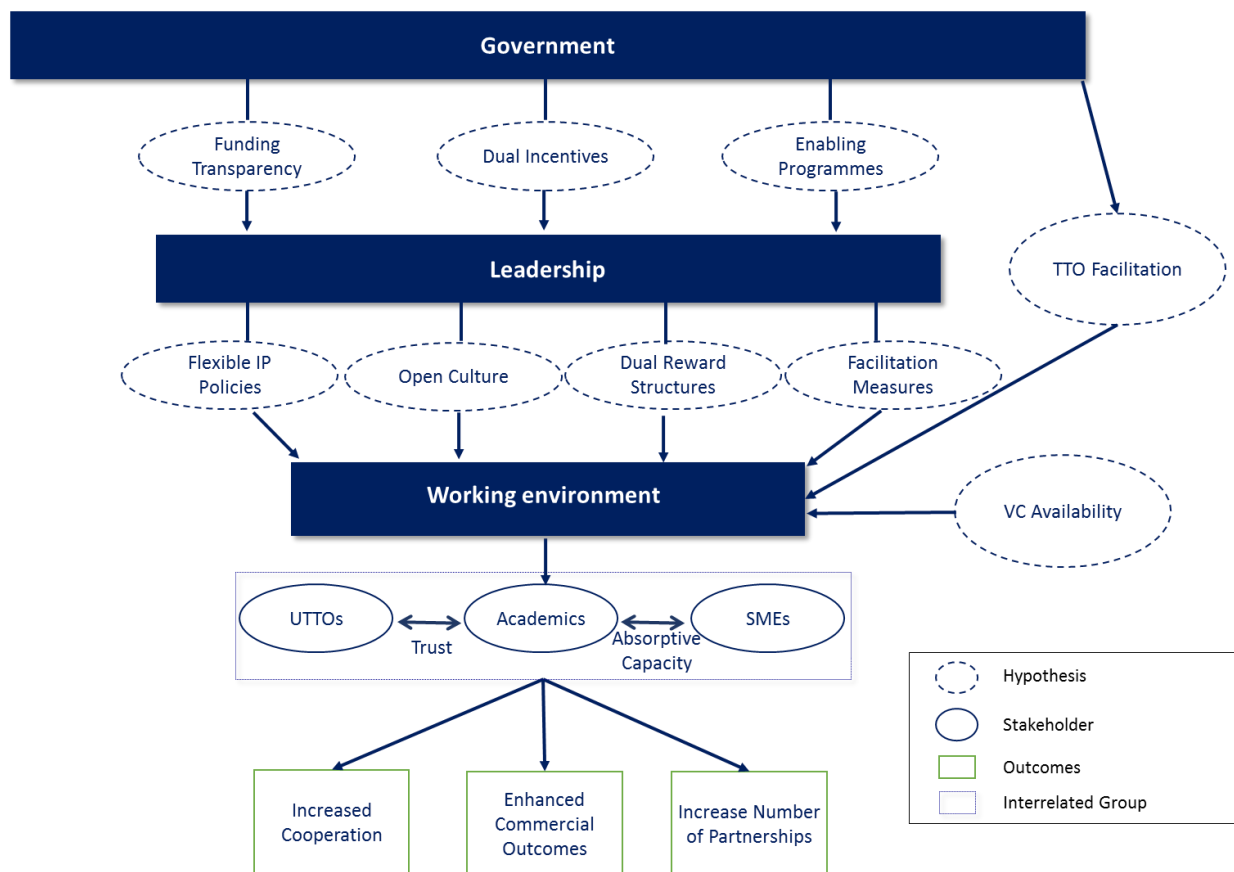


Figure 35 – Strategic Cascade Framework



This conceptual framework was formed by combining the cascade representations developed in Case Study A and B. These accounted for the commercialisation process relevant to their specific context. However, through the cross-case examination various similarities and differences were discovered. These then formed the basis of our strategic framework, as by accounting for barriers and enablers across two case studies, we believe it provides a more holistic approach to commercialisation.



The below table summarises the hypothesis that we have in the above framework.

1	Funding Transparency	Government funding impacts university leadership and thus is cascaded to SME/Academics. More transparent processes can improve engagement and willingness to collaborate
2	Dual Incentives	Government incentive schemes that promote research and impact have a positive effect on university leadership which is cascaded to UTTOs and thus to SME/Academics
3	Enabling Programmes	Government programmes which facilitate collaboration have a direct positive impact on the agenda of university leadership
4	Flexible IP Policies	Flexible IP policies from universities can incentivise academics' and SMEs' willingness to engage in the process
5	Open Culture	A culture which adopts a more open approach to informal channels of commercialisation, can lead to higher levels of commercial outputs
6	Dual Reward Structures	Reward schemes that encourage both academic and commercial impact, can encourage higher levels of participation in commercial projects
7	Facilitation Measures	Universities which make more allowances for researchers to pursue commercial applications to the research, can enhance the commercialisation process
8	Trust	Trust is integral to building a successful relationship, and an aspect of the process which has been underestimated
9	Absorptive Capacity	Absorptive capacity is an important aspect of relationships, as it acts as a precursor to trust which forms the foundation for a successful partnership
10	TTO Facilitation	TTOs are an important enabler to commercialisation, linking researchers with industry and helping manage relationships
11	VC Availability	Venture capital availability is important not just for funding purposes, but also for the positive impact it has on stakeholder attitudes

Figure 36 – Hypothesis Reflected in Strategic Cascade Framework



The strategic cascade framework demonstrates that the employment of the actionable strategies will result in outcomes such as increased cooperation, enhanced commercial outcomes as well as an increase in number of university-SME partnerships.

8.2. Practical Implications

8.2.1. Sponsor Implications

With Alternate Futures recently establishing their business and aiming to facilitate relationships between industry and research institutions, it is vital for them have a modern framework detailing the relationships between stakeholders and what measures will lead to enhanced commercialisation.

Our research provides Alternate Futures with a deeper layer of analysis as relevant stakeholder views have been accounted for. It is essential for Alternate Futures to be able to understand the perspectives of various stakeholders in order to successfully advise on how to best link these parties in commercialisation partnerships. Additionally, the identification of paradoxes provides Alternate Futures with a new area of which to develop innovative services upon.

Moreover, our framework provide Alternate Futures with an opportunity to develop actionable strategies to improve university-SME commercialisation outcomes. The framework further allows for a greater understanding of the inter-relationships between constructs in the process, making it easier for Alternate Future to generate advice for a more robust process as well as an increased understanding of inherent risks.



Moreover, our study provides marketing material that Alternate Futures can use when building their business and obtaining new clients. Being able to illustrate a dynamic view of university-SME commercialisation as well as novel concepts upon which new services can be built, will be a significant competitive edge for Alternate Futures as a new start-up in a competitive environment.

8.2.2. University Implications

Our study also provides actionable recommendations for universities with regards to enhancing their role in the process, thereby increasing productivity and innovation outputs. The strategic framework illustrates how flexible IP policies, an open culture, a dual reward scheme and facilitatory measures enable the commercialisation process. These are important considerations for university leadership, as by implementing these policies there should be an increase in U-I collaboration and the commercialisation of new research ideas.

8.2.3. Macro Policy Makers

Our data also contains several important implications for macro policy makers within government to consider. From a high level perspective, the analysis provides government with a clearer picture regarding U-I collaboration and how this is impacted by macro policies. The strategic framework provides an in-depth view of what measures policy makers can take in practice to positively impact the commercialisation process and consequently innovation output.

The framework proposes specific actions; such as fund distribution transparency, a dual incentive scheme and several types of enabling programmes. These include initiatives such as



science parks, innovation incubators and intermediary organisations dedicated to fostering U-I partnerships.

8.3. Future Research

Naturally, we recommend that future studies should validate our strategic framework through further case studies and a combination of quantitative and qualitative methodologies. Additionally, researchers should conduct quantitative studies with a probability sample - plus a larger sample for interviews - in an attempt to find a representative sample relevant to its context and thus be able to generalise findings. However, due to the size of the UK and Australia, this may be an unrealistic target. Therefore an alternative would be to conduct studies in different regions and then comparing results.

In addition to improving the study with regards to the two contexts, a comparison could be made with more countries. Of particular interest is the US, as it is often recognised as the most advanced in terms of university-industry partnerships. This would reveal additional potential best practices that policy makers could consider in order to further improve the process and achieve greater innovation outputs.

Furthermore, both the UK and the Australian Government representatives that we interviewed were reluctant to highlight any barriers to the process. This is a finding in itself as it shows that they are either not willing to share the problems that may be occurring or they fail to acknowledge them. However, more information on the topic is needed to reach any conclusions. Therefore we recommend this be explored in future research.



Another possibility for future research would be to investigate the individual steps of the process. This study provides a holistic view of the commercialisation process from a macro perspective, so mapping the process on a micro scale could reveal additional barriers and enablers inherent to the process. In relation to this, a longitudinal study could improve the investigation, as our project was subject to a time constraint.

Finally, we recommend replicating this study but focusing on specific industries. This would increase the accuracy of the results by definitively outlining the barriers and enablers to the process within one industry. Moreover, this could provide a greater amount of actionable recommendations specific to an industry. However, this was not performed as it was outside the scope of the project due to the fact that our financial sponsor had a greater interest in recommendations across the board that serve for future investigation.



Chapter 9

References

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9. References

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Chapter 10

Appendix

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10. Appendix

10.1. Meeting Log

Date	Mettings	Explanation	Daniel	Miguel	Liam	Linnea	Eline
21.02.2014	Internal meeting	Discuss potential target companies	X	X	X	✓	✓
27.02.2014	Internal meeting	Update on target companies	✓	✓	X	X	✓
22.03.2014	Internal meeting	Start team CV	✓	✓	✓	✓	✓
02.05.2014	Internal meeting	Skype meeting to update on our progress	X	✓	✓	X	✓
18.07.2014	Internal meeting	Finalise team CV	✓	✓	✓	✓	✓
20.07.2014	Internal meeting	Decide on comapnies to contact	✓	✓	✓	✓	✓
25.07.2014	Internal meeting	Send team CV	✓	✓	✓	✓	✓
28.07.2014	External Meeting with Sponsor	Discussion of possible projects	✓	✓	✓	✓	✓
01.08.2014	Internal meeting	Discuss Alternate Futures as potential sponsor	✓	✓	✓	✓	✓
08.08.2014	Internal meeting	Evaluate topics proposed by Alternate Futures	✓	✓	✓	✓	✓
15.08.2014	Internal meeting	Accept Alternate Futures proposal	✓	✓	✓	✓	✓
17.08.2014	Internal meeting	Contact School of Management about proposal	✓	✓	✓	✓	✓
18.09.2014	Internal meeting	Prepare presentation with alternate Futures	✓	✓	✓	✓	✓
19.08.2014	External Meeting with Sponsor	Acceptance of projects	✓	✓	X	✓	✓
20.08.2014	Internal meeting	Start Literature review	✓	✓	✓	✓	✓
25.08.2014	Internal meeting	Structure of Literature review	✓	✓	✓	✓	✓
31.08.2014	Internal meeting	Discuss readings for lit review	✓	✓	✓	✓	✓
06.09.2014	Internal meeting	Update on lit review progress	✓	✓	✓	✓	✓
08.09.2014	External Meeting with Sponsor	Project update	✓	X	✓	X	X
11.09.2014	External Meeting Academic Advisor	Project update and advise	✓	✓	✓	✓	✓
14.09.2014	Internal meeting	Methodology	✓	✓	✓	✓	✓
21.09.2014	Internal meeting	Methodology	✓	✓	✓	✓	✓
25.09.2014	External Meeting Academic Advisor	Project update and advise	✓	✓	✓	✓	✓
09.10.2014	External Meeting with Sponsor	Project update	✓	✓	✓	✓	✓
11.10.2014	Internal meeting	Interview planning	✓	✓	✓	✓	✓
15.10.2014	Internal meeting	Interview planning	✓	✓	✓	✓	✓
19.10.2014	Internal meeting	Mock interviews	✓	✓	✓	✓	✓
20.10.2014	Internal meeting	Interview debrief	✓	✓	✓	✓	✓
22.10.2014	External Meeting Academic Advisor	Project update and advise	✓	✓	✓	✓	✓
23.10.2014	External Meeting with Sponsor	Project update	✓	✓	X	X	X
26.10.2014	Internal meeting	Change interview protocol	✓	✓	✓	✓	✓
02.11.2014	Internal meeting	Change interview protocol	✓	✓	✓	✓	✓

Date	Meetings	Explanation	Daniel	Miguel	Liam	Linnea	Eline
06.11.2013	External Meeting with Sponsor	Project update	✓	✓	✓	✓	✓
20.11.2014	External Meeting Academic Advisor	Project update and advise	✓	✓	✓	✓	✓
21.11.2014	Internal meeting	Plan for Christmas	✓	✓	✓	✓	✓
14.01.2015	Internal meeting (Skype)	Update on plan for christmas	✓	✓	✓	✓	✓
22.01.2015	Internal meeting (Skype)	Update on transcriptions	✓	✓	✓	✓	✓
27.01.2015	External Meeting Academic Advisor	Project update and advise	✓	✓	✓	✓	✓
28.01.2015	External meeting with Ammon Salter	Advise	✗	✗	✗	✓	✓
02.02.2015	Internal meeting	Data analysis Australia	✓	✓	✓	✓	✓
04.02.2015	External Meeting Academic Advisor	Project update and advise	✓	✓	✓	✓	✗
05.02.2015	Internal meeting	Interview Plan UK	✓	✓	✓	✓	✓
11.02.2015	Internal meeting	Interview Update	✓	✓	✓	✓	✓
12.02.2015	External Meeting Academic Advisor	Project update and advise	✓	✓	✓	✓	✗
16.02.2015	Internal meeting	Interview Update and Data analysis	✓	✓	✓	✓	✓
18.02.2015	External Meeting with Sponsor	Project update	✗	✓	✗	✗	✗
20.02.2015	Internal meeting	Analysis of UK	✓	✓	✓	✓	✓
23.02.2015	External Meeting Academic Advisor	Project update and advise	✓	✓	✓	✓	✓
26.02.2015	Internal meeting	Analysis of UK	✓	✓	✓	✓	✓
04.03.2015	External meeting with Jens Roehrich	Advise	✗	✓	✗	✓	✗
05.03.2015	Internal meeting	Write results section	✓	✓	✓	✓	✓
06.03.2015	Internal meeting	Write results section	✓	✓	✓	✓	✓
07.03.2015	External meeting with Orietta Marsili	Advise	✓	✓	✓	✓	✓
08.03.2015	Internal meeting	Discussion	✓	✓	✓	✓	✓
09.03.2015	External meeting with Jens Roehrich	Advise	✓	✓	✗	✗	✗
10.03.2015	External meeting with Ammon Salter	Advise	✓	✗	✗	✓	✗
11.03.2015	Internal meeting	Conclusion	✓	✓	✓	✓	✓
12.03.2015	Internal meeting	Finalise project	✓	✓	✓	✓	✓
13.03.2015	External Meeting with Sponsor	Project update	✗	✗	✗	✗	✓
14.03.2015	Internal meeting	Appendix	✓	✓	✓	✓	✓
15.03.2015	Internal meeting	Formating	✓	✓	✓	✓	✓
16.03.2015	Internal meeting	Proof read	✓	✓	✓	✓	✓
17.03.2015	Internal meeting	Printing	✓	✓	✓	✓	✓

10.2. Company Proposal Form

**SCHOOL OF MANAGEMENT
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Proposal Form - Company Section

<http://www.bath.ac.uk/>

Company Name:	Alternate Futures
Address:	9/66 Belgravia St. Belmont, 6104 Perth Australia
Contact Name(s):	Denise Goldsworthy
Telephone:	+61 407 429 584
Email:	denise.goldsworthy@alternatefutures.net.au
Issue statement - what is being investigated:	
The issue being investigated is the process of commercialisation of University research and innovation in Australia and its prospects and perils. What are the current challenges in this process, and how to bridge the gap between academia and business?	
Context/Background to this issue:	
Key statistics like OECD/Eurostat which measure innovation collaboration with higher education or research institutions, continuously rank Australia as one of the lowest performing countries. This highlights that Australia is lagging behind in the field of innovation. In Europe and the US, they have managed to make successful partnerships between businesses and research institutions. Although the Australian government allocates huge funds to university research, Australia has yet to benefit from the economic benefits of industry-university partnerships. Alternate Futures wants to be able to provide solutions to businesses to better manage their innovation practices. They aim at acting as an intermediary between the academics and businesses to provide solutions based on the latest relevant research findings. Therefore, Alternate Futures are interested in finding out where the process of commercialising University research draws to a close.	
Suggested research methods:	
<u>Mixed method approach</u> • Qualitative: Interviews with academic researchers as well as industry leaders • Quantitative: (Drawing on the qualitative study) – survey based on qualitative study	
How will the company assist students in conducting the research (eg. access to staff, customers, supply chain partners etc).	
As Australian business woman of the year and member of a number of company boards of directors Denise Goldsworthy has a number of invaluable contacts that she has offered to put us in touch with both in industry and in Universities.	
Desired outcomes:	
• Validate a market need for the practice of Alternate Futures • Generate meaningful conclusions regarding the state of innovation in the Australian economy • Creating simple models in business language to be used as future “selling points” for Alternate Futures • Comparing Australia with Europe and the USA	

10.3. Confirmation of Final Year Project Form

SCHOOL OF MANAGEMENT
FINAL YEAR PROJECTS

Confirmation of Final Year Project Form



<http://www.bath.ac.uk/>

[The university and Alternate Futures have agreed to waive the fee and the company will cover the company expenses.]

Administrative & financial aspects

The sponsor is required to pay the following:

- (i) Administration fee of £1000 + VAT, payable to the University on successful completion of the project
- (ii) Expenses budget for team to cover costs incurred in carrying out the research (to include items such as travel, telephone, stationery, report printing, focus groups, purchase of research reports/journals etc.). The proposed expenses budget for this project is: **£ 395** (Note: Expenses budgets in the past have varied from £300 to £3000, depending on the research requirements, but the average spend is £1000).

To the Project Sponsor:

Please confirm the offer of a Final Year Project for 2014/15 by completing this form, then signing and returning it to the Projects Office, School of Management, University of Bath BA2 7AY - preferably by email (ugprojects@management.bath.ac.uk) or fax (01225 386942).

Project Finances

The company agrees to pay the Project Administration Fee of £1000 + VAT on successful completion of the Project: No. (SME)

The company agrees to fund project-related expenses incurred by the team to a proposed budget total of £395

Project Team Details

Team Number:

Team 16 (UWA)

Student Names: Eline Skeide, Daniel Calleja, Miguel González-Bueno, Liam O'Hara, Linnea Staalhammar

I/We understand that the Project will only proceed subject to the approval of the University of Bath, School of Management

Name:	Denise Goldsworthy
Job Title:	CEO
Telephone:	+61 407 429 584
Email:	denise.goldsworthy@alternatefutures.net.au
Signature:	
Date	20.08.2014

10.4. Proposal Form – Student Section

SCHOOL OF MANAGEMENT
FINAL YEAR PROJECTS



Proposal Form - Student Section

Student names:	Daniel Calleja
	Miguel González-Bueno
	Eline Skaget
	Linnea Stålhammar
	Liam O'Hara
Academic research question underpinning the study: OECD/Eurostat has placed Australia last in a study looking at innovation collaboration with higher education or research institutions. A number of studies have been conducted on the topic of innovation in Australia, both in research institutions and in an industry context. However, little research has been done on the commercialisation of University generated innovation and the rate at which it is implemented in an industry setting. Specifically, we want to look at the process of how university research and innovation in Western Australian Universities is commercialised in SMEs using the TEN model of innovation, and exploring the barriers of collaboration between universities and industry.	
Identify the main functional area of management that this project relates to (circle): HRM Decision/Risk Analysis Organisational Behaviour Operations/Supply Marketing Information Systems Accounting/Finance	
Identify key theories / references in this area that will underpin the theoretical contribution of the study	
Reference	Theory/Contribution
1 Harman, G., Harman, K., 2004. Governments and universities as the main drivers of enhanced Australian university research commercialisation capability. <i>Journal of Higher Education Policy and Management</i> . 26(2) pp. 153-168	Governments and universities efforts to enhance the research commercialisation and technology transfer capabilities of Australian universities.
2 Harman, G., 2001. University-Industry Research Partnerships in Australia: Extent, benefits and risks. <i>Higher Education Research & Development</i> . 20(3) pp. 245-264	University- Industry research partnerships in Australia: extend benefits and risks.
3 Heher, A. D., 2006. Return on Investment in Innovation: Implications for Institutions and National Agencies. <i>The Journal of Technology Transfer</i> . 31(4), pp. 403-414	Commercial success in universities turns into unrealistic expectations. Return on investment in innovation - implications for academic institutions and national agencies. Technology transfer.

4 Mazzarol, T., Reyhani, M., 2012. Nurture or nature: interplay between the individual and the institution within the commercialisation practices of Australian Universities. <i>Paper presented at ACERE-Diana Conference, 31 January to 3 February 2012, Fremantle Western Australia.</i>	The nature of academic entrepreneurship and the interplay between the individual researcher and the institution in which they work. Although there has been a growing body of research into technology entrepreneurship (Gans 2003), there is a gap in the literature relating to academic entrepreneurship.
5 Collier, A., et al., 2011. Enablers and barriers to university and high technology SME partnerships. <i>Small Enterprise Research</i> . 18(1) pp. 2-18.	Enablers and barriers to university and high technology SME partnerships.
6 Siegel, D.S., Veugelers, R., Wright, M., 2007. Technology transfer offices and commercialization of university intellectual property: performance and policy implications. <i>Oxford Review of Economic Policy</i> 23(4) pp. 640-660.	The recent increase in the rate of commercialization of intellectual property at US and European universities has important performance and policy implications. A key conclusion is that universities and regions must formulate and implement coherent and feasible technology transfer/commercialization strategies.
7 Markman, G. D., Gianiodis, P. T., Phan, P. H., & Balkin, D. B., 2005. Innovation speed: Transferring university technology to market. <i>Research Policy</i> , 34(7), pp. 1058-1075.	This study extends innovation speed theory by empirically linking the antecedents and outcomes of technology commercialization at universities.
8 Rosenbusch, N., Brinckmann, J., & Bausch, A., 2011. Is innovation always beneficial? A meta-analysis of the relationship between innovation and performance in SMEs. <i>Journal of Business Venturing</i> . 26(4) pp. 441-457.	Measures the performance implications of innovation in small and medium-sized enterprises (SMEs), and cease to obtain evidence whether and especially under which circumstances smaller, resource-scarce firms benefit from innovation.
9 Roos, G., Fernström, L., & Gupta, O., 2005. National Innovation Systems: Finland, Sweden & Australia Compared. <i>Learnings for Australia, Report for the Australian Business Foundation. Intellectual Capital Service Ltd</i> , 46.	The purpose of this paper is to analyse the national innovation systems of Finland, Sweden and Australia and, based on the comparisons of the Nordic countries with Australia, to identify potential policy options for improving Australia's innovation capacity.
10 Mazzarol, T., & Reboud, S., 2005. An Exploratory Study of How Small Firms Estimate the Potential Rent Returns from Investment in Innovation. <i>E&I 2005, Waikato (AUS) 07-08 Jul 2005.</i>	This study outlines the findings of a survey of small, high innovator firms in Australia. Provides a view of the difference between Short-term capital intensive innovation vs. Long term sustainable returns. Firms that reported possession of a formal, systematic approach to innovation were significantly more likely to generate superior innovations than those firms who did not.

**SCHOOL OF MANAGEMENT
FINAL YEAR PROJECTS*****Proposal Form - Student Section***

Research methods to be employed:

We remain flexible in terms of the research methods we can utilise for our project. Most of the previous literature on this topic draws from qualitative studies such as interviews with experts in the field. As very little has been done within our area of research, a possibility for our project could be to conduct unstructured, exploratory interviews with renowned academic researchers as well as industry leaders in Australia. We believe this would enable us to identify the most prevalent barriers to commercialisation and cooperation on innovation.

Comparative Case Study – between Australia and UK.

Academics, government institutions and SME's will be interviewed in each region.

Furthermore, a secondary quantitative data analysis will be conducted to supplement the primary research.

Access required to completed project (eg. to customers, the company, their partners)

We require frequent access to our sponsor company to make sure our progress is in line with their expectations. We also need access to their business partners and clients across the industry who will be used for our interviews to provide an industry perspective on our area of research.

We will also require access to academic researchers and University management, in order to understand the status quo on the commercialisation processes from the perspective of Universities. In addition, to broaden our study we will potentially require access to some contacts from the University of Bath.

How will this access be achieved:

We have established bi-weekly meetings with Denise Goldsworthy - CEO of Alternate Futures and have a good working relationship with her. She has agreed to provide us full access to the company's key partners and clients, and also access to her outside network.

We have begun contacting relevant lecturers within UWA to see which contacts we should be aiming to interview in the academic industry.

Managerial relevance/importance of findings:

Key statistics like OECD/Eurostat which measure innovation collaboration between research institutions and industry partners, continuously rank Australia as one of the lowest. This highlights the pressing issue of the lack of innovation in Australia, which has massive implications for the future of Australian economy. We believe our project is relevant as it provides insight on the state of innovation in the Australian economy, and could suggest measures to challenge the status quo. This could be relevant for both companies, universities and local politicians in WA, who would have great interest in this evolution.

Our company sponsor Alternate Futures is a consultancy firm based in Perth WA. The company's vision is to be able to help firms in WA innovate in terms of both company culture and systems. They are also aiming at providing executive mentoring programmes and facilitate innovation negotiation between key stakeholders. The company aim is acting as an intermediary between University researchers and industry to provide solutions based on the latest relevant research findings. Therefore we believe our project will be highly relevant to a start-up consultancy such as Alternate Futures, as it can help reinforce their business case to prospective clients.

Our research proposal will also be relevant to managers as it will provide a detailed view of the innovation commercialisation process, highlighting both barriers and enablers to successfully implementing university research in industry.

Academic relevance/importance:

The academic relevance of this research proposal is that we will be exploring a topic that has not been extensively researched before. We have found some supporting articles but none of them actually go into detail addressing our research proposal. As a result we feel we could add value in this academic space, whilst simultaneously addressing the business need for Alternate Futures.

It is of particular importance as currently there is a pressing issue in Australia regarding lack of innovation, as companies are falling behind their counterparts across the globe. By focusing on the transfer of knowledge/innovation from Universities to SMEs, we believe we may reveal some trends and findings that might provide useful insights to academics within the field.

10.5. Interim Report

Team members:

Daniel Calleja

Eline Skeide

Liam O'Hara

Linnea Stålhammar

Miguel Gonzalez-Bueno

Academic advisor:

Chris Archer-Brown

Sponsor:

Denise Goldsworthy, Alternate Futures (Perth, Australia)

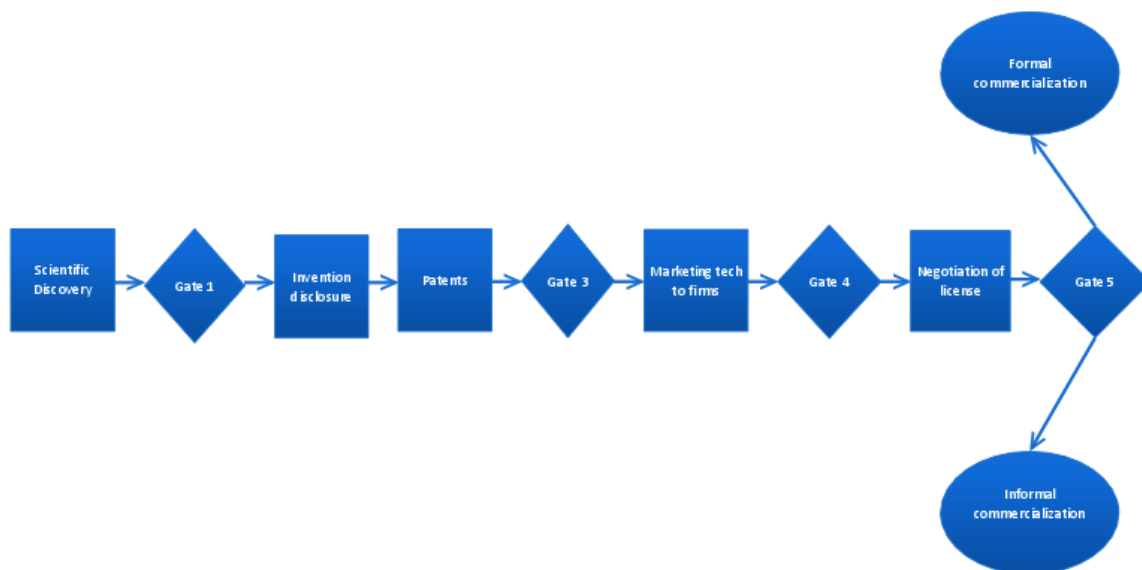
Work carried out thus far and team member contribution

Research question(s) and issues/themes for investigation

OECD/Eurostat has placed Australia last in a study of innovation/commercialisation collaboration with higher education or research institutions. A number of studies have been conducted on the topic of innovation in Australia, both in research institutions and in an industry context. However, little research has been done on the commercialisation of University generated innovation and the rate at which it is implemented in an industry setting or commercialised. Specifically, we want to investigate the process of how university research and innovation in Western Australian Universities is commercialized in SMEs using a conceptual framework based on Siegel (2004) as well as the Stage Gate model of innovation (Cooper, 1990). We want to explore the barriers and enablers of university/industry partnerships, the **process** being our identified unit of analysis.

Theoretical positioning/framework

We have developed a conceptual model for our project based on Siegel (2004) as well as the stage gate model of innovation (Cooper, 1990). Our conceptual framework can be seen below.



Due to the exploratory nature of our study, this framework might be changed throughout the course of the project as emerging themes arise.

Research methodology and research methods and rationale

We have adopted a case study research method for our project (comparative between Australia and the UK). The rationale for utilising this method is that our academic advisor explained that this was very suitable to our research topic, especially because we would need a highly varied sample in order to gain valuable insights on our topic. As a group we also agreed on this approach. We have interviewed academics, government officials, SMEs, University Technology Transfer Offices (UTTOs) as well as private incubator firms for our project. Since we are undertaking an exploratory study, we needed to get an understanding of several stakeholders attitudes and opinions of the process, thus for the methodology we chose a semi-structured interview approach. We designed an interview guide with open-ended questions, and aimed for the interviews to be very loosely structured so we would be open for interview objects to enter into undiscovered areas that could be of significance to us. Furthermore, a secondary data set will be added to supplement our primary research, to add context and rigour to our analysis. We are planning on writing up our studies in a journalistic/narrative manner to hopefully create a report that makes for an interesting read.

Data collection & analysis

Thus far we have scheduled and conducted 30 interviews in Australia. We complete the data for this study in early January.

Drafted (parts) of chapter(s)

Thus far we have done the following:

1. Rough draft of methodology section of the report
2. Rough draft of context section of the report
3. Plan for literature review
4. Scheduled and conducted 30 interviews for the Australian case study

Contribution by team member:

All:

The group members have contributed equally in terms of creating a team CV, engaging with company contacts and ultimately sourcing our sponsor Alternate Futures. Furthermore, everyone has contributed equally in identifying a gap in the literature, and ensuring that this gap is of value to our sponsor. Every group member has also contributed more or less equally when it comes to conducting interviews.

Daniel and Miguel:

Have been responsible for liaising with and keeping our company sponsor in the loop in terms of project progress. Members have also been responsible for producing presentations for our sponsor. They have also been responsible for scheduling interviews.

Liam:

Has written a rough draft of the context section of our report, as well as being responsible for ensuring requirements from Bath have been met (project proposals etc.).

Linnea and Eline:

Have made a structure for the literature review, developed a conceptual framework under the guidance of our Academic Advisor as well as writing up a rough draft for the method section of the report. Additionally, they have the responsibility to liaise with and prepare meeting materials for our academic advisor.

How close you are to your original timetable of planned activities

We made a Gantt chart in the beginning of our stay in Australia to make sure all tasks were completed by the time we leave Perth. However, we found it easier to plan “on-the-go” as things kept changing all the time. This method worked well for us and we have conducted 30 interviews in Australian case study, which was our top priority. Originally we planned to write up a large part of the report while we were here, but the nature of our study (exploratory case study) required that we kept an open mind and let go of our initially planned structured approach. Still, the methodology and literature review is in good shape, but we have not made a finished draft like we planned as the literature is evolving as we interview and new topics emerge. Moreover, we hoped to do more transcribing and analysis of the interviews while we were here, but the course structure at UWA left us with less time for FYP than we were hoping for. However, we are very comfortable with our progress thus far, and believe we are on track to complete the project in a timely manner.

Key milestones plan:

Key tasks to be completed:

Task	Responsible	Deadline
Transcribe interviews	All	1st Jan
Analyse Data from AUS study Nvivo + SPSS - see how this can be mixed with secondary analysis	Miguel and Dani	15th Jan
Secondary data analysis -(find facts that fit together etc) Make plan for write up of study 1)	Miguel and Dani	20th Jan
Scheduling UK Interviews (some to be conducted in January) → Ask miguel for templates email.	Liam	30th Jan (but need to schedule some interviews to be done in January) - start Jan 1st

Sections left to write (not started):

Section	Responsible	Deadline
Preface - Introduction + Team section	Eline	30th Jan
Literature Review	Eline + Linnea	30th Jan
Write up AUS study + secondary analysis	All	30th Jan
Context section (AUS) - using readings from the google drive about Australia as well as context section (UK)	Liam	30th Jan

Sections to be fully completed (started):

Section	Responsible	Deadline
Finish Methodology section	Linnea	15th Jan
Context section (general)	Liam	30th Jan

To finish when we get back to Bath in Feb:

Task	Responsible	Deadline
Conduct interviews for study 2	TBC	15th Feb
Analyse Data study 2 + secondary Data	TBC	25th Feb
Write up study 2	TBC	30th Feb
Write discussion section/comparison	TBC	10th March
Conclusion	TBC	15th March
Appendices	TBC	20th March

Deviation from your original research contract and justification for deviation

We decided to change the method of our study from a mixed methods approach based on only AUS data to a comparative case study between the UK and Australia. We made this change after we spoke to our academic advisor as he thought a case study method would be better suited for our research topic. Initially we were also under the impression that we had to do a mixed methods project if we wanted a first, but after discussing this with our advisor we realised that if done properly a case study method would be the best way for us to make

theoretical contributions to our selected research topic as well as generating valuable insights for our company sponsor. Our sponsor suggested replicating our Australian study in the UK, and as our academic advisor liked the idea as well the team, we decided that this was a good approach.

In addition, we decided to add secondary data to our project. There are a lot of external factors that contribute to the innovation process in Australia, which we will not get access to from primary research through our interviews. We decided as a team that an additional secondary analysis would add valuable context to the insights from our case study. We were inspired by the Mike Lewis paper on Zara, and decided to write our FYP through a journalistic lens so it would make for a more interesting read. We find that this will be beneficial for our sponsor, academic advisor as well as more interesting for us to work with.

Problems internal to the group, with adviser or sponsor and mitigation strategies

Issue 1: Time management

The main issue for us thus far has been time management. At the University of Western Australia (UWA) assessment is far more continuous than in Bath, and you have multiple large courseworks for each module. We have had some difficulty in finding the necessary time to work on our FYP. In spite of this we have managed to conduct 30 interviews whilst we have been here, so we are fairly happy with our efforts taking our situation into account. We managed the time restraints through being very flexible as of when tasks are completed and by whom. We have developed a culture within our group where people cover for each other and help each other out when someone has a lot on the agenda.

Issue 2: Different working procedures within the group

We have had some minor internal issues in the group, mainly related to different ways of working among group members. These issues have been efficiently resolved through assigning tasks based on the strengths of individual group members. We also encouraged an open dialogue within the group to ensure all concerns are dealt with as soon as they arise.

Issue 3: Exploratory case study

As BBA students we are all very used to detailed plans and highly structured ways of working, and due to the exploratory nature of our case study this has not been possible. We have found this quite challenging, but a very useful learning experience. We have not exactly “resolved” this issue as such, but we are getting better at being more flexible and it has been interesting seeing how the project has developed.

Issue 4: Working remotely

We expect to have a future challenge when it comes to working remotely on FYP throughout December and January, but we have made a detailed plan that has been approved by our academic advisor, which will hopefully mitigate some of the attached risks.

Academic Advisor and Company Sponsor:

We have not had any issues with either our academic advisor or our company sponsor: both have been incredibly supportive and helpful to us throughout this process, and their contributions have been essential to our progress.

10.6. Financials

Australian Dollars

Financials: Budget vs Expenditure			
Items	Budget	Expenditure	Difference
Travel			
Bus	\$30.0	\$53.0	\$23.0
Other Transport	\$100.0	\$0.0	-\$100.0
Research			
Microphone Recorder	\$10.0	\$10.0	\$0.0
Online Software	\$50.0	\$0.0	-\$50.0
Other	\$40.0	\$0.0	-\$40.0
Admin			
Post	\$15.0	\$0.0	-\$15.0
Printing and stationary	\$30.0	\$36.0	\$6.0
Final Report Printin	\$450.0	\$87.0	-\$363.0
Transcribing	\$0.0	\$490.0	\$490.0
Total in Australian Dollar	\$725.0	\$676.0	-\$49.0
Total in Pounds	£374.9	£349.6	-£25.3

Notes:

1. Exchange rate used: AUD/GBP 0.51710
2. Final report cost was reduced by £ 75.0, which was covered by the University of Bath. From £120.0 to £45.0

10.7. Explanation of Stakeholder Analysis

Explanation for table below text:

1. **Academics:** Academics hold a lot of power to influence the process as they can decide whether they want to engage in commercialisation or not. The university is providing the infrastructure in which they operate, thus it is legitimate to include the views and objectives from an academic side to better understand the process. Due to the reduced innovative output in Australia, obtaining in-depth views from an academic point of view on the functionality of the process is considered urgent.

2. **SMEs:** Due to SMEs being at the receiving end, they are powerful as their participation and absorptive capacity is vital for commercialisation. Thus, it is legitimate to spend time getting their views of the process as they will be appropriating the technology, and the rate to which they are willing to collaborate with university is essential to the process. Australia's national economy depends on SMEs' openness to external actors such as universities to support innovative output, and are therefore deemed urgent to investigate.

3. **Government:** Governments will be the most salient actor of all and hold the most power due to their ability to influence other stakeholder groups through policy changes and funding. They have the ability to radically change the process, and legitimising this as it could help contribute to the national economy. Its involvement is urgent as its influence on the process could enable future commercialisation.

4. **TTOs:** TTOs are given considerable power from the government and the universities as they have the ability to deem an innovation suitable for commercialisation or not. The need to understand them as a stakeholder in the process is pressing, due to their direct influence on project selection and management.

According to Mitchell et al. (1997), the most salient stakeholders are those who hold all three attributes, also defined as definitive stakeholders. University leadership was also considered, but classified as non-feasible to obtain an interview and was therefore not included. Further, students and venture capital firms and university research centres were not considered although their views are legitimate to include, lack in power and urgency to influence the process, and were therefore not selected.

Stakeholder	Power	Urgency	Legitimacy
Academics	✓	✓	✓
SMEs	✓	✓	✓
Government	✓	✓	✓
TTOs	✓	✓	✓
Students	✗	✗	✓
VC	✓	✓	✗
Uni. Leadership	✓	✗	✓
Uni. Research Centre	✗	✓	✓

10.8. Example of Email Sent to Potential Interviewees

Dear Sir/Madam,

I am contacting you as I have been kindly provided with your details by ICWA incubators. We are a group of final year students from the University of Bath currently doing an exchange program at UWA. As part of our final year project we have to conduct a group project on a specific area of research. We have focused on university research commercialisation, more specifically we are doing a case study comparing Australia with the UK.

We would like to conduct an open ended interview with experts from universities and SMEs to identify the main barriers and enablers in the transfer of research.

At this point we are ready to start setting up the meetings and we would like to schedule all of these during the last two weeks of October. As we already have made some appointments, it would be great if we could meet between the 27th and 31th October (of course if you would prefer to meet at some other point we would adapt to your requirements). As we are a group of five people, we can conduct several interviews simultaneously or on different dates, depending on your availability.

Would those dates suit you?

Kind regards,
Miguel González-Bueno

10.9. Initial Interview Protocol

Original Protocol

GENERAL INFO		CHECKLIST	yes/no
Date and Time		Recording and notes	
Location		Anonymity	
Interview object Role		About us	
1st Interviewer		Objectives of study	
2nd Interviewer		Ethics/Data protection	
Transcribing		OK to contact at later stage?	

Discussion Guide:

- Thank you for taking the time to meet with us today, we really appreciate it.
- **About them:** We have done some background research and understand that you specialise in (INSERT HERE) or work in (INSERT HERE) - We would like the interview to be focused on your specific knowledge and perspective.
- **About us:** We are a group of five students from University of Bath in the UK studying Business Administration. We are in Australia on an exchange programme and currently studying at UWA. The reason we are here today is that we are conducting research interviews for our bachelor thesis/final year project. The project will be finished in the UK by end-March.
- We are sponsored by a Perth-based consultancy called 'Alternate futures'. Once the project is finished, the final project and results will be uploaded to their website.
- Just to reiterate some of the pre-information we sent you via email, we are investigating the process of commercialisation of university innovations in Australia. We have conducted thorough market research and are familiar with major concepts and the status quo.
- We are here to gain expert advice from you to further our understanding of the topic. This interview will be very loosely structured, so any insights or topics you find interesting is warmly welcomed and very interesting to us.
- Are you happy with this information or do you have any concerns?
- If you would be more comfortable remaining anonymous, this can be arranged without any problems.
- Are you comfortable with us recording and taking notes of the conversation?

Broad research topics:Broad question:

Could you tell us about your experiences with the innovation **process** in relation to university/industry partnerships?

- Describing the process (any new steps we haven't thought about?)

Subtopics: patents, marketing, licensing, contracts

- **Barriers to innovation partnerships**
 - Identifying relevant hurdles and moderators (experience, opinion)
 - Licensing negotiation?
 - Patenting process?
- **Enablers of innovation partnerships**
 - Identifying antecedents and preconditions for innovation to happen between universities/industry (experience, opinion)
 - Relationships, links?
- **Drivers of innovation between university/industry**
 - Identifying factors or people providing forward momentum (opinion, influence)
 - Gatekeepers? – Who decides whether the process moves forward or not?
 - What do decision makers base their go/kill decisions on throughout the process?
- **Management of innovation process**
 - Identifying process information (opinion, perspective)
 - Performance of key decision makers
 - Patenting – how is it managed?
 - Licensing - how is it managed?
- **Outputs of the innovation process**
 - Identifying various outcomes (expectations, perception)
 - What is the end-goal? Doesn't have to be regular commercialisation.
 - Social enterprise, commercialisation, cross-pollination, organizational learning?
- **Innovation networks**
 - Identifying touching points (experience, knowledge)
 - Marketing to firms?
 - 1. Maybe different to our own model? Instead of marketing to firms maybe SMEs contact universities?

Closing:

- Thank you so much for taking the time to talk to us today. We have gained great insights from you, and we have discovered many interesting elements to our research.
- Is there anything else you would like to add? Any areas we haven't covered in this interview?
 - **Are you aware of any documents we should have a look at that could be useful to our research?**
- Do you have any comments or feedback in terms of this interview?
- If there is something we need to clarify at a later stage, would it be OK for us to contact you?
 - If yes: How would you like us to contact you?
 - Also, if we need to ask some follow-up questions, would you be open to a phone call/Skype at a later stage?

10.10. Revised Interview Protocol

Interview Protocol v2

GENERAL INFO		CHECKLIST	yes/no
Date and Time		Recording and notes	
Location		Anonymity	
Interview object Role		About us	
1st Interviewer		Objectives of study	
2nd Interviewer		Ethics/Data protection	
Transcribing		OK to contact at later stage?	

Discussion Guide:

- Thank you for taking the time to meet with us today, we really appreciate it.
- **About them:** We have done some background research and understand that you specialise in (INSERT HERE) or work in (INSERT HERE) - We would like the interview to be focused on your specific knowledge and perspective.
- **About us:** We are a group of five students from University of Bath in the UK studying Business Administration. We are in Australia on an exchange programme and currently studying at UWA. The reason we are here today is that we are conducting research interviews for our bachelor thesis/final year project. The project will be finished in the UK by end-March.
- We are sponsored by a Perth-based consultancy called 'Alternate futures'. Once the project is finished, the final project and results will be uploaded to their website.
- Just to reiterate some of the pre-information we sent you via email, we are investigating the process of commercialisation of university innovations in Australia. We have conducted thorough market research and are familiar with major concepts and the status quo.
- We are here to gain expert advice from you to further our understanding of the topic. This interview will be very loosely structured, so any insights or topics you find interesting is warmly welcomed and very interesting to us.
- Are you happy with this information or do you have any concerns?
- If you would be more comfortable remaining anonymous, this can be arranged without any problems.
- Are you comfortable with us recording and taking notes of the conversation?

Broad research topics:Broad question:

Could you tell us about your experiences with the innovation **process** in relation to university/SMEs partnerships?

- Describing the process (any new steps we haven't thought about?)

Subtopics: Barriers and Enablers

- **Barriers to innovation partnerships**
 - Identifying relevant hurdles and moderators (experience, opinion)
 - Drivers of innovation between university/SMEs
 - Identifying factors or people providing forward momentum (opinion, influence)
 - Management of innovation process. Identifying process information (opinion, perspective)
 - Performance of key decision makers
 - IP process/negotiation
 - Outputs of the innovation process. Identifying various outcomes (expectations, perception)
 - What is the end-goal? Any expectations?
- **Enablers of innovation partnerships**
 - Identifying antecedents and preconditions for innovation to happen between universities/SMEs (experience, opinion)
 - Relationships, links?
 - Drivers of innovation between university/SMEs
 - Identifying factors or people providing forward momentum (opinion, influence)
 - Management of innovation process. Identifying process information (opinion, perspective)
 - Performance of key decision makers
 - Innovation networks
 - Identifying touching points (experience, knowledge)
 - Marketing to firms?

Closing:

- Thank you so much for taking the time to talk to us today. We have gained great insights from you, and we have discovered many interesting elements to our research.
- Is there anything else you would like to add? Any areas we haven't covered in this interview?
 - Are you aware of any documents we should have a look at that could be useful to our research?

- Do you have any comments or feedback in terms of this interview?
- If there is something we need to clarify at a later stage, would it be OK for us to contact you?
 - If yes: How would you like us to contact you?
 - Also, if we need to ask some follow-up questions, would you be open to a phone call/Skype at a later stage?

Changes made from initial protocol:

1. Emphasis on SMEs rather than industry
2. Changed subtopics as all form part of Barriers and Enablers. Just two main topics in new protocol: Barriers and Enablers
3. Some specific questions removed (i.e. social enterprise, cross-pollination)
4. Certain questions grouped (i.e. Patenting and Licensing under IP)
5. Some topics included in both Barriers and Enablers as could be both

10.11. Example of Presentation to Alternate Futures



Final Year Project – Research Proposal Discussion Meeting

19th August 2014



Agenda



1. Meet The Team
2. Research Proposal
3. Financials
4. Project Timeline
5. Discussion and Next Steps

Meet The Team



 Daniel Calleja – Company Liaison/Methodology Expert

Qualities: Objective, Communicative, Creative
Experience: Finance, Client Management, Beauty Industry



 Linnea Stålhammar – Literature Expert/Administration

Qualities: Structured, Diligent, Dynamic
Experience: Retail, Social Enterprise, FMCG



 Liam O'Hara – Data Analyst/Editor

Qualities: Problem Solver, Resilient, Logical
Experience: Finance, Operations, Risk Management



 Eline Skeide – Team Leader/Industry Expert

Qualities: Empathetic, Goal Oriented, Motivating
Experience: Tech Consultancy, Client Management, Operations



 Miguel González-Bueno – Finance Officer/Sponsor Liaison

Qualities: Critical, Efficient, Detail-oriented
Experience: Investment Banking, Commercial Banking



3



Research Proposal

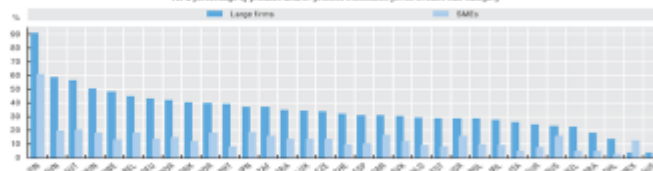
What is being investigated?

- We are investigating the process of commercialisation of University research and innovation in Australia

What is the background to this issue? ⁽¹⁾

- Key statistics like OECD/Eurostat which measure country innovation, rank Australia as one of the lowest performing countries
- If companies fall further behind their international rivals, they could struggle to compete
- The lack of innovation commercialisation can result in declining performance for Australian businesses
- Australian university research is not being utilised to its potential

Firms collaborating on innovation with higher education or public research institutions, by firm size, 2008-10
As a percentage of product and/or process innovation firms in each size category



Source: (1) OECD, based on Eurostat (CS-2010) and national data sources, June 2013



4



Research Proposal (Cont.)

What research methods will be employed?

Mixed method approach:

- Qualitative: Interviews with academic researchers as well as industry leaders
- Quantitative: (Drawing on the qualitative study) – survey based on qualitative study

Help required from Alternate Futures?

- Put us in contact with industry leaders and researchers to conduct our interviews

Desired outcome from the project?

- Validate a market need for the practice of Alternate Futures
- Generate meaningful conclusions regarding the state of innovation in the Australian economy
- Using simple business models as "selling points" for Alternate Futures
- Comparing Australia with Europe and the U.S.

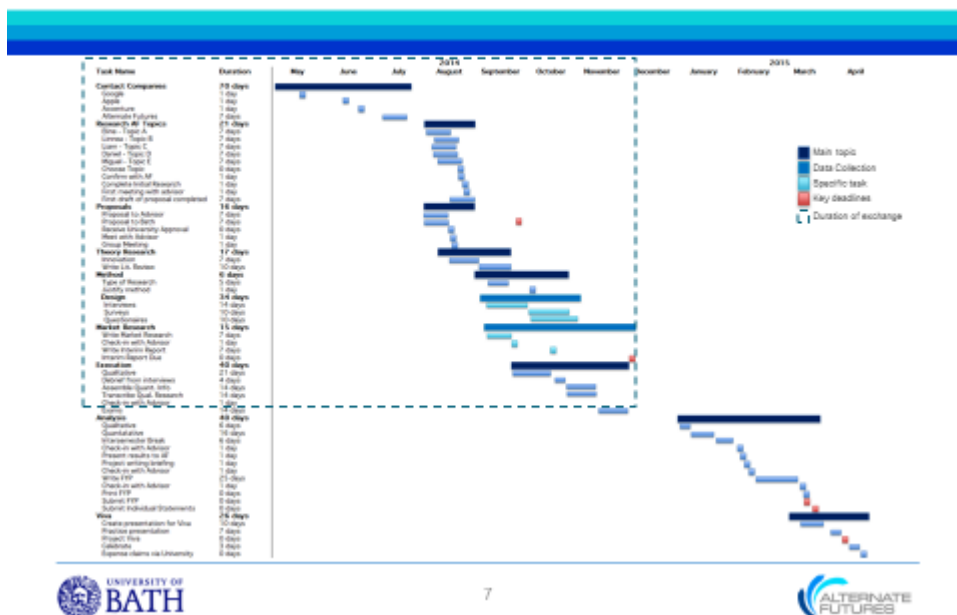


Financials

Budget Vs Expenditure Proposal			
Costs	Budget	Expenditure	
Travel			
Bus	\$30		
Other Transport	\$100		
Research			
Microphone recorder	\$10		
Online Software (Eg: Survey Monkey)	\$50		
Other	\$40		
Admin			
Post	\$15		
Printing and stationary	\$30		
Final Report Printing	\$430		
Total AUD	\$705		\$0
Total GBP	£395		

- These expenses cover the combined costs that the group members will incur throughout the whole project
- The proposed financial budget has been calculated based on previous Final Year Projects' expenditures
- Potentially the cost for printing the report could be covered by the University – further discussion is needed

Project Timeline



Discussion and Next Steps

Discussion

- Research proposal
- Financials
- Reading updates
- ATSE + additional literature
- Scope of project
- Frequency and form of communication

Next Steps

- Submit research proposal
- Obtain an academic advisor
- Literature review