

***"Developing Regional Knowledge Economies:  
How Higher Education Institutions engage in SME  
collaboration – A Research Support Perspective"***

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*This dissertation is submitted in partial fulfilment of the requirements for the  
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## **Abstract**

The ongoing economic turmoil has left us wondering about the future and how we are going to rebuild our damaged economy. The Irish Government however is in no doubt that the path we must pursue is the development of a knowledge economy, built on knowledge and innovation. We are currently just over 10 years into the 20 year effort to transform our economy from an agricultural and manufacturing mix to one driven by knowledge and creativity. This new economy however is dependent on research, scientific discovery and creative thinking.

The purpose of this study is therefore to investigate the Development of Regional Knowledge economies (RKEs), focusing on how Higher Education Institutions (HEIs) engage in Small to Medium sized Enterprise (SME) collaborations, from a research support perspective. The primary research for this study was conducted with eleven respondents across three Institutes of Technology (IOTs) in three different regions in Ireland. This involved analysing the characteristics and underlying assumptions of regional knowledge economies, identifying appropriate means through which HEIs engage with SMEs and exploring the various ways HEIs communicate their research capabilities to SMEs. Underpinned by the phenomenological school of thought, the study was conducted using qualitative methods. Semi structured interviews were conducted face to face allowing the researcher to gain a greater understanding of the respondents experiences of HEI/SME engagement.

The research identified some key findings pertaining to the topic namely; not all HEIs operate on a regional basis and the key characteristics of a regional knowledge economy are predominantly determined by geographic proximity, industry base and skill set. As the term regional knowledge economy is frequently seen as a buzz word its definition is frequently adapted. Not all HEIs feel they are solely responsible for driving the regional knowledge economy and identified key stakeholders such as the National Government, support agencies and local agencies as playing a key role.

Relationship building through knocking on doors, word of mouth and building trust emerged as key components to HEI/SME collaborations. Enterprise Ireland Innovation Vouchers are viewed as the single most effective scheme for encouraging collaborations. Awareness and negotiation was identified as a crucial way of reducing collaboration barriers for SMEs. This research revealed that HEIs actively communicate their research activities to SMEs mainly through their research publications and internal websites, yet the findings suggest SMEs are not engaging in Research & Development (R&D) activity and more is needed to be done in this area of promotion and communication. A need for additional research infrastructure was expressed, with 64% citing the need for more people and 36% citing the need for more capital.

This study adds to the literature on regional knowledge economies in general, whilst contributing specifically to the field of study from a HEI research support perspective. The research provides an understanding of how research collaborations between HEIs and SMEs emerge and identifies various methods to continue and enhance their development. This research has implications for academics, SMEs, policy providers both nationally and regionally, funding support agencies and local authorities.

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## **ETHICAL DECLARATION**

I declare that this research proposal is wholly my own work except where I have made explicit reference to the work of others.

I have discussed, agreed and complied with whatever confidentiality or anonymity terms of reference were deemed appropriate by those participating in the research.

I have read the Structured Masters Research Policy, Procedures and Guidelines (September, 2009) and hereby declare that this dissertation is in line with these requirements.

I have uploaded this dissertation to Turnitin, examined my "Originality Report" by viewing the detail behind the overall "Similarity Index", and have addressed any matches that exceed 3% when quotations and bibliography are excluded. Any unaddressed matches in excess of 3% should be explained by way of additional note with the proposal submission. I have made every effort to minimise my overall 'Similarity Index' score and the number of matches occurring.

Signed:        Eimear Fitzpatrick        \_\_\_\_\_

Date:         11th August 2010

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## **Abbreviations**

ARE – Applied Research Enhancement  
BERD - Business Expenditure on Research and Development  
Carlow IT - Carlow Institute of Technology  
CSO – Central Statistics Office  
DIT – Dublin Institute of Technology  
DKIT – Dundalk Institute of Technology  
EI – Enterprise Ireland  
EPP - Enterprise Platform Programme  
EU – European Union  
GDP – Gross Domestic Product  
HEI - Higher Education Institution  
HOR – Head of Research  
IBEC – Irish Business and Employers Confederation  
ICM – Incubation Centre Manager  
ICT – Information Communication Technology  
IDA – Industry Development Agency  
ILO – Industry Liaison Officer  
IOT – Institute of Technology  
IP – Intellectual Property  
ISME – Irish Small and Medium Enterprises  
OECD – Organisation for Economic Co-operation and Development  
QDAS - Qualitative Data Software Tools  
R&D – Research & Development  
RKE – Regional Knowledge Economy  
SFI – Science Foundation Ireland  
SME - Small to Medium sized Enterprise  
SSTI - Strategy for Science, Technology and Innovation  
TI - Tipperary Institute

TTO – Technology Transfer Officer

USA – United States of America

VAT – Value Added Tax

WIT - Waterford Institute of Technology

# **Chapter 1 Introduction**

## **1.0 Chapter Overview**

This chapter provides the reader with insights into the importance of the current research. It will begin with an explanation of the rationale of why the researcher undertook this study. It will also detail the research questions and research objectives that this study seeks to gain answers to. A brief overview of the structure of this thesis is provided, followed by the limitations of the study. The chapter concludes by highlighting the benefits and contribution of this study.

This study undertakes research in the area of regional knowledge economies and specifically into how Higher Education Institutions (HEIs) through their collaboration with Small to Medium Sized Enterprises (SMEs) contribute to their development. The researcher felt that this is a critical area for research as it has been acknowledged that HEI and SME collaborations contribute significantly to the development of regional knowledge economies. Yet this area has been under researched particularly from an Institute of Technology (IOT) research support perspective. This research is focused entirely on HEIs and is concerned with understanding how research collaborations between HEIs and SMEs can contribute to the development of regional knowledge economies.

## **1.1 Rationale for the Study**

In recent years, considerable sums have been invested by the European Union and National Governments in support of SMEs, through direct financial assistance and through subsidised advisory services (OECD, 2006), to ensure their continued survival. This is based on the assumption that small firms that engage in assistance programmes will become more effective, thus contributing to the economy as a whole. Yet considerable evidence exists to support the fact that many fail to grow (Storey, 2008).

Furthermore, much academic research has been conducted into the potential role of HEIs in shaping regional knowledge economies and increasingly, interactions between HEIs and SMEs are perceived as a key aspect of innovation (Cox and Taylor, 2006).

In particular, a number of National policy reports aimed at stimulating innovation in regional economies have highlighted the importance of fostering greater collaboration between HEIs and SMEs (SSTI, 2006; Innovation Task Force, 2010). The Irish Government talks about making Ireland the innovation hub of Europe, a place where ideas can turn into business and it is now acting on the recent Innovation Taskforce report (2010) which has developed ways to help Ireland fulfil this role. In May 2010, Minister of Enterprise Trade and Innovation, Batt O' Keeffe stated that:

The Innovation Taskforce has developed a road map to make Ireland the best place in Europe to turn research and knowledge into products and services; ... to start and grow an innovative company; ... to relocate or expand and scale a small to medium sized enterprise; and the best place in Europe for research intensive multinationals to collaborate with each other and with clusters of small companies

The Irish Government has introduced various reports to achieve this goal of becoming a knowledge economy. However, it became apparent from the review of the literature that very little emphasis has been placed on the actual process through which HEIs and SMEs engage particularly from a research support perspective.

## **1.2 Purpose of the Study**

The purpose of this study is therefore to provide a greater understanding of how collaborations between HEIs and SMEs emerge and also how they can contribute to the development of regional knowledge economies. Thus, this study will focus on the experiences of HEI research personnel who actively engage in collaborations with SMEs under the following research question:

*Developing Regional Knowledge Economies:  
How Higher Education Institutions engage in SME collaboration – A Research  
Support Perspective*

To address this question the following objectives were identified:

- To analyse the characteristics and underlying assumptions of regional knowledge economies
- To identify appropriate means through which Higher Education Institutions engage with SMEs
- To explore the various ways Higher Education Institutions communicate their research capabilities to SMEs

Qualitative research methods were adopted in this study to achieve these objectives, consisting of eleven semi-structured face to face interviews. These interviews were conducted in three different Institutes of Technology, within three separate regions namely; the South East, Greater Dublin and the North East.

### **1.3 Chapter Outline**

This thesis comprises six chapters and the structure is graphically depicted in Figure 1.1. Chapter 1 delineates the broad direction of the research and provides background information on the research topic. The chapter outlines the research question and objectives which underlie the thesis in addition to its contribution to knowledge.

Chapter two undertakes a study of current literature pertaining to SMEs in an Irish context, regional knowledge economies, and the role of Higher Education Institutions in the contribution to regional knowledge economies.

Chapter three describes the methodology employed in the study. This chapter clarifies the research question and objectives and outlines the rationale behind the choice of methodology. The advantages and disadvantages of the research philosophy and chosen method are explored. The sample selection, data collection and analysis are also presented in this chapter.

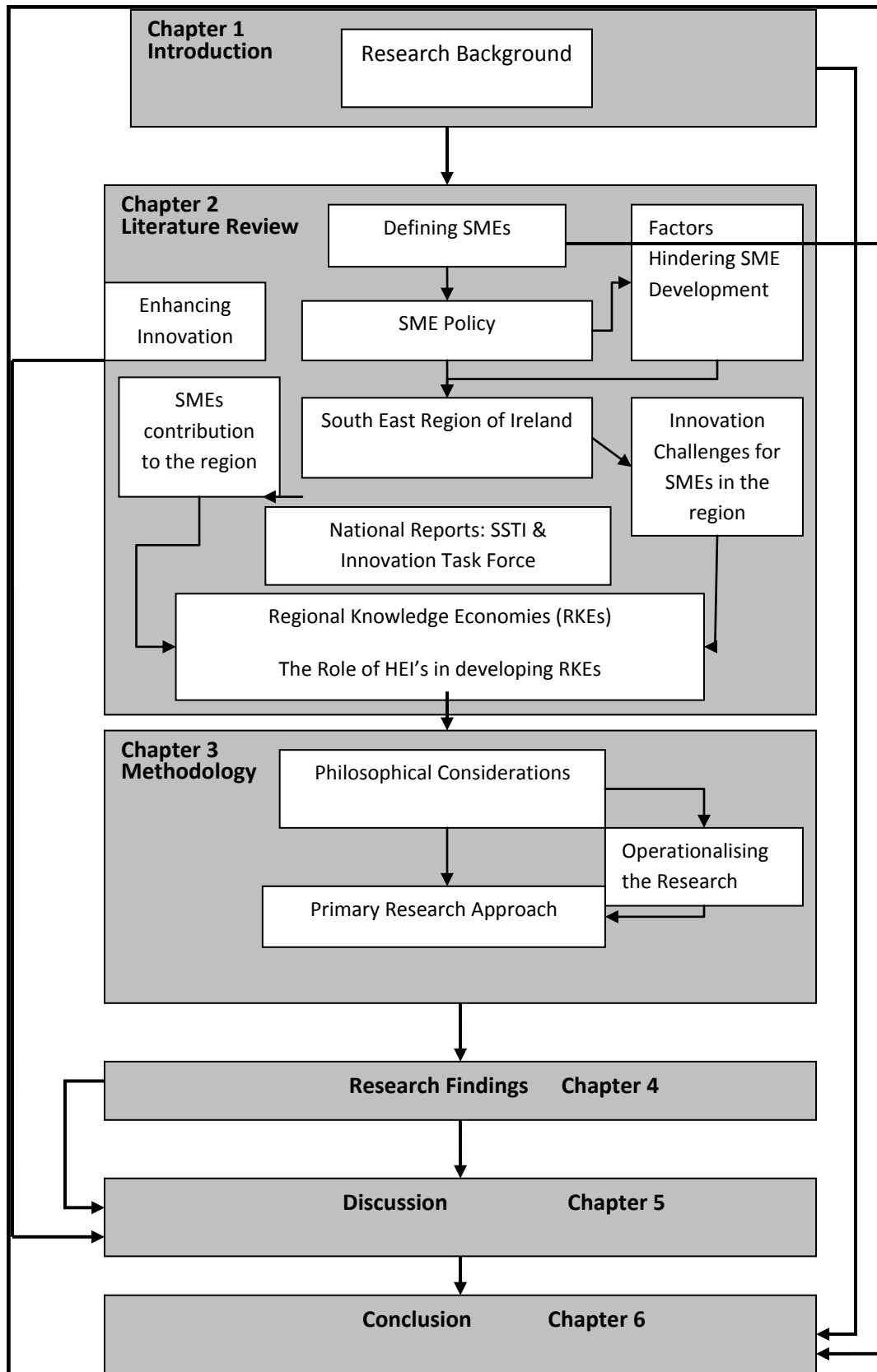
The findings from the primary research are outlined in chapter four. The data is examined under the three research objectives and are sub divided into relevant themes. The findings are presented in the context of previous research, emphasising the key outcomes of the study.

This is followed by chapter five which discusses these findings within the context of the literature review. It attempts to examine and critique the findings that are supported or contradicted and presents some emerging findings on the topic.

The final chapter revisits the research question and objectives and finally draws conclusions and recommendations from the study. The chapter concludes by highlighting the limitations of the study and provides recommendations for future research.



**Figure 1.1: Chapter Outline**



Source: Authors Own Work

#### **1.4 Limitations of the Study**

As with any research there are a number of limitations associated with this study. Firstly, the study is inherently limited by the sample size, which consisted of eleven respondents which constrains the generalisability of the study. Secondly, the fact that the sample is limited to the IOT sector presents limitations. Finally, the sample does not include SMEs perspectives therefore presenting further limitations. These limitations amongst others are presented in greater detail in chapter six.

#### **1.5 Benefits of the Study**

The current research contributes to the growing body of literature on regional knowledge economies and in particular how collaborations between HEIs and SMEs contribute to the development of these economies. Although the topic of RKEs, HEIs and SMEs have gained momentum over the past number of years, to the best of the researchers knowledge this research is unique as it examines how HEIs collaborate with SMEs, solely from a research support perspective within the HEIs. This study enhances our understanding of exactly how such collaborations emerge, thus this research has implications for academics, SMEs, policy providers both nationally and regionally, funding support agencies and local authorities. Finally, another benefit of this study is to understand how to enhance the quality of HEI/SME research collaborations which could contribute to the development of the regional knowledge economy.

#### **1.6 Conclusion**

This chapter introduced the purpose of the research study and outlined the rationale for the study. The structure of the thesis, limitations and benefits were then presented. Chapter two will review the literature that informs the current study.

## **Chapter 2 Literature Review**

### **2.0 Introduction**

This chapter examines SME policy in both Irish and European contexts. An overview of the South East region of Ireland and best practice in terms of regional knowledge economies will be explored. Finally, the author examines the role of Higher Education Institutions in the development of regional knowledge economies.

### **2.1 Defining SMEs**

Zimmerer and Scarborough (1994) stated that this century would dawn with the greatest number of small businesses ever. As predicted, over the past 25 years, small to medium-sized enterprises (SMEs) have been heralded by most western governments as the engine of economic growth, the incubator of innovation, and the solution to decades of persistent unemployment (Birley & Westhead, 1990; Audretsch, 2004). In recent years, considerable sums have been invested by the European Union and National Governments in support of SMEs, through direct financial assistance and through subsidised advisory services (OECD, 2006), to ensure their continued survival. The term "small firm" or SME is used with frequent regularity throughout both academic literature and in business in general.

Thus, the SME sector has become a focal point of scientific and policy interest as it is widely believed that this sector contains the rejuvenation potential that is necessary for revitalising the industrial and services sectors in stagnating economies. This is based on the assumption that assisted firms will become more effective, thus contributing to the economy as a whole. Small businesses are seen as important for employment creation and economic innovation, and there has been a growth in public support for this sector (European Commission, 2006). From a quantitative perspective, although not the sole defining criterion of SMEs, employee numbers are the most frequent mode through which they are defined.

As Table 2.1 illustrates, the European Union criteria of an SME in terms of employees, is any business with less than 250 employees, it is clear that the definition of small to medium sized firms is not applicable to Ireland where at least 89.8% of firms have less than 10 employees. This is acknowledged by Forfás (1999) who state that in Ireland small enterprises are often defined as having 50 employees or fewer.

**Table 2.1 Defining SMEs**

	<b>Micro enterprises</b>	<b>Small-sized Enterprises</b>	<b>Medium-sized Enterprises</b>
<b>EU Criteria in Terms of Employees</b>	<b>&lt; 10</b>	<b>&lt; 50</b>	<b>&lt; 250</b>
<b>Percentage of Enterprises in Ireland</b>	<b>89.8%</b>	<b>8.0%</b>	<b>1.6%</b>

**Source: Forfás (1999)**

Small to medium sized enterprises comprise the vast majority of enterprises in Ireland and are responsible for a large percentage of gross national product and employment as Table 2.2 illustrates.

**Table 2.2 Irish SME Statistics**

	<b>Ireland</b>
<b>Percentage of SMEs</b>	<b>99.4%</b>
<b>GDP (purchasing power parity)</b>	<b>\$189 billion (2008 est.)</b>
<b>GDP (official exchange rate)</b>	<b>\$267.6 billion (2008 est.)</b>
<b>GDP - real growth rate</b>	<b>-3% (2008 est.)</b>
<b>Labour force</b>	<b>2.241 million (2008 est.)</b>

**Source: The World Factbook**

## **2.2 SME Policy**

In December 2005, research by the Small Business Forum suggested that, while the short-term outlook for Irish SMEs appeared buoyant, increased emphasis must be placed on ensuring that small businesses make the transition to medium enterprises if the sector is to sustain wealth creation and continue to drive economic growth.

The main thrust of current SME policies stress the strengthening of managerial capability as well as improving access to sources of knowledge and expertise.

The priorities of current Irish policy as outlined by the Small Business Forum (2005) include:

- To encourage subsidiaries of multinational enterprises to link and transfer technologies to SMEs.
- To encourage new, domestic technology-based SMEs in Ireland by, for example, networking international R&D (Research and Development) programmes and management training.
- To improve the capability of Irish SMEs to receive, adapt and diffuse technologies, and to become more efficient and competitive generally.

### **2.3 Factors Hindering the Growth/Development of SMEs**

According to the Small Business Forum (2005) the most commonly cited factors hindering the development and growth of SMEs include:

- Difficulty in accessing finance
- Weak management capability
- Lack of innovation, inadequate infrastructure
- Poor access to information and advice
- Costly administrative regulations
- On a national level, despite having access to a very wide variety of information sources, many SME owners in Ireland are without a single point of contact and are often unsure where to go at each stage of their business development.

## 2.4 Enhancing Innovation

The Global Innovation Scoreboard (2006) linked closely to the annual Commission-inspired European Innovation Scoreboard ranked countries according to their performance under a set of innovation indicators outlined in Figure 2.1.

**Figure 2.1 The Global Innovation Scoreboard 2006**

The Global Innovation Leaders	Next Best Performers	The Follower Countries	Lagging Countries
Finland	Germany	Hong Kong	Lithuania
Sweden	Denmark	Russia	Greece
Switzerland	Netherlands	Slovenia	China
Japan	Canada	Italy	Slovakia
United States	United Kingdom	Spain	South Africa
Singapore	Korea	Czech Republic	Portugal
Israel	France Iceland Norway Belgium Australia Ireland Luxembourg New Zealand	Croatia Estonia Hungary Malta	Bulgaria Turkey Brazil Latvia Mexico Poland Argentina India Cyprus Romania
7	14	10	16

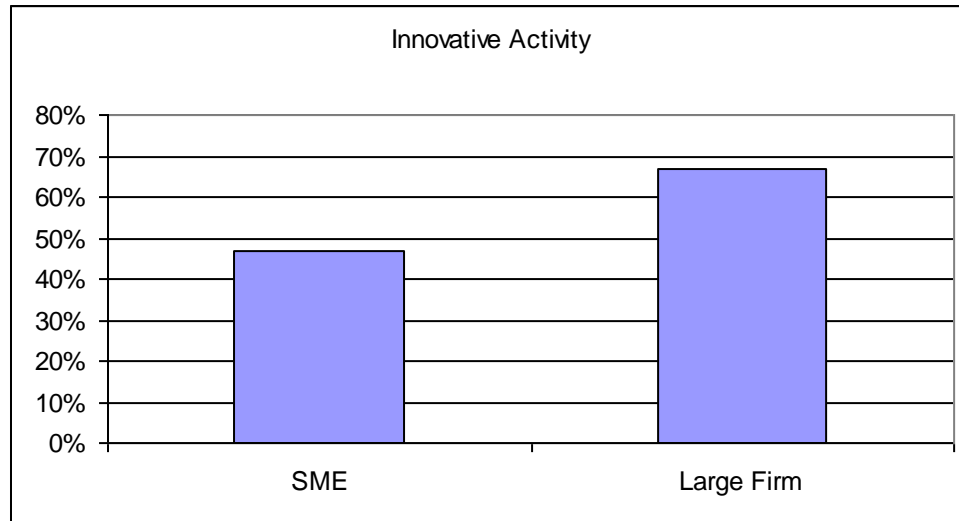
**Source: Eurostat 2007**

The indicators used included innovation drivers; knowledge creation; diffusion; applications and intellectual property. The strong performance of both Finland comes as no surprise as by most Eurostat innovation-related indicators, they regularly outperform most other EU members. In the areas of ICT, and broadband penetration in particular (a major driver of innovation capacity), Ireland performs very poorly by international standards.

This concurs with a report published by the Irish Central Statistics Office (CSO), entitled "*Small Business in Ireland*" in 2008, which stated that just under half of small businesses (47%) reported innovation activity over the period 2002 – 2004.

This compares to two thirds of medium and large enterprises (67%) reporting innovation activity over the same period as illustrated in Figure 2.2

**Figure 2.2 Irish Innovation Activity**



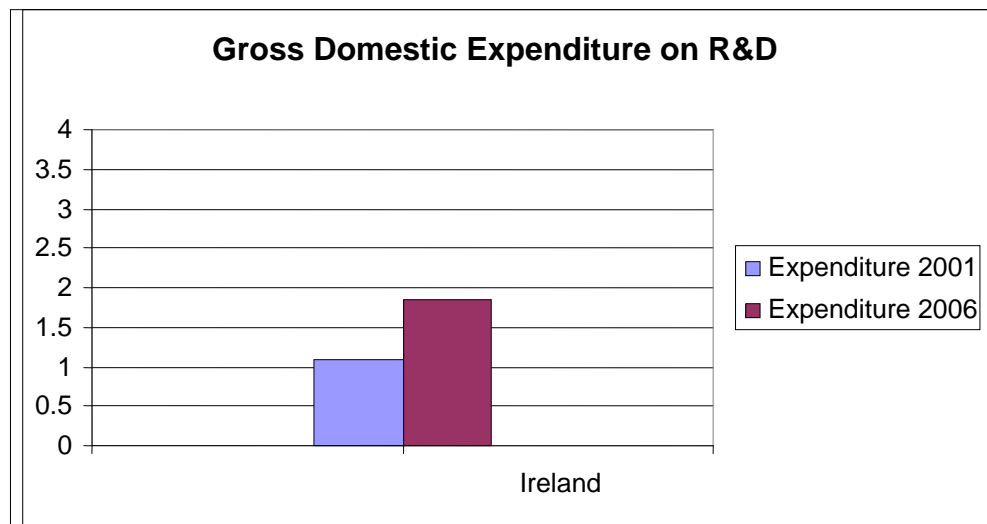
**Source: Small Business in Ireland Report 2008**

This could stem from the fact that, on average, small firms are less likely to conduct Research and Development (R&D) than larger firms. Additionally, small firms often partially contribute to the output of larger firms. According to this same report, almost two in every five (nearly 40%) of small enterprises introduced a new or significantly improved production process, distribution method, or support activity for goods or services.

Innovations relating to planning and process improvements are suitable for SMEs as they involve less investment/risk and shows that Irish small firms are striving to enhance business efficiency. This concurs with Storey (1993), who noted that a new breed of professional class owner/manager is emerging seeking greater assistance to take their firms forward and identify factors leading to growth and success.

Within Ireland, expenditure on R&D as a proportion of GDP (Gross Domestic Product) is well below the EU and OECD averages (OECD, 2006). According to a CSO report (2007) entitled "*Measuring Ireland's Progress*", 1.1% of gross domestic expenditure was spent in Ireland on R&D in 2001 and 1.84% in 2006, outlined in Figure 2.3.

**Figure 2.3 Gross Domestic Expenditure on R&D**



**Source: Measuring Irelands Progress Report, Irish Central Statistics Office (2007)**

The Forfás "*Community Innovation Survey*" (2004) reports that the main barriers to innovation for SMEs include:

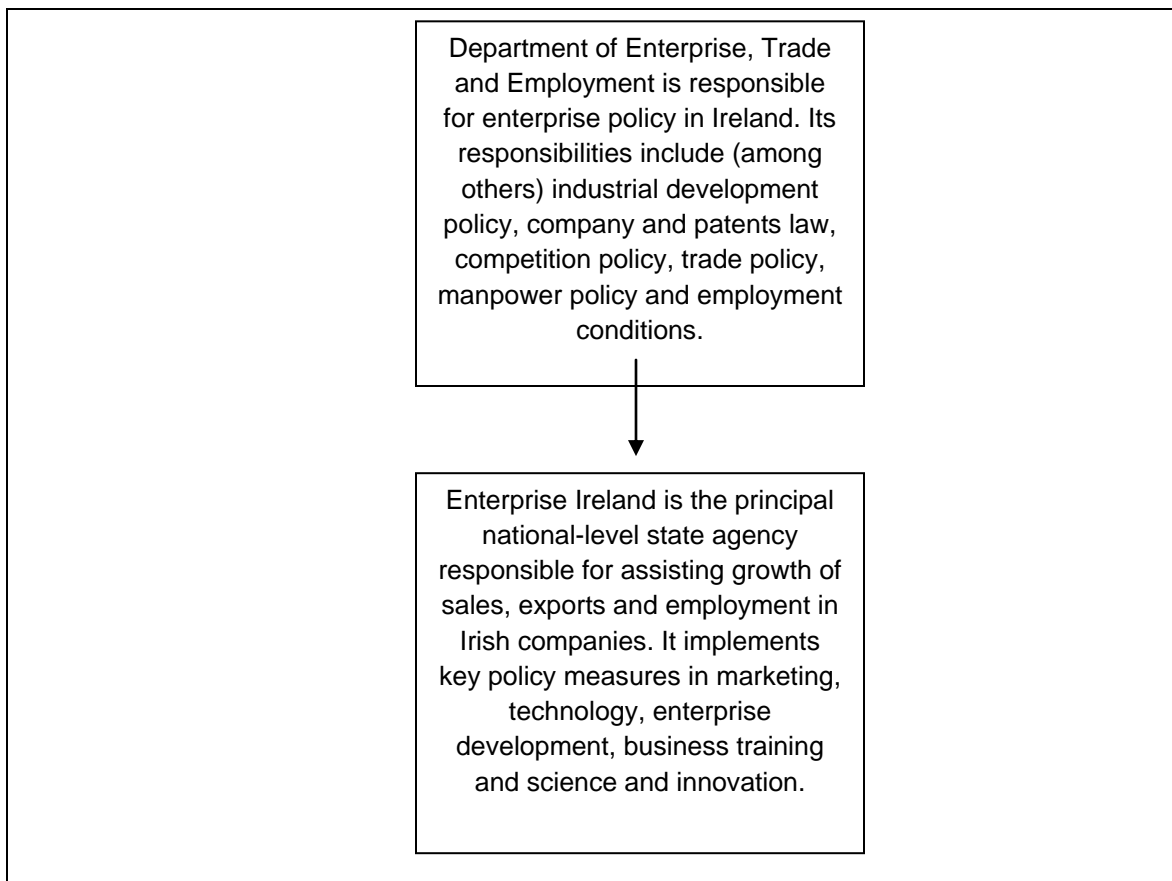
- Lack of funds within enterprise
- Lack of finances from outside enterprise
- High innovation costs
- Lack of qualified personnel
- Lack of information on technology, lack of information on markets
- Difficulty in finding cooperation partners; market domination by established enterprises and uncertain demand



As a result, the focus of Forfás policy work in 2006 was to foster excellence, relevance and coherence in publicly-funded research and it supports the ability of universities to interface with enterprise. Progress in these areas would increase the opportunities to strengthen the enterprise base through public investments in scientific research.

Figure 2.4 outlines the support structure available in Ireland to assist SMEs in their activities and enact the policy objectives as set out at government level (Department of Enterprise, Trade and Employment). Enterprise Ireland is the government agency responsible for the development and promotion of the indigenous business sector. Their mission is to accelerate the development of world-class Irish companies to achieve strong positions in global markets resulting in increased national and regional prosperity.

**Figure 2.4 Support structure in Ireland**



**Source: Authors Own Work**

Irish policy makers have recognised that fostering public-private partnerships may be the most expeditious path to a dynamic SME sector. One way in which knowledge transfer has been a success in Ireland is through innovation vouchers, which are distributed by Enterprise Ireland. The core objective of the Innovation Voucher initiative is to build links between Ireland's public knowledge providers and small businesses and create a cultural shift in the small business community's approach to innovation.

Additionally, coordinated programmes have been implemented at national level, encouraging and creating links and networks between SMEs and academia. For example, Enterprise Platform Programmes (EPPs) have been implemented in Ireland, comprising a one-year full-time professional training and enterprise support programme, aimed at the needs of entrepreneurs in a business start-up situation and managed by Irish Institutes of Technology.

## **2.5 South East Region of Ireland**

The South East Region of Ireland comprises of five counties Carlow, Kilkenny, South Tipperary, Waterford and Wexford. The population of the region increased from 423,616 to 460,083 between 2002 and 2006, an increase of 8.8% (South East Regional Authority, 2009). Since 1994 the South East Regional Authority has played a major role in identifying, and addressing the deficiencies, development needs and investment priorities of the South East region. The region is further sub divided into local authorities namely Carlow, Kilkenny, South Tipperary, Waterford City, Waterford County and Wexford, who each establish their own priorities for their region.

The regional economy of the South-East is based primarily, but not exclusively, on agriculture and related sectors such as food and fishing, manufacturing and services, and tourism. Industries based in this region are predominantly in the electronics and engineering sectors, pharmaceutical and healthcare and are concentrated mainly around the urban centres of Waterford, Wexford, Clonmel and Kilkenny.

Indigenous Irish-owned micro and small to medium sized enterprises make up approximately 80% of all enterprises in the region (O' Gorman, 2007). Within the region there are three Institutes of Higher Education including Waterford Institute of Technology (WIT), Carlow Institute of Technology (Carlow IT) and Tipperary Institute (TI), (Southern and Eastern Regional Assembly, 2009), with WIT acting as the largest education provider.

## **2.6 SMEs – Present and Future Contribution to the South East**

Despite their relative smallness, SMEs make a considerable contribution to total employment. It is vitally important, therefore, in terms of regional development, that every effort should be made to enhance the competitiveness of SMEs by helping them ease their cost burden and to avail of the benefits of innovation.

According to the Southern and Eastern Regional Operational Programme (2007-2013) building the knowledge base and innovation capacity of the region are vital components in ensuring greater competitiveness and ultimately, continued growth and prosperity in the region. In relation to innovation, the EU's Lisbon Agenda has placed the highest priority on stimulating innovation and the knowledge economy throughout the Union.

In a highly competitive global marketplace, firms in the EU will clearly have to harness the opportunities provided by innovation in order to remain competitive. SMEs have a clear role to play in achieving this objective, yet much more needs to be done to ensure that they can avail of the opportunities presented. Hence, the Southern and Eastern Regional Operational Programme (2007-2013) intends on bringing together the region's strong educational assets and its enterprise developments agencies.

Innovation and R&D activity among indigenous firms within the region has to date been limited. The majority of such activity has been carried out by large and highly mobile, foreign-owned companies (South East Regional Authority, 2010).

In such circumstances, developing a secure, indigenous, innovation and R&D base is vital for the future prosperity of the region as it faces the many competitive challenges from other parts of the EU and beyond (SSTI, 2006).

## **2.7 Innovation Challenges for SMEs in South East Ireland**

Most of the current R&D and innovation in Ireland is carried out by large foreign-owned firms who have the structures and cost base to allow them to do so. Figures produced by Forfás show for example, that of total Business Expenditure on Research and Development (BERD 2007/08), 72.4% was carried out by foreign owned firms and only 27.6% by Irish-owned firms.

Of that 27.6%, an even smaller percentage would have been carried out by SMEs. For the SME sector to thrive in the future, it needs to exploit the R&D and innovation opportunities available. These services are available but too frequently, not availed of by SMEs (Forfás, 2008). In the Southern and Eastern Regional Assembly's view, promoting channels of access to the full range of R&D and Innovation opportunities should be a high priority among those agencies and bodies that interact with the SME sector.

SMEs also feel the effects disproportionately of rising cost burdens including tax, utility, insurance or material costs, compared with larger firms. These added cost burdens for SMEs have been highlighted by the main SME representative organisation ISME, in addition to the Small Business Forum, Forfás and Enterprise Ireland.

## **2.8 National Strategy for Science, Technology and Innovation (SSTI)**

In June 2006 the Irish Government published a National Strategy for Science, Technology and Innovation (SSTI) which outlined a plan to grow Irish research capability as a component of the EU's drive to become the most competitive and dynamic, knowledge-driven economic unit in the world. As a component of the SSTI, there are commitments to regional economic development in Ireland.

The SSTI acknowledges the concentration of scientific and technological resources in major cities, and the fact that companies in regional locations can find it more difficult to access support for innovation.

As part of the Government's ongoing support for regional economic development, the framework set out by the SSTI aims to enhance the importance of regional innovation. Moreover, the HEIs, including the IOTs in particular, represent a major resource in this context. The Strategy further acknowledges that the HEIs can develop into effective technology resources, focused on collaboration with local industry on the basis of strategic and or applied research and technology development directed at the challenges facing companies.

## **2.9 Innovation Ireland – Innovation Task Force 2010**

More recently, the Innovation Ireland, Task Force Report (2010), states Ireland's future success depends on increasing levels of innovation across all sectors of Irish enterprise. Economic evidence suggests that the ability to absorb and adapt innovation is crucially dependent on having a strong R&D culture.

The report acknowledges that SMEs who do not carry out R&D often fall outside the remit of current research and innovation investment and support programmes and believe that efforts are required to incentivise companies to carry out these activities for the first time. The report further acknowledges that while SMEs can gain a competitive edge by innovating across all their operations, day-to-day pressures can make it difficult for smaller companies in finding the time and resources to engage in innovation.

The taskforce state that increasing levels of innovation is the best means for them to survive and prosper. The introduction of an innovation audit for qualifying SMEs is therefore strongly recommended to assist these companies to innovate. As part of the innovation audit, innovation partners could be identified (e.g. customers, consultants, suppliers, HEIs), as well as appropriate sources of research funding.

The report also suggests that SMEs gain the most benefit from R&D collaborations. Furthermore, access to State funding for research has been identified by many SMEs as a key barrier to scaling hence, the report recommends that current initiatives should be reviewed to ensure increased involvement by SMEs in research activities.

The introduction of laboratory access programmes to HEIs similar to those in the USA is also proposed. These programmes provide an opportunity for SMEs, who with their own resources could not afford expensive research equipment, to undertake their own advanced development.

Another initiative suggested by the report is that the Commercialisation of State sponsored R&D should be further catalysed by enabling both Irish resident and overseas entrepreneurs to be placed into HEI R&D centres and laboratories. Entrepreneur in residence schemes can also have fruitful impact on academic researchers by helping them understand key research challenges and opportunities faced by specific companies. In turn this may make researchers more likely to produce research solutions to existing commercial problems.

The taskforce recommend that SMEs need a clear, consistent, speedy and predictable system to facilitate their engagement in research with HEIs, and to find and access IP created at HEIs, in order to turn it into products and services that meet customer needs. Ideally, this should enable SMEs to:

- go to a single location to find all research opportunities and all IP that has been generated across the entire HEI system;
- immediately get referred to the key person who will negotiate an agreement, and only be required to negotiate with one key person, even if the activity/IP exists in multiple HEIs;
- get the same, standard, predictable and professional service every time they access the system.

Finally, the report recognised that significant progress has been made in recent years towards achieving these goals, particularly with the strengthening of the Technology Transfer and Development offices of the HEIs, funded through Enterprise Ireland, however, it also suggests that there is more work to be done in order to get to a system that is truly entrepreneur friendly.

## **2.10 Regional Knowledge Economies**

In March (2000) the European Council set a new strategic goal for the European Union:

...to become the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion.

The definition of the knowledge economy has since been broadened to include every aspect of the contemporary economy where knowledge is at the heart of value added, from high-tech manufacturing and ICTs through knowledge intensive services to the overtly creative industries such as the media and architecture (European Commission, 2006).

Knowledge based sectors and related activities have been expanding rapidly in many countries and regions throughout Europe (OECD, 2001; European Commission, 2005). There are assertions that knowledge based sectors bring a dynamic growth of jobs, in particular for the highly skilled labour force, career prospects and income possibilities. However, the preconditions for developing knowledge economies differ strongly between types of regions, depending on their location conditions and firm structures. Studies of knowledge based sectors have shown that those sectors are often concentrated in particular locations and regions (Cooke, 2002; Cooke, De Laurentis, Tödtling and Trippl, Hollanders, 2007) and that it is easier for some regions to develop such activities than for others.

The sectoral view of the knowledge economy argues that a dynamic growth of knowledge based sectors usually requires specific location conditions such as excellent universities and research organisations, good educational institutions, a highly qualified labour force in addition to a well developed ICT infrastructure (Keeble and Wilkinson, 2000).

It is suggested that the generation of new firms and innovation, a high level of entrepreneurship, incubators, venture capital and a good networking of firms and knowledge organisations are needed for a dynamic growth and development of these sectors (Swann, Prevezer, and Stout, 1998; Cooke, 2002; Cooke et al., 2007). Such firms are able to interact with the knowledge organisations and capable to apply and commercialise the knowledge generated. What is more, knowledge can be accessed and exploited through various mechanisms such as the cooperation of regional firms with knowledge organisations (e.g. R&D cooperation's), licensing, or the setting up of new companies in the form of spin-offs from existing firms or from academia.

On the other hand regions which have no tradition in promoting high technology industries, the rise of knowledge based sectors is likely to take an alternative route (Rosson and McLarney, 2005). These areas often have a weak knowledge base, few universities and research organisations, little experience in commercialising scientific discoveries, a weak culture of risk taking, low levels of social capital, and frequently they lack crucial factors such as venture capital or a support structure specialised in promoting academic spin-offs. Hence, there are good reasons to assume that the State plays a stronger role in such regional settings to promote high technology clusters (Rosson and McLarney, 2005).



Metropolitan regions are often regarded as locations for knowledge intensive sectors (Cooke *et al.*, 2007) as well as centres of innovation (Simmie, 2003). Leading research organisations and universities, business services, as well as headquarters of international firms and high-tech companies are often concentrated in metropolitan areas (Simmie, Carpenter, Chadwick, Martin, and Wood, 2006). As a consequence, knowledge intensive sectors such as ICT, as well as innovative activities, such as R&D and patenting are usually above average (Simmie, 2003).

Nevertheless, not all metropolitan regions are centres of innovation; some are lacking dynamic clusters of innovative firms, despite the fact that individual technology companies, R&D activities and research organisations may exist (Cooke *et al.*, 2007). These areas often have a highly developed organisational infrastructure of public research and educational institutions and a dense supply of often commercialised knowledge transfer services. However, the problem of fragmentation, i.e. the lack of networks and interactive learning seems to represent an important innovation barrier similar to those highlighted in section 2 above.

## **2.11 The Role of Higher Education Institutions in developing Regional Knowledge Economies**

In the globalising knowledge economy, OECD countries face competition in a number of markets; as a result they are turning to knowledge intensive products and services, which increase dependency on access to new technologies, research results and knowledge and skills.

As global success is often based on local excellence, the local availability of knowledge and skills is becoming increasingly important. Higher education institutions (HEIs) are the most important sources of knowledge and innovation (OECD, 2007).

A higher education system which is strongly research and innovation oriented has the potential for mutually beneficial interaction with the enterprise sector (SSTI, 2006).

In addition, HEIs can play multiple roles in their regions, notably: knowledge creation through research and technology transfer; knowledge transfer through education and human resources development and cultural and community development, which create the conditions where innovation thrives. The contribution of HEIs to developing their home regions has not previously been a major concern for public policy or the HEIs themselves. But this is changing with the expansion of higher education, particularly in the non-university sector, which in some cases has aimed to address regional disparities (Arbo and Benneworth, 2007).

Being located in specific regions, higher education institutions are being asked to make significant contributions to the development of these specific regions. According to Chatterton and Goddard (2000) these demands are ...

Driven by processes of globalisation and regionalisation in economic development, whereby the regional environment is as relevant as the national macro economic situation in determining the ability of enterprises to compete in the national, supra-national and global economies.

Within such environments, although the physical infrastructure is of the utmost importance accessibility to regional knowledge and skills is also paramount. Thus, regionally-engaged HEIs have the potential to become the motivating force for regional economic development (Chatterton and Goddard, 2000).

Furthermore, the Association of European Universities Report (2000) stressed the increasing necessity for HEIs to engage with their external stakeholders stating that:

In order to respond better to the needs of different groups within society, higher education institutions must engage in a meaningful dialogue with stakeholders . . . (Davies, 1998).

Given the concentration of scientific and technological resources in the major cities, companies in regional locations can find it more difficult to access support for innovation.

Regional economic development is a key aspect of Irish Government policy (SSTI, 2006). Hence, Institutes of Technology (IOTs) represent an important resource in this context. Their multi-regional location and openness to working with industry provides a platform upon which real industrial impact can be built. It is clear that the IOTs can develop into effective technology resources, focused on collaboration with local industry on the basis of applied research and technology development directed at the challenges facing the company (SSTI, 2006).

According to the Southern and Eastern Regional Assembly (2009) many SMEs are simply unaware of the innovation work carried out by third-level institutions and how they can benefit from it. "Ivory tower" notions of the university and other third-level bodies are gradually disappearing as these bodies reorient their role in a more commercial direction and as SMEs interact with them more frequently, but progress in this area needs to continue. Lack of access is particularly acute in the micro-enterprise sector (10 or less employees).

Many SMEs, on the other hand, have seen their businesses benefit from knowledge transfer interaction with third level which has provided useful templates for other SMEs. Many of these bodies organise such activities as: tailored seminars, mentoring, business angel schemes and innovation award schemes to stimulate interest and involvement in innovation. An innovative idea proposed by the Small Business Forum is the establishment of a first-stop "Knowledge Base" which could provide SMEs with a suite of innovation services in one location thus easing access difficulties.

The Assembly believes that such initiatives should be actively encouraged, as they have direct experience of the challenges faced by SMEs in accessing innovation. One common challenge is the lack of awareness among many SMEs of the opportunities available in the innovation area. The assembly highlighted the need to make improvements in this area in the future, a factor which many HEIs have since taken on board.

If however, the HEIs in the region are to contribute significantly to the attainment of national objectives, investment that will improve the scale and capability of regional research is needed. Investments in underpinning capabilities and infrastructure should, complement investments in enhancing the quality of research conducted (SSTI, 2006).

A high quality response to these regional challenges will require the research community in the HEIs to understand the science behind problems, be familiar with research processes and good research management practices, and be comfortable working in the context of an industrial environment.

It is in that context that the requirement to strengthen the overall research capability in the regions is set out (Southern and Eastern Regional Operational Programme 2007-2013).

## **2.12 Conclusion**

Having reviewed the literature it emerged that innovation, access to information and advice are the main areas that small firms struggle with (South Eastern Regional Assembly, 2009). It is also evident that there are inconsistencies in the literature regarding the types of programmes aimed at enhancing the innovation capabilities of Irish SMEs such as those identified in the (SSTI, 2006) and the (Innovation Task Force, 2010) reports.

The following chapter will present the methodological approach undertaken in order to answer the research question, which is to investigate the development of Regional Knowledge Economies: How Higher Education Institutions engage in SME collaboration– A Research Support Perspective.

## **Chapter 3 Research Methodology**

### **3.0 Introduction**

The purpose of this chapter is to identify the research methods available to the author for the research being performed. It details the research problem and informs the reader of the research question, the investigation of the research paradigms available, the choice of data methods and sets out how the research will proceed.

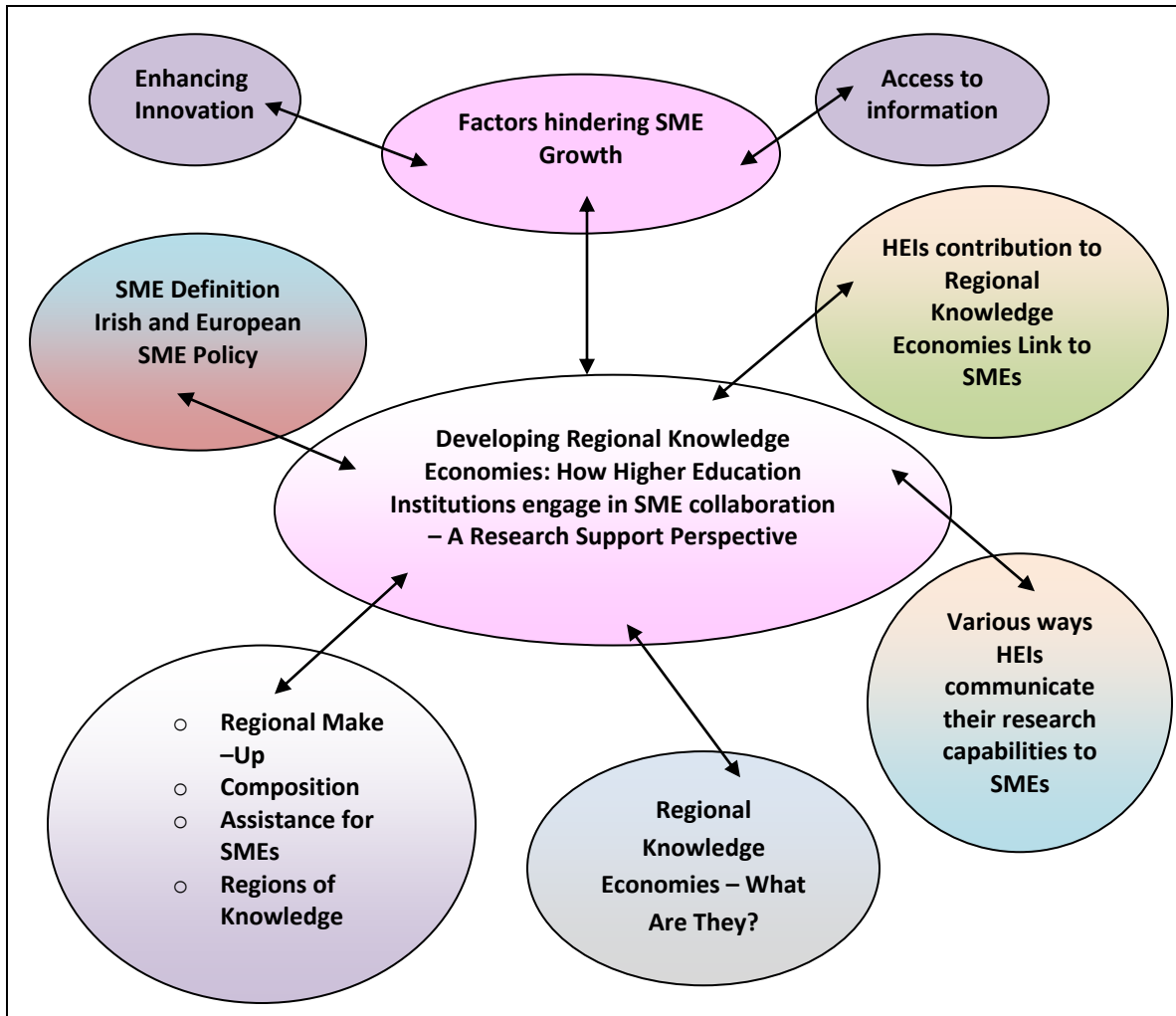
### **3.1 Research Problem**

According to Remenyi *et al.* (2003) the starting point in all research undertakings is to focus clearly on the fact that the ultimate aim is to add something of value to the body of accumulated business and management knowledge. The focus of this research is to investigate the development of regional knowledge economies, looking specifically at how HEIs engage in SME collaboration. This study will look at HEI/SME engagement from a research support perspective.

Although the topic of SMEs and regional knowledge economies have been explored in much research over the past decade, very little research attention has been paid to the role that HEIs play in meeting the regional needs of SMEs to assist with the development of regional knowledge economies. The researcher reviewed the literature available pertaining to SMEs, regional knowledge economies and HEIs and found that innovation and access to information are areas that SMEs struggle with predominantly in Ireland. Furthermore, considerable sums have been invested by the European Union and National Governments in support of SMEs and knowledge economies (OECD, 2006) yet many fail to grow (Storey, 2008).

As part of developing the research question and objectives for this current research a conceptual framework was developed (Figure 3.1). The conceptual Framework was designed to assist with clarification and development of the research question and objectives. As can be seen from the diagram below the research question is central to this research process.

**Figure 3.1: Conceptual Framework**



**Source: Authors Own Work**

### **3.2 The Research Question**

Bryman and Bell (2003) believe it is essential that the research question is well defined, stating that it will provide focus and clarity to the study. This research seeks to investigate how research collaborations between HEIs and SMEs contribute to the development of regional knowledge economies. Hence, the research question is:

*Developing Regional Knowledge Economies: How Higher Education Institutions engage in SME collaboration – A Research Support Perspective*

### **3.3 Research Objectives**

Once the research question has been clarified the research objectives can then be identified (Saunders *et al.*, 2003). The research objectives for this study are as follows:

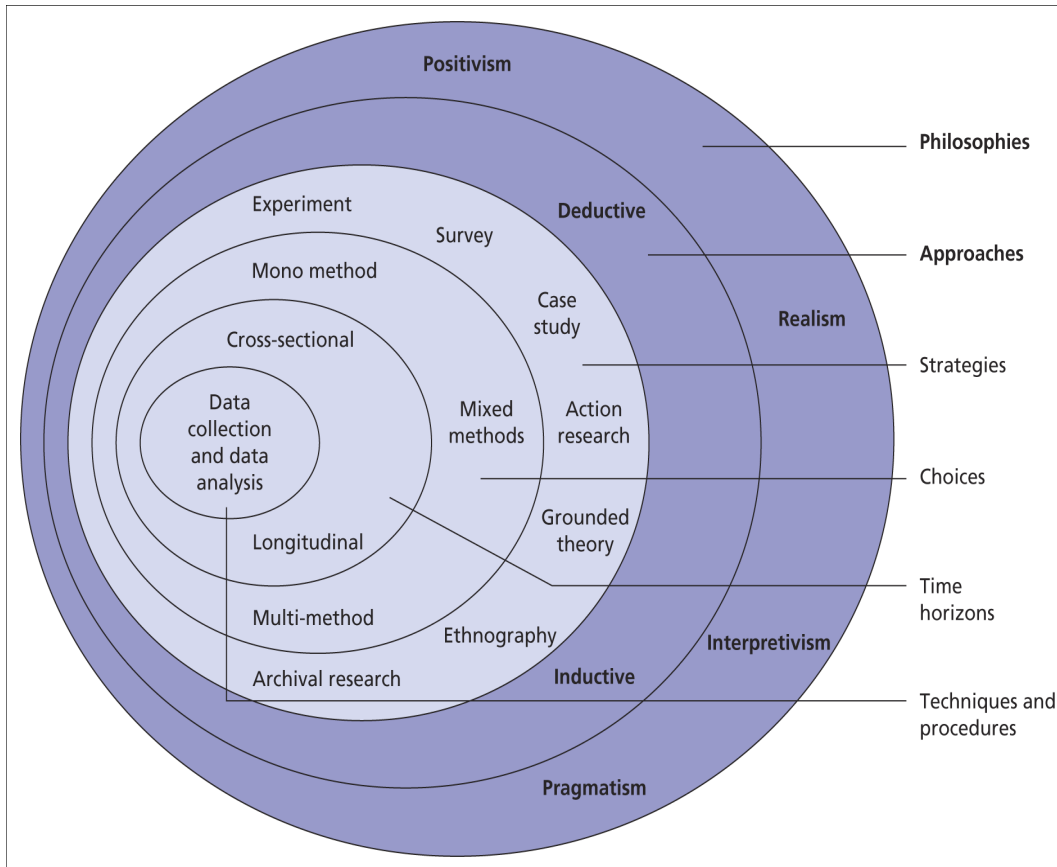
- To analyse the characteristics and underlying assumptions of regional knowledge economies
- To identify appropriate means through which Higher Education Institutions engage with SMEs
- To explore the various ways Higher Education Institutions communicate their research capabilities to SMEs

### **3.4 The Research Process**

Saunders *et al.* (2003) developed the "Process Onion" (see Figure 3.2), which illustrates the process that researchers go through in order to perform their investigations effectively. As can be seen from this model, the issues underlying the choice of data collection methods are first examined before the data collection tool is selected. They believe that each layer must be peeled back before the final layer of data collection can be reached. They ascertain that researchers primarily focus on which method should be used to collect primary data, rather than first gaining an appreciation of the philosophy that the method is based upon.

Therefore, in accordance with this belief the author will explore the research philosophy before considering the method of data collection to be used for this research.

**Figure 3.2: The Research Process Onion**



**Source: Saunders, Lewis and Thornhill (2003)**

### 3.5 Research Philosophies

There are two main types of philosophical research, ontological and epistemological. Ontology is the study of phenomena and the nature of their existence (Gill and Johnson, 1991). Epistemology deals with questions about how and what it is possible to know (Chia, 2002). Epistemology can be subdivided into two research paradigms; positivism and phenomenology (see Table 3.1).



**Table 3.1: Two Philosophical Schools of Thought**

	<b>Positivist Paradigm</b>	<b>Phenomenological Paradigm</b>
<b>Basic Belief</b>	<ul style="list-style-type: none"><li>○ The world is external and objective</li><li>○ Observer is independent</li><li>○ Science is value-free</li></ul>	<ul style="list-style-type: none"><li>○ The world is socially constructed and subjective</li><li>○ Observer is part of what is observed</li><li>○ Science is driven by human interests</li></ul>
<b>Researcher Should</b>	<ul style="list-style-type: none"><li>○ Focus on facts</li><li>○ Look for causality and fundamental laws</li><li>○ Reduce phenomenon to simplest elements</li><li>○ Formulate hypotheses and then test them</li></ul>	<ul style="list-style-type: none"><li>○ Focus on meanings</li><li>○ Try to understand what is happening</li><li>○ Look at the totality of each situation</li><li>○ Develop ideas through induction from data</li></ul>
<b>Preferred Methods Include</b>	<ul style="list-style-type: none"><li>○ Operationalising concepts so that they can be measured</li><li>○ Taking large samples</li></ul>	<ul style="list-style-type: none"><li>○ Using multiple methods to establish different views of phenomena</li><li>○ Small samples investigated in depth or over time</li></ul>

**Source: Easterby – Smith et al., (1997) page 27**

### **3.6 The Positivist Approach**

The basic tenet of positivism is to focus on the fact, or the given, and to ignore everything else. Positivist research tends to generate quantitative data that can be analysed statistically. It is concerned with hypothesis testing, using large samples, when data is highly specific, precise and quantifiable (Easterby–Smith *et al.*, 1997).

With this approach, is not always possible to separate the researcher's personal values and experiences from the object being examined and thus remain "objective" (Hughes, 2002) and it does not provide a way to examine human beings and their behaviours in depth (Crossan, 2002).

### **3.7 Phenomenology (Interpretive) Approach**

Hussey and Hussey (1997) believe that there are a number of characteristics inherent to the phenomenological school of thought stating that this approach tends to be qualitative in nature, the data produced is rich and subjective and that the researcher is part of this approach as the subject is examined in their natural location. Thus, the phenomenological approach is centred around the notion that humans are not objects and can be subject to many influences on behaviours, feelings, perceptions and attitudes (Crossan, 2002). Phenomenological research is however time consuming, difficult to control, and interpretation of data can be complex.

### **3.8 Selection of Research Philosophy**

This study aims to gain an in depth insight into existing HEI/SME research collaborations. It also seeks to gain a greater understanding of regional knowledge economies and how HEI/SME engagements contribute to their development. As this descriptive information does not lend itself to statistical analysis the author therefore deems the phenomenological approach as the most suitable choice for this research study.

### **3.9 Qualitative versus Quantitative Research**

In addition to the different philosophical methods, there are two groups of research processes such as quantitative methods, linked to positivism and qualitative methods linked to phenomenology schools of thought. Table 3.2 identifies the differences between the two processes.

**Table 3.2 Quantitative (vs) Qualitative Research Strategies**

	<b>Quantitative</b>	<b>Qualitative</b>
<b>Principal Orientation to the role of theory in relation to research</b>	Deductive; Testing of Theory	Inductive; Generation of Theory
<b>Epistemological Orientation</b>	Natural Science Model in particular Positivism	Interpretivism
<b>Ontological Orientation</b>	Objectivism	Constructivism

**Source: (Bryman and Bell, 2003)**

Johnson and Harris (2002) believe that quantitative data will always involve numerical analysis of data, with the data presented in the form of tables, charts and graphs. Jankowicz (2000) argues that qualitative research is about the nature and content of what is being said, it is about its meaning rather than the number of people saying it or the frequency with which it is being said. It encompasses a variety of methods that are flexible, enabling respondents to reflect upon and express their views encapsulating their feelings and experiences. In this study the researcher utilised the qualitative research approach because the type of information sought in this study is very descriptive and seeks to understand opinions, attitudes, experiences and beliefs. Thus, it would not have been possible to obtain this information by conducting quantitative research.

### **3.10 Research Methods**

Hughes (2002) argues that research methods are the tools of data collection or techniques such as interviews. Interviews are regarded as the most commonly used method of gathering qualitative data (Easterby-Smith *et al.*, 2002). In general personal interviews can be categorised as structured, unstructured and semi-structured. Saunders *et al.* (2007) suggest that semi-structured interviews involve the use of a set list of questions in addition to the incorporation of unplanned questions. Thus, for the purpose of this research semi-structured interviews were the method of choice.

Table 3.3 highlights the merits and limitations associated with using semi-structured interview methods, which the researcher took into account before deciding to adopt this method.

**Table 3.3: Advantages and Disadvantages of Semi- Structured Interviews**

<b>Advantages of Semi-structured Interviews</b>	<b>Limitations of Semi-structured Interviews</b>
The researcher is likely to gain valuable information based on the depth of the information gathered	Requires Skill, Time and effort in the interviewing and analysis stages
Interviews are generally prearranged, offering a greater response rate	High costs to the researcher if the interviewees are geographically dispersed
Interviewees have an opportunity to expand their ideas and explain their views, opinions and priorities	Analysis, Transcribing and Coding of the interview is very time consuming
Interviews are more personal and can be a rewarding experience for the interviewee as they may enjoy the opportunity to discuss their experiences, ideas, opinions and thoughts to a non critical audience.	Recording devices can hinder the interview as many people prefer to speak off the record and maintain confidentiality
Consist of Open and Closed ended questions  Non standardised - Omit Questions / Change order of questioning	The interviewer can present personal bias

**(Source: Adapted from Denscombe, 2005)**

### **3.11 Justification for using Semi-structured Interviews**

For the purpose of this research semi structured interviews will be utilised as they allow the researcher to probe areas further if needed and also to gain an understanding of the respondent's world (Easterby-Smith *et al.*, 2002). The use of personal interviews was deemed the most appropriate as they permit an exploration of the "why", "what" and "how" Saunders *et al.*, (2007). They further acknowledge the advantages associated with personal contact stating that respondents are more willing to participate in interviews than completing questionnaires.

The researcher was also prompted to adopt face to face interviews due to the high quantity of open ended questions required. This fits with the researcher's decision to conduct exploratory research as it facilitates a deeper understanding of the research topic, allowing the researcher gain in-depth information relating to HEI/SME collaborations. Another contributing factor is the non-standardisation of semi-structured interviews which should enable the researcher to pursue emerging themes which may surface during the interviews.

### **3.12 Research Design**

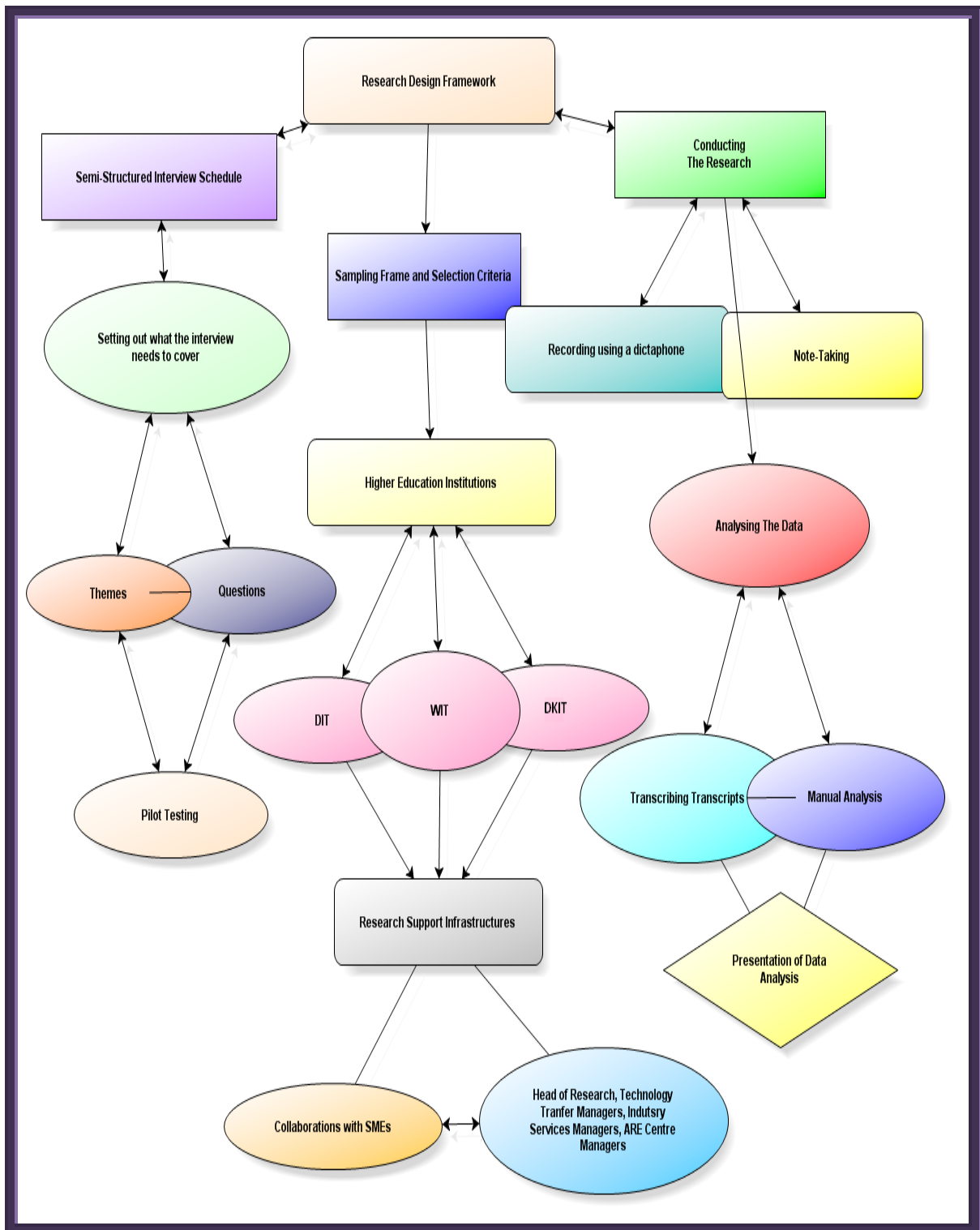
A research design is the framework for a study which provides useful guidelines for collecting and analysing data. According to (Yin, 2003):

A research design is an action plan for getting from here to there where here is the initial set of questions and there are the set of answers.

Validity and reliability play an important part in the research design phase of any research study (Powell, 1997). Reliability refers to the extent to which the research methods produce findings which are consistent, whereas validity refers to the extent to which the data collection methods measures what is intended (Baker, 2001; Saunders *et al.*, 2007).

Pilbeam and Corbridge (2006) warn that validity is reduced when interviews are poorly structured. Figure 3.3 outlines the Research Design Framework adopted by the researcher in this study, followed by details on how the research was operationalised.

**Figure 3.3 Research Design Framework**



**Source: Authors Own Work**

### 3.13 Operationalising the Research

#### 3.13.1 Sampling Frame and Selection Criteria

Remenyi *et al.*, (2005, p.192) refer to a research sample as "*those individuals who are to provide information*". The author's sampling frame consisted of the research support units within three Higher Education Institutes. The researcher looked at various different IOTs in Ireland but deemed WIT, DIT and DKIT to be the most relevant for this study. Each institute is operating in the Institute of Technology sector as opposed to being a designated University and is quite similar in terms of their Institutional research strategies. Each of the Institutes has successfully secured Applied Research Enhancement funding in addition to Incubation Centre funding. In addition, each of the three regions in which the institutes are located is notably different see table 3.4.

**Table 3.4 Regional Selection**

<b>Regional Characteristics</b>	<b>South East Region</b>	<b>Greater Dublin Region</b>	<b>North East Region</b>
<b>Population</b>	400,000	1.5 million	231,267
<b>Industry Base</b>	Agricultural, Manufacturing Tourism Pharmaceutical	High value Financial services, Technological and Knowledge-based sectors	Food-processing, ICT, Financial services, Electronics and Automation
<b>Educational Provision</b>	3 IOTs No University	4 Universities 3 IOTs 2 Private Universities	1 IOT No University

**Source: Authors Own Work**

The eleven participants in the primary research include five respondents from WIT, three from DIT, and three from DKIT. The participants hold senior positions within the Research departments of each Institute including two Heads of Research, two Technology Transfer Managers, two Industry Liaison Officers, two Incubation Centre Managers and three Applied Research Enhancement (ARE) Centre Managers. The researcher interviewed three Applied Research Enhancement managers as they have direct contact with SMEs.

### **3.13.2 Ethical Issues**

Yates (2004) advises that a research contract be drawn up to tend to the ethical concerns surrounding the research interview, suggesting that this contract can be read out by the researcher at the beginning of the interview and signed by both parties. As this study is not a benchmark of HEI/SME collaboration across the three individual Institutes but merely a study to examine existing HEI/SME research collaborations; the researcher had to assure the interviewees in DIT and DKIT of this. Based on Yates's guidelines the researcher developed a research contract (Appendix B), which guaranteed confidentiality and was read out to each participant and signed by both parties at the beginning of each interview.

### **3.13.3 Interview Schedule**

Constructing an interview schedule is a useful way of setting out what the interview needs to cover (Yates, 2004). Yates further highlights the appropriateness of identifying the range of themes that the interview should cover and arranging these themes into logical order. Thus, the researcher drafted the interview schedule. For the purpose of this study the respondents were coded so as to aid analysis. The Heads of Research were coded (HOR:1) and (HOR:2), the Technology Transfer Officers were coded (TTO:1) and (TTO:2), the Industry Liaison Officers were coded (ILO:1) and (ILO:2) the Incubation Centre Managers were coded (ICM:1) and (ICM:2) and finally the Applied Research Enhancement Centre Managers were coded (ARE:1) to (ARE:3). Table 3.5 outlines the Interview Schedule.



**Table 3.5 Interview Schedule**

<b><i>Institute</i></b>	<b><i>Interviewee (Who)</i></b>	<b><i>Interview Method (What/ How)</i></b>	<b><i>Date (When)</i></b>	<b><i>Location of Interview (Where)</i></b>	<b><i>Duration (How Long)</i></b>
<b>Waterford Institute of Technology</b>	Head of Research & Innovation	Face to Face Interview	May 2010	On Campus WIT	2 Hours
	Industry Liaison Officer (Manager Industry Services)	Face to Face Interview	May 2010	On Campus WIT	2 Hours
	Technology Transfer Manager	Face to Face Interview	May 2010	On Campus WIT	1.5 Hours
	Incubation Centre Manager	Face to Face Interview	May 2010	On Campus WIT	1.5 Hours
	Enterprise Ireland ARE Centre Manager	Face to Face Interview	May 2010	On Campus WIT	1.5 Hours
<b>Dublin Institute of Technology</b>	Head of Research	Face to Face Interview	June 2010	On Campus DIT	2 Hours
	Enterprise Ireland ARE Centre Manager	Face to Face Interview	June 2010	On Campus DIT	1.5 Hours
	Technology Transfer Manager	Face to Face Interview	June 2010	On Campus DIT	1.5 Hours
<b>Dundalk Institute of Technology</b>	Incubation Centre Manager	Face to Face Interview	July 2010	On Campus DKIT	2 Hours
	Industry Liaison Officer	Face to Face Interview	July 2010	On Campus DKIT	1.5 Hours
	Enterprise Ireland ARE Centre Manager	Face to Face Interview	July 2010	On Campus DKIT	1.5 Hours

**Source: Authors Own Work**

Each interview took between 1.5 and 2 hours and was conducted on a one to one basis as this allowed the interviewer uncover more depth. Owing to the private and confidential aspect of HEI and SME collaborations the author was concerned that interviewees would not be willing or permitted to disclose sensitive information without meeting the researcher face-to-face.

As the nature of this study is about examining the effectiveness of existing HEI/SME research collaborations through gaining an appreciation of each of the three IOT's unique situation, *what, why, how* and *can you identify / explain* open ended and probing type questions were used (Appendix C).

The interviewees were selected on the basis of their level of involvement with research activity within the institute and their experience with HEI/SME collaborations. In order to gain access to key people in DIT and DKIT, preliminary contact by telephone was primarily made by the person known to the prospective interviewee and then by the researcher. All seven respondents gave their consent to be interviewed and a suitable date, time and location were arranged. The researcher arranged each of the five WIT interviews by calling to the interviewees in person.

The eleven interviews took place on site at each Institute in order to facilitate the interviewees busy working schedules. David and Sutton (2004) highlight that many factors may impact on the interviewee during interviews including the use of recording equipment. To counteract this, the researcher obtained permission to use a dictaphone and to take additional notes during interviews. The researcher also agreed to send the final transcript of the interview to each interviewee for review and final agreement, as documented in the research contract.

### **3.14 Data Analysis**

Several authors ascertain that while there are numerous qualitative data software tools (QDAS) that aid analysis, analysis can be done just as effectively manually (Johnson and Harris, 2002; Mason, 2002). Thus, the researcher decided to perform the analysis manually due to the smaller size of this study and also due to the limited time available.

The use of a tape recorder, in conjunction with field notes, allows the researcher to return to the data in its original form as often as they wish (Silverman, 2005).

Bearing this in mind after each interview was conducted the researcher carefully transcribed it. Transcription according to Silverman (1993) is an important part of the analysis process as it provides documentation of the procedures used in analysis. Details about which words were emphasised, where the interviewee paused, and when the interviewee sped up or slowed down were also recorded so that the researcher fully understood what the speaker was trying to communicate.

### **3.15 Data Analysis Process**

Miles and Huberman (1994) stated that once the data has been gathered, it is then important to begin the process of reducing the data. Once the researcher gathered the data steps were devised to help with the analysis process as per Figure 3.4. This process was in accordance with Miles and Huberman (1994) who believe that with manual coding, revision and revising codes is a tedious but crucial part of the analysis.

**Figure 3.4 Data Analysis Process**

<b>Step 1 – Getting to Know the Data</b>
<ul style="list-style-type: none"><li>○ Read and Re-Read each interview transcript.</li></ul>
<b>Step 2- Focused the Analysis by Question / Topic / IOT</b>
<ul style="list-style-type: none"><li>○ Revisited the Research Question and Research Objectives to establish what exactly the analysis needed to answer.</li><li>○ Organised the data by question and looked across all respondents and their answers to identify consistencies and differences.</li><li>○ Organised the data from each IOT and analysed it as a whole.</li><li>○ Decided to combine approaches and analysed the data both by question and by case i.e. per IOT.</li><li>○ Put all the data from each question together.</li></ul>
<b>Step 3 - Categorised the Information</b>
<ul style="list-style-type: none"><li>○ Identified Themes/Patterns such as ideas, behaviours, concepts, interactions, terminology, phrases used.</li><li>○ Organised Themes/Patterns into categories to summarise and bring meaning to the information. Involved reading and re-reading the text to identify relevant categories.</li><li>○ Assigned abbreviated codes - letters, words and symbols next to the theme, this helped organise the data into categories.</li><li>○ Provided a descriptive label (name) for each category created.</li><li>○ Identified other themes as sub categories. Continued this process until all relevant themes were labeled.</li></ul>
<b>Step 4 – Bringing it all Together</b>
<ul style="list-style-type: none"><li>○ Interpreting the data – attached meaning and significance to the analysis.</li><li>○ Developed a list of key points / important findings from categorising and sorting the data.</li><li>○ Sat back and thought what will those who use the results of the evaluation be most interested in knowing?</li></ul>
<b>Step 5 – Thinking about presenting the Findings</b>
<ul style="list-style-type: none"><li>○ Developed an outline for presenting results - looked at significant quotes and descriptive examples to illustrate points. Looked at using visual displays in MS Word and Excel to communicate the findings.</li></ul>

**Source: Authors Own Work**

### **3.16 Conclusion**

This chapter revisited the research question and research objectives. The research process was also explored placing particular emphasis on the "Research Process Onion" developed by Saunders *et al.* (2003). The research philosophy, research methods and research design were also discussed. A plethora of graphical representations are proposed by Polonsky and Waller (2005) including tables and pie charts. The author will adopt a mixture of these options using Microsoft word and excel to present the findings data in the following chapter.

## **Chapter 4 Research Findings**

### **4.0 Introduction**

The findings from the current study will be presented in this chapter. This chapter is predominantly structured around the three research objectives and each objective is sub divided under relevant themes.

Firstly, in order to explore the characteristics and underlying assumptions of Regional Knowledge Economies, the findings examine their regional make up, perceived definitions of regional knowledge economies and the role HEIs play in contributing to their development. The roles of key external stakeholders including SMEs are also examined.

Secondly, in an attempt to identify appropriate means through which HEIs engage with SMEs, the findings examine the SME definition used across each Institute and why such definitions are applied. They explore how HEI/SME collaborations emerge and what specific policies and mechanisms are in place to encourage such engagements. The perceived benefits and barriers associated with HEI/SME collaborations, reduction of such barriers and the provision of dedicated R&D space is also investigated.

Finally, to explore the various ways HEIs communicate their research capabilities to SMEs, the findings consider the promotion of research access to SMEs and the need for additional research infrastructure to encourage HEI/SME collaborations. The findings conclude with the HEIs future plans to enhance collaborations with SMEs.

## **4.1 Research Objective 1:**

**To analyse the characteristics and underlying assumptions of regional knowledge economies**

### **4.1.1 Regional Make Up**

This section presents the findings pertaining to the distinct characteristics of each of the three regions. The findings revealed that regional make up is classified by Geographic Proximity, Industry Base and Skills Set outlined in Figure 4.1. Interestingly, two of the HEIs maintain they are operating on a National basis whilst the other HEI is operating on a regional basis and is marketing itself distinctly on this characteristic.

Each of the three regions has a different industry base but there is commonality across the skills set available in the region. Region 1 and Region 3 do not have a University within their region making them one of the sole educational providers for their regions, whilst Region 2 has 4 Universities in its vicinity.

Region 3 has suffered from outward migration in the past with locals migrating to Dublin or Belfast in search of employment. Finally, each of the regions has a large number of SMEs, and in particular region 1 has a dynamic mix available.

**Figure 4.1 Regional Make Up**

<b>Regional Make Up</b>	<b>Region 1</b>	<b>Region 2</b>	<b>Region 3</b>
<b>Geographic Proximity</b>	<ul style="list-style-type: none"> <li>○ Operating on a Regional Basis</li> <li>○ 2 Hours Drive from Dublin and Cork</li> </ul>	<ul style="list-style-type: none"> <li>○ Operating on a National Basis rather than a Regional one</li> <li>○ Biggest Region in Ireland 1.5 million people</li> <li>○ 3/4s of the people in Ireland are employed in the region</li> </ul>	<ul style="list-style-type: none"> <li>○ Operating on a National Basis rather than a Regional one</li> <li>○ 1 Hours Drive from Dublin and Belfast</li> </ul>
<b>Industry Base</b>	<ul style="list-style-type: none"> <li>○ Manufacturing, Pharmaceutical, Tourism and Telecoms industries</li> </ul>	<ul style="list-style-type: none"> <li>○ Technologies, Construction, Services, and Education, and has four Universities, three IOTs and two Private Universities</li> </ul>	<ul style="list-style-type: none"> <li>○ Food, Engineering, BioPharma and Construction industries</li> </ul>
<b>Skills Set</b>	<ul style="list-style-type: none"> <li>○ Strong Availability of Science, Engineering and Business Graduates</li> </ul>	<ul style="list-style-type: none"> <li>○ Strong Availability of Sciences, Engineering, Architecture, Creative Arts and Media Graduates</li> </ul>	<ul style="list-style-type: none"> <li>○ Strong Availability of Science, Engineering and Business Graduates</li> </ul>
<b>Unique Characteristic</b>	<ul style="list-style-type: none"> <li>○ Dynamic Mix of SMES in the region</li> <li>○ No University in the region</li> <li>○ Operating on a Regional Basis – servicing the region</li> </ul>	<ul style="list-style-type: none"> <li>○ Large Number of SMEs in the region</li> <li>○ Four Universities, three IOTs and two Private Universities in the region</li> </ul>	<ul style="list-style-type: none"> <li>○ Large Number of SMES in the region</li> <li>○ No University in the region</li> <li>○ Region has suffered from Outward Migration</li> <li>○ Cross Border Collaborations</li> </ul>

**Source: Authors Own Work**

#### **4.1.2 Regional Knowledge Economy**

The following section looks at the term regional knowledge economies and the respondents interpretations of its meaning. The findings suggest that 90% of the respondents deemed the term to be a buzz word used by different people to mean different things, and in order for them to identify with the term they had to put their own definition around it. Although each definition was slightly different, there was commonality across the terminology used such as: exploitation of knowledge, economic end, regional purpose, support, commercial activities, competitive advantage, people, assistance and innovation.

#### **4.1.3 Higher Education Institutions role in contributing to the development of Regional Knowledge Economies**

The findings revealed that although each of the respondents agreed that their Institute had a large role to play in contributing to regional knowledge economies, they did not feel they were solely responsible for their development and that other stakeholders had a part to play. 100% of the respondents agreed that their HEIs core functions were to educate and train graduates and the workforce of the future, whilst enabling the current workforce to reposition themselves for developments going forward. Surprisingly, only 18% of the respondents mentioned that in contributing to regional knowledge economies, the HEIs role was to provide assistance to SMEs, for example (TTO: 1) asserted that:

*.....Our role is to provide assistance in whatever way we can to regional companies and entrepreneurs to developing their business..... there are a lot of great people in the region even though it's small there are a lot of smart people with great ideas that you can work with to help them achieve their ideas.*

#### **4.1.3 Other key stakeholders driving the knowledge economy**

81% of the respondents identified the National Government support agencies such as Enterprise Ireland, Science Foundation Ireland, The Environmental Protection Agency, Teagasc, Tyndall, and Fáilte Ireland as being the key stakeholders in driving the knowledge economy agenda. 63% of the respondents identified IBEC, ISME, IDA and the Chambers as playing a role, whilst again only 18% of the respondents identified the SMEs themselves as being major stakeholders in driving this agenda. The remaining 82% respondents did not mention the SMEs in this context.

#### **4.1.4 SMEs contribution to the Regional Knowledge Economy**

Although, earlier findings confirmed that only 18% of the respondents identified SMEs as being key stakeholders in the development of regional knowledge economies, findings later revealed that 100% of the respondents expressed the vital importance of SMEs.



This importance was highlighted in terms of sustainability of employment, the potential growth of employment, servicing into larger companies, regional development and research and development. This indicates that SMEs were in fact contributing to the development of regional knowledge economies in a substantial way, for example (TTO: 2) asserted that:

*If you don't have an economy of SMEs it would be difficult to get started on anything other than licensing to a big company which would be outside the region so even in the case of things coming out of the Institute the SMEs are the people who have come through that process and are key to getting it going.*

## **4.2 Research Objective 2**

**To identify appropriate means through which Higher Education Institutions engage with SMEs**

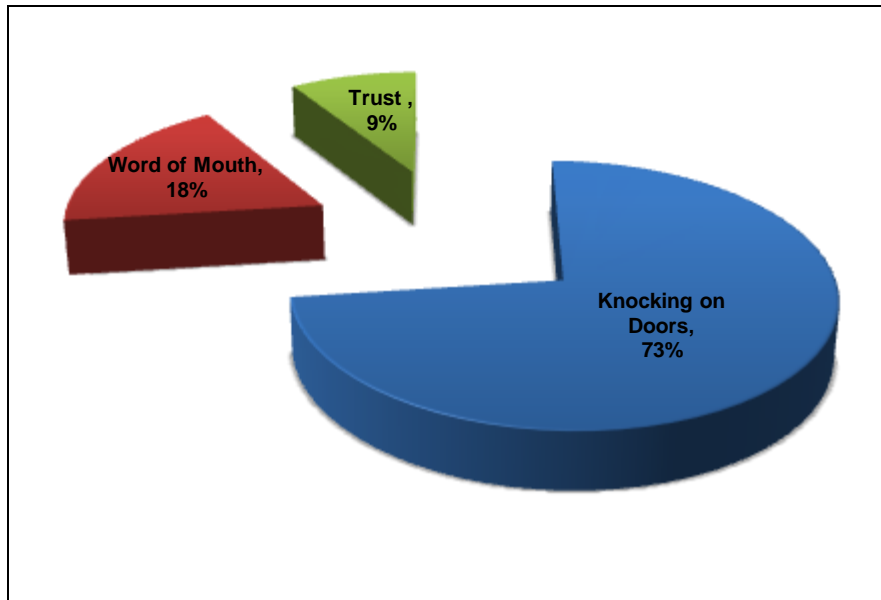
### **4.2.1 Defining SMEs**

Despite the fact that all of the respondents confirmed they adopt the EI/EU SME definition when determining whether a company is eligible to apply for SME funding schemes, 45% of respondents declared that in most cases the SMEs they deal with in their particular regions are in actual fact microenterprises. They defined a microenterprise as an enterprise which employs less than 10 persons.

### **4.2.2 HEI/SME Collaborations**

In terms of developing HEI/SME research collaborations, relationship building was deemed to be the most fundamental component in this process. 100% of respondents agreed that in order for such collaborations to emerge, HEIs must first build up a relationship with the companies. Figure 4.2 outlines the responses on the various ways in which HEI/SME collaborations emerge.

**Figure 4.2 How HEI/SME Collaborations Emerge**



**Source: Authors Own Work**

Interestingly, 73% of the respondents revealed the most predominant way collaborations emerge is by, "*knocking on doors*", visiting the companies face to face, explaining the research capabilities of the Institute and funding mechanisms available. These respondents suggested that meeting the companies face to face shows the human side of the HEI; it gives the SME opportunities to ask questions in relation to IP issues and to explain the scope of work in detail.

18% stated that collaborations emerged through "*word of mouth*", whereby SMEs would have heard about the HEIs research from a third party, such as a support agency like Enterprise Ireland or through a contact of their own and then made direct contact with the HEI themselves. Finally, 9% of the respondents felt that "*trust*" had an important part to play in these collaborations, stating that trust was an essential building block to ensuring that HEI/SME collaborations develop smoothly.

Surprisingly, 81% of the respondents revealed that if they did not have the research capability themselves to assist an SME they wouldn't think of passing them on to a HEI with those capabilities.

All of the respondents reflected that this was somewhat flawed but declared that it would not be out of HEI rivalry, they just simply wouldn't think of it. One respondent did highlight that if he could not carry out the research in his HEI, he would find out where it could be done and travel to that HEI himself to personally conduct the research and charge the SME a fee for his time. Thus, this finding highlights that HEI/SME collaborations do not emerge as a result of HEIs sharing SME contacts with one another.

#### **4.2.3 Research Policies**

100% of the respondents revealed that their Institute does not have any specific Institute policies pertaining to HEI/SME collaborations. 72% of the respondents pointed out that it features heavily within their Institute's strategic plan and research strategy but no specific policy exists, which (ICM:1) felt was somewhat perturbing:

*The strategy documents make references to industry but not to SMEs, which is a little worrying considering the makeup of what's here in this region*

All of the respondents confirmed that it was more a case of specific initiatives that have been developed over time, or specific funding programmes that have been targeted, to encourage collaborations. In particular, the respondents referred to the Incubation centres, the Applied Research Enhancement (ARE) centres and the Technology Transfer Offices (with the exception of one Institute who does not have a Technology Transfer office). All of these were established as a result of targeting and securing National funding and interestingly, all three functions are funded by Enterprise Ireland.

40% of the respondents made reference to the Enterprise Partnership Programmes, stating that once again they were set up as a result of securing National research funding from the HEA and that signify the importance of HEI/SME collaboration, for example (ILO:1) stated that:

*We don't have specific policies but there has been a series of initiatives consciously or not for example the EPP programme, the actual Innovation Centre and the investment that has gone in to that and also the emphasis on the research agenda associated with regional economics and entrepreneurship.*

#### 4.2.4 HEI/SME Collaboration Mechanisms

Another aspect revealed was the various mechanisms adopted by the HEIs to encourage SME engagement. 100% of the respondents identified the "*Innovation Voucher Scheme*" provided by Enterprise Ireland, as the single most effective mechanism for encouraging SMEs engagement. The objective of the Innovation Voucher initiative is to build links between Ireland's public knowledge providers and small businesses. The voucher valued at €5,000 enables SMEs with a business opportunity or problem to collaborate with HEIs to identify a solution that could help take the SME to the next level. All of the respondents advocated this scheme and one HEI in particular mentioned that since 2007 they had secured over 180 vouchers, which equates to almost €1million in research funds enabling them to work with a variety of SMEs in the region. However, the findings highlighted that the HEIs had an ongoing problem in recovering VAT costs on these projects, with some SMEs refusing to pay it and so they had to introduce a policy of demanding VAT costs upfront.

The "*Innovation Partnership Scheme*" was mentioned by some of the respondents, which again is provided by Enterprise Ireland. They explained that this Initiative offers financial support to companies who engage in collaborative research projects with HEIs. Enterprise Ireland provides grants of up to 80% towards eligible costs of the research project but the proposal process and administration of the project must be managed by the HEI. The findings revealed that these partnerships have a threshold. Enterprise Ireland will not award a partnership to a company that is too small, as there is a risk that it may not be around in a few years to exploit the successful research. As a result, the respondents further revealed that their HEI will not work with SMEs who are too small as there is no way these SMEs can obtain funding under the majority of funding programmes.

All of the respondents from one particular Institute referred to a cross border research initiative called "*Fusion*" which is provided by InterTrade Ireland. They informed the researcher that this initiative provides up to £29,500 for SMEs to recruit talented graduates to lead innovation projects for their business.

The SMEs are partnered with a HEI with specialist expertise and a high calibre science and technology graduate who will be based in their company to lead a 12 month innovation project.

The respondents from the other HEIs did not refer to this initiative or indeed to any other local initiatives other than the National supports. Interestingly, on the other hand, the findings revealed that almost all of the respondents expressed concern that SMEs have become too reliant on support grants and that they are reluctant to invest their own funds. The "*Fast Track*" voucher scheme which requires SMEs to co-fund 50% of research costs was mentioned with 72% of respondents declaring that the uptake on this scheme was quite low as SMEs are not as willing to put forward their own funds.

In terms of SEED funding initiatives within the HEIs, 90% of the respondents stated that they were not aware of any such initiatives within their Institute, whereby funds would be made available internally to encourage HEI/SME collaborations, (ICM: 1) stated:

*With Enterprise Ireland there is always the question of what is your Institute doing, there is always an expectation that you become self financing and take ownership of some if it ourselves, it would be preferable to letting the whole thing fall back, you would like it to be used to keep collaborations going but also open it to new researchers who have never engaged with SMEs.*

The findings also revealed that not everyone was supportive of SEED funding initiatives with 36% maintaining it would be costly to the HEI and too difficult to manage.

#### **4.2.5 Benefits / Barriers of HEI/ SME Collaborations**

The perceived benefits and barriers associated with HEI/SME collaborations were examined, with all respondents giving their perceptions from both the HEI and SME side. It is interesting to note that the majority of respondents (72%) identified more barriers (9) than benefits (7) for the HEI.

As Table 4.1 below illustrates, engagement with local companies was perceived to be the greatest HEI benefit by all three Institutes as well as access to real problems.

Only one Institute (HEI: 1) felt that HEI/SME collaborations could be seen as a distinguishing factor for the HEI whilst (HEI: 2) and (HEI: 3) felt that it provided them with the opportunity to engage in collaborative research. Once more, all three of the HEIs mentioned that it helped them access certain funding mechanisms, hence keeping staff employed for longer and giving their staff more focus.

**Table 4.1 Benefits to the HEI**

Benefits to the HEI	HEI 1	HEI 2	HEI 3
Engagement with Local Companies	√	√	√
Access to Real Problems	√	√	√
Distinguishing Factor for the HEI	√		
Engage in Collaborative Research		√	√
Access to Funding Mechanisms	√	√	√
Keeps HEI staff employed for longer	√	√	√
Keeps Staff Focused	√	√	√

**Source: Authors Own Work**

As demonstrated in Table 4.2 below, all three HEIs concurred on the following: HEI/SME collaborations can be time consuming for the HEI; SMEs can be too demanding and expect too much from the HEI; collaborations can be restricted by the traditional culture of the HEI and research personnel find themselves fighting internal systems.

Yet again, all three HEIs agreed that by the nature of the academic calendar it can be difficult to get people at certain times which can damage SME relationships as it leads to over promising and under delivering. Respondents noted that SMEs have shorter time lines so a fast response time is critical. Again, all three of the HEIs identified the nature of the Academic contract as a barrier, stating that academics have a relatively significant teaching load unlike the Universities where time is allocated for research in their contract.

**Table 4.2 Barriers for the HEI**

Barrier for the HEI	HEI 1	HEI 2	HEI 3
Time Consuming	√	√	√
Lose the Focus of what a HEI is	√	√	√
Scheduling Conflicts	√		√
SMEs too demanding – Expect too much	√	√	√
Risk	√		
Nature of the Academic Contract	√	√	√
Restricted by the Culture of the Traditional HEI	√	√	√
Lack of Funding	√	√	
Academic Calender- Difficult to get People	√	√	√

**Source: Authors Own Work**

An interesting finding is that all three of the HEIs felt that there is a risk of becoming a commercial research laboratory doing work for hire and losing traditional HEI focus. The findings highlighted that although SME collaboration is a priority, the HEIs do not want to become a service organisation for SMEs. The respondents felt that you have to be careful of letting collaboration with SMEs become the driver of the HEI strategy, maintaining that it should be on the side of that strategy. Finally, (HEI: 1) and (HEI:2) expressed concern that lack of funding is a major barrier, as without the funds collaborations will not be able to continue.

As Table 4.3 below illustrates, there was agreement by all three HEIs on six of the SME barriers identified such as: SMEs are fearful of HEI bureaucracy; of IP; of not being taken seriously; of not having the Academic knowledge; of the slow response times from the HEIs; and not having enough funds to engage. Two of the HEIs held the opinion that SMEs may not know who to contact in the HEI. Notably, (HEI: 3) did not concur with this assertion and felt that there was ample promotion for SMEs regarding HEI access.

**Table 4.3 Barriers for the SME**

Barriers for the SME	HEI 1	HEI 2	HEI 3
<b>Fearful of HEI Bureacracy</b>	√	√	√
<b>Fearful of IP and Legality of Terms</b>	√	√	√
<b>Lack of Academic Knolwedge – Won't be taken seriously</b>	√	√	√
<b>Time Consuming- Too busy Fire Fighting</b>	√	√	√
<b>Slow Response Times from the HEI- not on Business Time Table</b>	√	√	√
<b>Lack of Funding</b>	√	√	√
<b>Not Knowing Who to Contact or How to go about it</b>	√	√	

**Source: Authors Own Work**

Various ways to reduce these perceived barriers were identified. The majority of respondents felt that "*Awareness and Negotiation*" was the best way to reduce barriers through face to face meetings with the SME, explaining IP issues and clearly outlining the scope of work. An interesting finding is that the majority of respondents felt that a common framework should be designed around the area of IP. (TTO: 1) revealed:

*Unlike the MNC's, SMEs do not have the luxury of a corporate lawyer to decipher the IP agreements for them, and so it is my job to ensure that they understand all aspects of IP which I explain to them face to face but ideally a common framework around IP is needed across the HEI sector.*

#### **4.2.6 Dedicated Research & Development (R&D) Space**

The findings showed that 56% of the respondents revealed that their HEI provided SMEs with dedicated R&D space to come and use office space, equipment, or avail of expertise within the incubation centres and the ARE centres. However, when asked how many SMEs used this space less than half of these respondents could provide an actual metric. Of those who did, there were major disparities across responses with one respondent saying 100% of SMEs used the space and another saying 35% of SMEs used this very same space.



One respondent in particular did not agree that the Incubation Centres and the ARE Centres space could be considered dedicated R&D space for SMEs. He believed that this was too controlled and did not permit ideas to be explored. He suggested that HEIs adopt similar programmes to the "*Entrepreneurs in Residence*" offered by MIT, whereby SMEs come and use the facilities be it office space, equipment or people's expertise to explore an idea.

If research comes out of that it is a bonus and if not perhaps it will develop into research further down the line. He advocates that this type of facility would encourage SMEs to engage in R&D and further integrate SMEs into the HEIs whilst contributing to regional economic development.

These sentiments were echoed by (TTO: 1) who asserted that companies should not be turned away from a HEI merely because they do not have a research project from the outset and should be given access to R&D facilities to explore idea development. The remaining 44% of respondents stated that their Institute did not have dedicated R&D space for SMEs but held the opinion that although it would be great idea it would be difficult and costly to manage. They also revealed that the funding agencies have a bias towards research and would not fund it under current schemes so it would not happen in Ireland.

### **4.3 Research Objective 3**

**To explore the various ways HEIs communicate their research capabilities to SMEs**

#### **4.3.1 Research Access**

The findings revealed that the three HEIs adopted various promotional tools to promote research access to SMEs. Figure 4.3 outlines this breakdown.

**Figure 4.3 Promotional Tools Adopted to Promote HEI Research Access for SMEs**

<b>Promotional Tools Used to Promote HEI Research Access for SMEs</b>	<b><u>HEI 1</u> % of Respondents who used this tool</b>	<b><u>HEI 2</u> % of Respondents who used this tool</b>	<b><u>HEI 3</u> % of Respondents who used this tool</b>
Internal Website	100%	100%	100%
Attending Seminars, Talks and Conferences	60%	66%	100%
Individual Researcher Spreading the Word	100%	100%	100%
Via the Support Agencies	80%	66%	66%
In House Seminars	60%	100%	100%
Media/Press Release	40%	33%	33%
Brochures/Research Publications	100%	100%	100%

**Source: Authors Own Work**

Seven promotional tools were identified for the promotion of research access to SMEs. There was 100% commonality across the following tools: Promotion via the Institute websites; individual researchers actively spreading the word to SMEs; research brochures and publications such as "*Research Matters*", "*Link*" and "*Research News*". However, there was disparity across the use of certain tools, in particular with hosting in house seminars inviting the SMEs into the HEI. Respondents from (HEI: 1) mentioned that because of their regional make up and the fact that there are so many different types of SMEs within it, it was difficult to suit the needs of all the SMEs stating that they had tried it in the past but because they has such "*spotty*" research activities and such an eclectic mix of SMEs it did not work very well for them. Only 40% or less of the respondents across the three HEIs used the media or press releases to promote access and (ARE: 2) noted that:

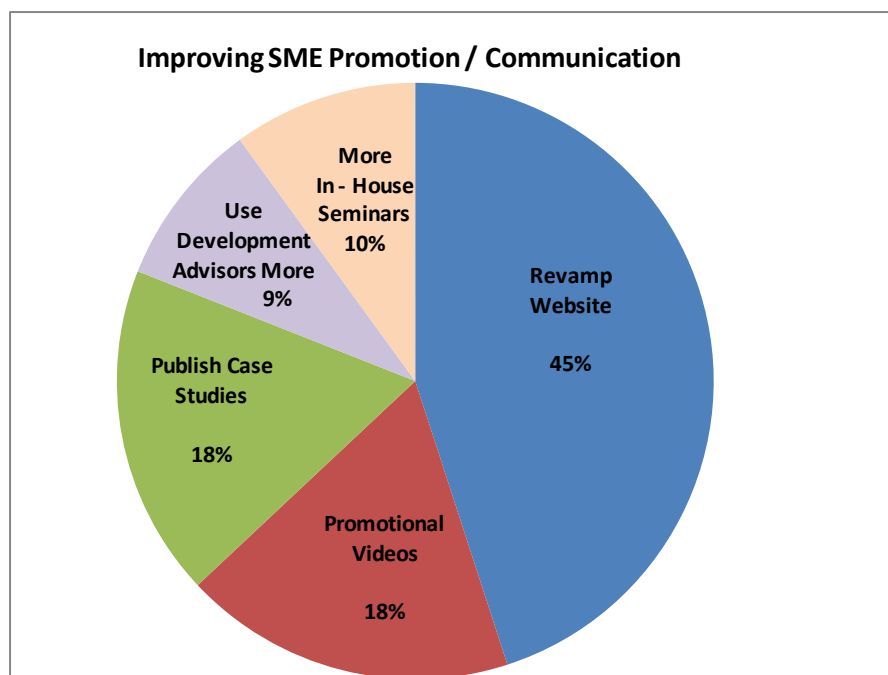
*We also use the press but this is only if we are launching something and then we mention the services we provide as part of that release.*

It is interesting to note that 81% of the respondents felt that promotion could be improved and that it was proving to be a challenge for them. Another striking finding is that 100% of the respondents declared that they used their website to promote research access, yet 90% asserted that their websites needed to be revamped, (ILO: 1) stated that:

*We do need to improve on promotion, our website is one area for a start, and I still don't think we promote the incubation centre well enough, we do it through literature and other areas of expertise ourselves internally sufficiently well but there could be more ways to improve this promotion...*

Figure 4.4 outlines the suggestions put forward by the respondents to improve promotion of research access and communication to SMEs.

**Figure 4.4 Promotional Suggestions**



**Source: Authors Own Work**

#### **4.3.2 Need for Additional Research Infrastructure**

It was found that 64% of the respondents felt that in order to effectively collaborate with SMEs, more research personnel were needed.

They mentioned that recent employment embargos within the public sector had made it more difficult for them to ensure that the needs of SMEs were met in a timely manner. 36% of respondents felt that more capital was required and expressed concern that when funding runs out such collaborations may not be able to continue, (ICM: 2) stated that:

*having the sufficient funding is critical but it is out of our control, I would hate to see the funding drop off and for things to fall back to the way they were before, we have made great progress with SMEs and this needs to continue.*

### 4.3.3 Future Plans

The findings revealed that 100% of the respondents expressed intentions to do more over the coming months to further promote and continuously improve HEI/SME collaborations within their Institute. As Figure 4.5 illustrates there was 100% commonality in terms of revamping the website and applying for more SME targeted funding programmes. (HEI: 1) intends to focus more on the promotional aspect, whilst (HEI: 2) will focus on communication and (HEI: 3) intends to enhance its internal functions to improve collaborations.

**Figure: 4.5 HEIs future plans to promote/improve HEI/SME collaborations**

<b>HEI 1</b>	<ul style="list-style-type: none"> <li>○ Revamp the Research Websites</li> <li>○ Further explore the "Word of Mouth Avenue"</li> <li>○ Publish Case Studies of successful collaborations</li> <li>○ Introduce Video Promotion</li> <li>○ Review the option of introducing an internal Seed funding initiative</li> <li>○ Extend existing incubation centre to other towns in the region</li> <li>○ Apply for more SME targeted funding programmes</li> </ul>
<b>HEI 2</b>	<ul style="list-style-type: none"> <li>○ Spend more time on the Road- Visiting SMEs ie "Knocking on Doors"</li> <li>○ Work more closely with Enterprise Ireland Development Advisors</li> <li>○ Amend the Academic Contract to provide time for research</li> <li>○ Revamp Research Website</li> <li>○ Employ Additional Research Personnel</li> <li>○ Apply for more SME targeted funding programmes</li> </ul>
<b>HEI 3</b>	<ul style="list-style-type: none"> <li>○ Develop and incubate brand Ireland for the IOT sector through the IOTI</li> <li>○ Introduce a Technology Transfer office</li> <li>○ Develop Research Information forums for SMEs</li> <li>○ Amend the Academic Contract to provide time for research</li> <li>○ Revamp Website</li> <li>○ Apply for more SME targeted funding programmes</li> </ul>

**Source: Authors Own Work**

#### **4.4 Conclusion**

This chapter highlighted that the key characteristics of a regional knowledge economy are predominantly determined by geographic proximity, industry base and skill set. As the term regional knowledge economy is frequently seen as a buzz word its definition is frequently adapted. Interestingly, only 18% of respondents see that their role is to provide assistance to SMEs directly, yet 100% see SMEs as being vitally important for Regional Knowledge Economies.

Relationship building through knocking on doors, word of mouth and building trust were identified as key components to collaborations. It was revealed that all three HEIs target specific initiatives and funding schemes funded by Enterprise Ireland, with Innovation vouchers being identified as the single most effective scheme for encouraging collaborations. Benefits and barriers of collaborations for the HEI and the SME were identified, noting that awareness and negotiation could reduce barriers.

Finally, this chapter revealed that HEIs raise awareness to SMEs mainly through their research publications and internal websites, yet 45% of respondents confirmed they intended to revamp their sites. A need for additional research infrastructure was expressed, with 64% citing the need for more people and 36% citing the need for more capital. Future plans to improve collaborations will focus mainly on promotion and communication to SMEs.

The following chapter will provide an interpretation of these findings and their meaning in the context of the literature review.

## **Chapter 5 Discussion**

### **5.0 Introduction**

This chapter will discuss the primary research findings put forward in chapter four in the context of extant literature. It is important to note that literature pertaining to this research focuses predominantly on the SME perspective, whereas the primary research focuses solely on the HEIs perspective, thus enabling the researcher to compare the two distinct perspectives. The information will be presented in three sections, referencing the three research objectives of this study under relevant themes.

### **5.1 Research Objective 1:**

**To analyse the characteristics and underlying assumptions of Regional Knowledge Economies**

#### **5.1.1 Regional Knowledge Economy**

The findings from this study revealed that the key characteristics of a regional knowledge economy are predominantly determined by geographic proximity, industry base and skill set. Some HEIs distinguish themselves on a regional basis whilst others distinguish themselves on a National basis. HEIs also draw upon certain characteristics within their regions such as the skills sets available and the industry base which notably differed across the three regions in this study.

In terms of education provision which in turn influences the skill sets available and the industry base attracted to the regions; one region has several Universities whilst in the other two regions the IOTs are fulfilling this role. These findings corroborate with the the sectoral view of the knowledge economy put forward in the literature. Keeble and Wilkinson (2000) argue that a dynamic growth of knowledge based sectors usually requires specific location conditions such as excellent universities and research organisations, good educational institutions, a highly qualified labour force in addition to a well developed ICT infrastructure (Keeble and Wilkinson, 2000).

### **5.1.2 Higher Education Institutions role in contributing to the development of Regional Knowledge Economies**

100% of the respondents from this study revealed that although they agreed their HEI had a role to play in contributing to regional knowledge economies, they did not feel they were solely responsible for their development. This finding conflicts with the literature whereby the OECD (2007) proposed that HEIs are among the single most important sources of knowledge and innovation.

This resonates with Chatterton and Goddard (2000) who believed that by being located in specific regions, higher education institutions are being asked to make significant contributions to the development of these specific regions.

The respondents identified numerous other stakeholders whom they felt had an important role to play, including State agencies such as Enterprise Ireland. These findings reassert contemporary thinking of Davies (1998) and results of the Association of European Universities Report (2000) which states that in order to respond better to the needs of different groups within society, HEIs must engage in a meaningful dialogue with stakeholders. Table 5.1 provides a brief overview of the significant findings under research objective 1.

**Table 5.1 Key Findings for Research Objective 1**

<p style="text-align: center;"><b><u>Research Objective 1 :</u></b></p> <p><b>To analyse the characteristics and underlying assumptions of regional knowledge economies</b></p> <p><b><u>Regional Knowledge Economies</u></b></p> <p>Classified by: Regional Make Up</p> <ul style="list-style-type: none"><li>○ Geographic proximity – Not all HEIs operate on a regional basis</li><li>○ Industry Base – Differs across the 3 regions, Dynamic Mix of Industries</li><li>○ Skill Set – 2 of the 3 regions do not have a University, skill set is influenced by the education provision of the region.</li><li>○ Dynamic Mix of SMEs across the 3 regions</li></ul> <p><b><u>Term Regional Knowledge Economy</u></b></p> <ul style="list-style-type: none"><li>○ Means different things to different people</li><li>○ Seen as a Buzz word - individuals had to put their own definition around the term to help them understand it</li></ul> <p><b><u>Role of the HEI</u></b></p> <ul style="list-style-type: none"><li>○ HEIs feel they contribute to the development of RKEs but they are not solely responsible for their creation</li><li>○ HEIs identified various Stakeholders as playing a role in the development of RKEs mainly Enterprise Ireland</li></ul>
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**Source: Authors Own Work**

## **5.2 Research Objective 2**

**To identify appropriate means through which Higher Education Institutions engage with SMEs**

### **5.2.1 Defining SMEs**

The findings revealed that in order for SMEs to access specific funding initiatives they must meet certain criteria. 100% of the respondents in the primary research asserted that in order to determine whether a company was an SME, they would adopt the definition put forward by the European Union/Enterprise Ireland which is defined in the literature as any business with less than 250 employees. However, the research highlights that this definition of small to medium sized firms is not applicable to Ireland where at least 89.8% of firms have less than 10 employees (Forás, 1999).



The primary research from this study confirms this, with 45% of the respondents acknowledging that in reality they deal more with microenterprises, whom have less than 10 employees therefore this research argues that the SME definition applied across the HEI sector in Ireland does not take into account the makeup of regional SMEs.

### **5.2.2 HEI/SME Collaborations**

A key contribution of this study is the identification of specific ways in which HEI/SME collaborations actually emerge. Various reports in the literature such as the (SSTI, 2006; Southern and Eastern Regional Operational Programme, 2007; Innovation Task Force, 2010) advocate HEI/SME engagements and make reference to their intention to introduce initiatives to facilitate such interactions by proposing the creation of regional knowledge hubs and laboratory labs. However, these reports fail to recognise how collaborations emerge in the first place.

Having looked at this dimension, the primary research revealed relationship building as a key component in developing collaborations. The findings illustrated that the most effective way for HEIs to build relationships with SMEs is by "*knocking on doors*" actively visiting the SMEs informing them of the HEIs research capabilities. The research also revealed that "*word of mouth*" and "*trust*" were central to building up relationships between HEIs and SMEs. Therefore, this research contends that in order for support agencies to introduce concrete initiatives to facilitate such interactions, they must first understand how HEI/SME collaborations emerge.

An interesting finding however, from this current research is that there appears to be no inter-collaboration between the HEIs. The findings revealed that, should one of the HEIs be unable to assist the SME, they would not think of passing them on to another HEI, whom they know would have the research capability. This indicates that each of the HEIs in this study is operating their collaborations in an insular fashion.

### **5.2.3 Research Policies/Funding Initiatives**

The research highlights that the three HEIs in the primary research do not have any specific policies pertaining to HEI/SME engagement, but that HEI/SME collaborations has begun to feature heavily within their HEI strategy and their research strategy over the past few years. This finding concurs with (Arbo and Benneworth, 2007) who argued that the contribution of HEIs to developing their home regions has not previously been a major concern for public policy or the HEIs themselves but, this was changing with the expansion of higher education, particularly in the non-university sector.

This research identified Enterprise Ireland as the main funding support for HEI/SME collaborations in addition to the Enterprise Platform Programmes (EPPs) funded by the Higher Education Authority. This concurs with the literature which endorsed Enterprise Ireland as the main support structure in Ireland to assist SMEs in their activities (Department of Enterprise, Trade and Employment). The literature also suggested that coordinated programmes have been implemented at national level, encouraging and creating links between SMEs and academia, identifying the Enterprise Platform Programmes (EPPs) as an example. The findings revealed specific funding programmes that have been targeted by the HEIs to encourage HEI/SME collaborations including the Incubation centres, the Applied Research Enhancement (ARE) centres and the Technology Transfer Offices.

The findings further revealed specific funding initiatives such as the Innovation Voucher Scheme and the Innovations Partnership Schemes that had been targeted, all of which are supported by Enterprise Ireland. Thus, this research may suggest that outside of Enterprise Ireland supports there is very little funding available in Ireland to encourage HEI/SME collaboration. This assertion can be further supported by the findings which revealed that none of the HEIs had an internal "SEED" funding initiative in place to encourage collaboration with SMEs, and how Enterprise Ireland are beginning to expect HEIs to become self financing, funding some of the HEI/SME supports themselves. What's more only one of the HEI referred to a local funding initiative they had availed of.

The Innovation Task Force report (2010) asserted that access to State funding for research has been identified by many SMEs as a key barrier to scaling thus recommended that current initiatives should be reviewed to ensure increased involvement by SMEs in research activities. This research however revealed that the HEIs believe we have created a culture of SMEs in Ireland who are too reliant on State funding and are reluctant to put forward their own funds to conduct research. Giving the example of the "*Fast Track Voucher*" scheme which requires SMEs to co-fund 50% of the research costs, HEIs indicated that uptake of this scheme by SMEs has been limited to date.

The research also revealed that HEIs have difficulty recovering the VAT element of the "*Innovation Voucher*" scheme which SMEs have to contribute. This research suggests that although HEIs agree that funding schemes need to be reviewed, they recommend that new schemes should require SMEs to fund some of the research costs themselves, moving away from this over dependency on State funding. This study also revealed that should the funding be withdrawn by State agencies, these new schemes would absorb some of the costs and allow HEI/SME collaborations to continue.

#### **5.2.4 HEI/SME Collaboration Mechanisms**

This study found that there were targeted opportunities available for SMEs to engage in innovative activities with HEIs, for example the "*Innovation Voucher scheme*", funded by Enterprise Ireland. The findings identified this as the single most effective funding mechanism currently available to SMEs enabling them to collaborate with HEIs to come up with a solution to a problem or an opportunity.

This finding contradicts the literature which identified Innovation as one of the main areas SMEs struggle, suggesting that just under half of small businesses (47%) reported innovation activity over the period 2002 – 2004 (CSO, 2008).

The literature cited lack of funds within enterprise, lack of finances from outside enterprise, high innovation costs, lack of qualified personnel, lack of information on technology, lack of

information on markets and difficulty in finding cooperation partners as the main barriers to innovation for SMEs (Forfás, 2004).

However, the findings argue that Innovation Vouchers provide SMEs with finances from outside enterprise i.e. Enterprise Ireland, access to knowledge and expertise and access to cooperative partners i.e. the HEI who provide the cheapest and most effective rates available in an attempt to help SMEs become more innovative. This research suggests that SMEs do in fact have ample access to innovation schemes and that uptake by SMEs has been extremely high, thus the findings of the Forfás "*Community Innovation Survey*" (2004) conflict with the findings of this current study.

#### **5.2.5 Benefits / Barriers of HEI/ SME Collaborations**

Although the factors hindering the growth and development of SMEs were identified in the literature by the Small Business Forum (2005) the benefits and barriers associated with HEI/SME collaborations were not mentioned. Thus, the findings in this study revealed that not only are HEIs highly aware of the perceived benefits and barriers associated with collaborating with SMEs from their own perspective, but more importantly, they are aware of the perceived barriers from the perspective of the SMEs.

The findings further suggest that the HEIs are actively trying to reduce these barriers for the SMEs and identified "*Awareness and Negotiation*" as the main way to do so, acknowledging that SMEs can be fearful of engaging with HEIs, viewing them as being SME unfriendly. This concurs with the (Southern and Eastern Regional Assembly, 2009) who noted that "Ivory tower" notions of the university and other third-level bodies are gradually disappearing as these bodies reorient their role in a more commercial direction and as SMEs interact with them more frequently.

The findings revealed that HEIs would like to see a common framework put around the area of IP, as the respondents perceived this to be one of the main areas SMEs struggle

with, thus preventing collaboration. This concurs with the recommendations in the report put forward by the (Innovation Task Force, 2010) which suggested that SMEs need to easily find and access IP created at HEIs, in order to turn it into products and services that meet customer needs.

#### **5.2.6 Research & Development**

Regarding R&D activity, the findings from this study revealed that 33% of respondents particularly the Technology Transfer Officers across the three HEIs asserted that they need to do more to encourage R&D activity amongst SMEs. The findings suggest that HEIs should be more open to SMEs and provide facilities to allow them to conduct R&D activity. These findings concur with the report put forward by the (Innovation Task Force, 2010) which recommended HEIs introduce laboratory access programmes similar to those in the USA providing opportunities for SMEs, who with their own resources could not afford expensive research equipment, to undertake their own advanced development.

Interestingly those respondents in the findings who advocated such initiatives had many years research experience working in the US, witnessing firsthand the benefits of these schemes. This finding further supports the assertions in the literature that on average small firms are less likely to conduct R&D than larger firms. According to the (OECD, 2006) expenditure on R&D as a proportion of GDP in Ireland is well below the EU and OECD averages citing that only 1.84% of gross domestic expenditure was spent in Ireland on R&D in 2006. The literature also suggests that for the SME sector to thrive in the future, it needs to exploit the R&D and innovation opportunities available (Forfás, 2008).

On the other hand, the findings did not corroborate with the literature in that 67% of the respondents identified the provision of space within the Incubation Centres and the ARE centres as dedicated R&D space for SMEs. These findings suggested that HEIs were

actively encouraging SMEs to conduct R&D activity within their Institute. They argue that the advantages of this service to the SMEs includes cheap and flexible rates; access to key knowledge providers, access to funding schemes and enhanced networking capabilities.

However, these respondents could not give an exact number of how many SMEs used this space. A key contribution of this study is that 100% of respondents agreed that in order for SMEs to collaborate with researchers within the HEIs, their idea or problem must first be deemed to be research. The findings indicated that if there is no research content at the outset SMEs are turned away, hence opportunities to collaborate with them in the future have been lost which only further contributes to the lack of R&D activity amongst SMEs in Ireland.

Table 5.2 provides a brief overview of the significant findings under research objective 2.

**Table 5.2 Key Findings for Research Objective 2**

<b>Research Objective 2:</b> To identify appropriate means through which HEIs engage with SMEs
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**Defining SMEs**

- HEIs adopt EI/EU definition of an SME which employs <250 employees in order to access certain SME funding schemes
- In fact in their regions they deal more with microenterprises which employ <10 employees so this criterion excludes micro companies from accessing funding.

**HEI/SME collaborations emerge through**

- relationship building;
- knocking on doors;
- word of mouth;
- building up trust between the 2 entities

**Mechanisms used to help SME engage**

- Technology Transfer Offices
- ARE Centres
- Incubation Centres
- EI Innovation Vouchers
- EI Innovation Partnerships
- No internal SEED funds in HEI
- Only 1 HEI used the "Fusion" scheme - a local cross border initiative
- Other 2 HEIs did not refer to any local schemes

**SMEs are Innovating**

- SMEs availing of the Innovation Voucher Scheme to conduct innovation – HEIs feel this is the single most effective funding scheme

**SMEs over reliant on grants**

- SMEs reluctant to co-fund research
- Difficult to get SMEs to pay VAT on Innovation Vouchers
- Uptake from SMEs on "Fast Track" Co-funded vouchers is limited

**Over reliance on Enterprise Ireland**

- 90% of funding schemes are funded by EI, perhaps HEIs could be too reliant on this source

**HEIs aware of collaboration Barriers for the SMEs**

- HEIs not on same time schedule
- Fearful of : HEI, IP, of not being taken seriously
- Not knowing who to contact
- Time Consuming
- Lack of Funds

**HEIs recommendations to reduce barriers for the SME**

- Awareness and Negotiation – Face to Face meetings with SMEs
- Explain IP and scope of work
- Develop a Common Framework around IP

**R&D**

- HEIs do not provide dedicated R&D space for SMEs
- Some HEIs deem the Incubation space and ARE spaces to be dedicated space for SMEs
- SMEs must have a research idea or problem before they can collaborate with the HEI
- SMEs cannot come and use HEI facilities to try out ideas

**Source: Authors Own Work**

### **5.3 Research Objective 3**

**To explore the various ways Higher Education Institutions communicate their research capabilities to SMEs**

### **5.3.1 Research Access**

Previous research cited lack of awareness of the research opportunities available as a common problem highlighted by SMEs (Southern and Eastern Regional Assembly, 2009). Interestingly the findings revealed that HEIs had adopted various promotional tools to promote research access and communicate funding opportunities to the SMEs. This promotion was disseminated primarily through HEI websites, however the primary research also found that these websites were being revamped indicating that promotion required improvement.

Conversely, 33% of the respondents felt that they were amply promoting and communicating research access and funding opportunities to SMEs, and that no more could be done on their side as it was up to SMEs to avail of the opportunities.

It is important to note that there appears to be an anomaly in the literature put forward by the Southern and Eastern Regional Assembly (2009). As highlighted above they maintain that SMEs are not aware of the funded research opportunities available to them. However, at the same time they refer to that fact that many SMEs have seen their businesses benefit from knowledge transfer interaction with HEIs, stating that HEIs organise tailored seminars, mentoring, business angel schemes and innovation award schemes to engage with SMEs.

Some of the schemes mentioned in the literature concur with those revealed in the primary research such as the tailored seminars and mentoring schemes. However, this research discovered many other ways including HEI websites, media, via the support agencies, research publications, attending talks and the researchers actively spreading the word themselves.

A key contribution of this research is that HEIs are actively promoting and communicating research opportunities to SMEs, however the regional make up of their regions should be taken into consideration when determining how best to do it. The findings revealed in one particular HEI their research activities are diverse and there is a dynamic mix of SMEs in their region, hence holding in house seminars tailored to suit the



SME needs proved difficult. Thus this finding demonstrates that certain methods of promotion and communication to SMEs may work for one HEI in one region but may not work for other HEIs in other regions.

### **5.3.2 Future Plans to Improve HEI/SME collaborations**

Each of the three HEIs outlined various ways they intended to further promote and continuously improve collaborations with SMEs. Plans included publishing case studies of successful collaborations; producing promotional videos; revamping websites; and exploring Seed funding initiatives. They also intended to explore the word of mouth option by spending more time visiting the SMEs; applying for more targeted SME funding; holding more in house seminars and using the Development Officers in Enterprise Ireland more as they have direct contact with the SMEs. Plans also included attempts to amend the academic contract to provide academics with time to conduct research and (HEI: 3) intended to develop a technology transfer office.

These findings resonate with the Innovation Task Force (2010) recommendation that SMEs need a clear, consistent, speedy and predictable system to facilitate their engagement in research with HEIs. The report also recognised that significant progress has been made in recent years particularly with the strengthening of the Technology Transfer and Development offices of the HEIs, funded through Enterprise Ireland, however, it also suggests that there is more work to be done in order to get to a system that is truly entrepreneur friendly. In addition this research also found that in order to continue the progress made with SMEs, HEIs need additional research infrastructure in terms of people and capital.

Finally, the findings from this research asserted that although HEIs agree collaborations with SMEs is of vital importance to regional development, it should not be the driver of the HEI strategy. They recommend that HEI/SME collaborations should only be part of the strategy otherwise HEIs run the risk of becoming commercialised service

organisations for SMEs, losing their traditional focus which is to educate and train graduates for the future.

This finding conflicts with the literature which stated that IOTs can develop into effective technology resources, focused on collaboration with local industry on the basis of applied research and technology development directed at the challenges facing the company (SSTI, 2006). Table 5.3 provides a brief overview of the significant findings under research objective 3.

**Table 5.3 Key Findings for Research Objective 3**

<b><u>Research Objective 3</u></b>
<b>To explore the various ways Higher Education Institutions communicate their research capabilities to SMEs</b>
<b><u>Research Access</u></b>
HEIs promote access to SMEs through <ul style="list-style-type: none"> <li>○ HEI websites</li> <li>○ Research Publications</li> <li>○ Attending Talks</li> <li>○ Via the Support Agencies</li> <li>○ Hosting in House Seminars for SMEs which is dependent on the region, the HEI and the SMEs</li> <li>○ Researchers on the road spreading the word to SMEs</li> </ul>
<b><u>Future Plans to promote communication to SMEs</u></b>
<ul style="list-style-type: none"> <li>○ 100% agreement HEI websites need to be revamped.</li> <li>○ Via the Development Advisors in EI who work closely with SMEs</li> <li>○ More time knocking on doors</li> <li>○ Amend Academic contract to give academics more time to do research</li> <li>○ Introduce internal SEED funding</li> </ul>
<b><u>Need for Additional Research Infrastructure</u></b>
<ul style="list-style-type: none"> <li>○ 64% feel they need more People</li> <li>○ 36% feel they need more Capital – promoting it is not a problem HEIs need the funds to continue to build progress</li> </ul>

**Source: Authors Own Work**

## **5.4 Conclusion**

This chapter sought to relate the findings from the primary research to the secondary research in the literature review. To remind the reader, Tables 5.1, 5.2, and 5.3 summarised the key findings from this current study under each of the three research

objectives. The next and final chapter will present the overall conclusions from this current research. It will also draw attention to a number of limitations associated with the study and make recommendations for future research in this field.

## **Chapter 6: Conclusions, Limitations & Recommendations**

### **6.0 Introduction**

Essentially, this study sought to understand the role that HEIs play in meeting the needs of SMEs to assist with the development of regional knowledge economies. This research therefore, examined the characteristics of regional knowledge economies, the means

through which HEIs collaborate with SMEs and the various ways HEIs communicate their research capabilities to SMEs. Thus, the research question of this study was to investigate:

*Developing Regional Knowledge Economies: How Higher Education  
Institutions engage in SME collaboration – A Research Support Perspective*

The research objectives of this study were:

- To analyse the characteristics and underlying assumptions of regional knowledge economies
- To identify appropriate means through which Higher Education Institutions engage with SMEs
- To explore the various ways Higher Education Institutions communicate their research capabilities to SMEs

In order to gain answers to the research question and research objectives it was necessary to review literature pertaining to the research topic. Literature in the areas of SME policy, regional knowledge economies, the South East region and National policy were examined. Primary data was gathered using semi-structured interviews. The findings from this research were then presented and discussed in chapters four and five. Thus, the purpose of this final chapter is to draw conclusions from the research findings and from the research as a whole. This chapter will address the limitations of this study and finally recommendations will be made for future research into this field of study.

## **6.1 Conclusions**

The research findings have indicated that HEIs acknowledge they have a role to play in contributing to the development of RKEs but that they are not solely responsible for their creation. HEIs have identified key external stakeholders such as EI, IDA, IBEC and SFI amongst others whom they feel are also driving the regional knowledge economy agenda. Although located in regions, not all HEIs operate on a regional basis, identifying

geographic proximity; industry base and skills sets as key characteristics of their regional make up which they draw upon.

The findings revealed that HEIs are playing an active role in regenerating and revitalizing their regions through stimulating and sustaining SME development. HEIs are interacting with SMEs in a number of ways, for example, through training and skills development, bespoke research and consultancy clustering, knowledge transfer partnerships and spin-outs. This study also highlights that the Enterprise Ireland fund over 90% of funded research programmes, suggesting that outside EI very little else exists in Ireland to support such engagements. The findings further revealed that HEIs believe SMEs are not passive enough in accessing the rich and diverse research base that they can offer and need to avail of the opportunities being provided.

This research highlighted that SMEs are not willing to co-fund research and that SMEs in Ireland are perhaps over reliant on State supports. As this research draws on the experiences of HEI personnel who are working at the coal face with SMEs, the findings provide practical insights into how HEIs engage with SMEs, revealing relationship building and trust as vital components. This study found that collaborations emerge through the researchers "knocking on doors" of SMEs or through SMEs hearing of the research capabilities and contacting the HEI. However it also revealed that HEIs do not refer SMEs on to each other, showing a lack of collaboration at the HEI level.

This research also highlights the benefits and barriers that are facing HEIs in the current context of HEI/SME collaboration. Benefits include an enhanced role in regional economic development; access to research funding providing new research facilities and sophisticated equipment; exposure to challenging industry problems and retention of research staff.

Barriers include SMEs demanding too much; time consuming; scheduling conflicts; the nature of the academic contract and conflicts with the traditional culture of the HEI. The perceived barriers for the SME included Fear of: HEI bureaucracy; of IP; of not been taken seriously; of not having the academic knowledge; lack of funds; too time consuming and not knowing who to contact. Interestingly, HEIs have identified "Negotiation and Awareness" as the principal method to reduce these barriers by meeting the SME face to face explaining the scope of work and any IP issues, whilst also seeking a common framework to be put around the area of IP.

SMEs are being encouraged by governments to play a demand-led role through stimulating collaborative research and development opportunities (SSTI, 2006; Innovation Task Force, 2010) however, this research found that HEIs have warned that these enhanced roles could lead towards a model of commercialisation which could threaten their existence and undermine their founding principle which is to educate and train graduates. The study would argue that HEIs are actively promoting research access and are communicating funding opportunities to SMEs revealing that this is done via their website, research publications, researchers and funding agencies spreading the word, hosting in house seminars and attending talks and conferences. However, this study also revealed that a one cap fits all approach would not work as regional characteristics such as the dynamics of SMEs and the research capabilities of the HEI need to be considered when deciding on communication methods. Table 6.1 presents a 13 point plan summarising the major contributions of these findings to the research field which could benefit academics, SMEs, policy provision both nationally and regionally, funding support agencies and local authorities.

**Table 6.1 13 Point Plan: Contributions of New Findings to the Field of Research**

1. Regional Knowledge economies need to take into account the regional make up of particular regions, classified by geographic proximity, industry base and skills sets, the latter two are heavily influenced by the education provision within the region.
2. The term regional knowledge economy has become a buzz word and is perhaps over used, people have amended the definition to their own meaning and understanding of the term
3. HEIs do not want to be seen as having sole responsibility for creating RKEs; they will actively contribute and admit they play a part along with other key stakeholders such as

- the Government, National funding agencies and National Bodies. Only 18% of HEI recognised the SMEs as a stakeholder in driving this agenda but later acknowledged they are vital to the development of RKEs.
4. The EI/EU SME criterion used by HEI does not take into account the microenterprise and so is excluding a large number of firms from accessing certain funding programmes, we need to take into account the number of SMEs vs the number of Microenterprise in Ireland and amend the criterion of funding schemes accordingly
  5. Relationship building is a vital component to HEI/SME collaborations which emerge mainly through researchers going out knocking on the doors of the SMEs promoting research access and funding opportunities. HEIs do not pass on SMEs to one another, there is a lack of inter collaboration across the HEIs.
  6. HEIs avail of mechanisms introduced by Enterprise Ireland but have very little else to avail of, there are no internal Seed funds in the HEIs and there is very little emphasis on regional supports from the Enterprise Boards, Assembly's or the Chambers at local and regional level
  7. SMEs are innovating by availing of the Innovation Voucher Schemes allowing them to collaborate with the HEIs to become more innovative, more schemes like this are needed
  8. SMEs are not willing to part with their own funds to fund research and are too reliant on support grants, therefore new schemes should try and encourage SMEs to become less dependent on grants and set aside a portion of their own funds for R&D
  9. HEIs are well aware of the perceived barriers for SMEs in terms of collaborating with them, so much so they have identified Awareness and Negotiation as a key tool in reducing these barriers. HEIs are explaining IP issues to SMEs, meeting them face to face to allay their fears and explain the scope of work, HEIs would like to see a common framework around the whole area of IP
  10. No dedicated R&D spaces are provided for SMEs within the HEIs, this could encourage more SMEs to conduct R&D thus become even more innovative
  11. Enterprise Ireland is recognised as the sole provider of research funds for developing HEI/SME collaborations, HEIs could be too dependent on EI
  12. Promotion of Research Access and Communication to SMEs needs to continue but regional factors such as the number and mix of SMEs in the region and the research activities of the HEI need to be taken into account before deciding on which method to use
  13. HEIs need more research personnel and more capital to continue their efforts to collaborate with SMEs.

**Source: Authors Own Work**

## **6.2 Limitations**

A principle limitation of this study is that the primary research was conducted solely on the side of the HEIs; no SMEs were interviewed to obtain the primary data. This has therefore, only allowed the researcher to put forward the perspective from the side of the HEIs.

Secondly, because the research is qualitative in nature, the sample size was small, only containing eleven interviewees from three HEIs. While this provided deep rich data, it inherently limited the generalisability of the research.

Thirdly, the researcher conducted the HEI interviews within three IOTs; no Universities were interviewed. Had the study been administered throughout a more diverse range of HEIs in other regions across Ireland the results would have represented the perspective of the wider HEI community.

### **6.3 Recommendations**

The limitations exposed in this research provide a number of opportunities for future research. It is proposed that a similar research study be undertaken incorporating both the HEI and the SME perspectives in a number of different regions. The study revealed that HEIs are actively promoting and communicating research access to SMEs via their websites, knocking on doors, word of mouth, seminars, talks, and research publications. 33% of respondents revealed they feel it is up to the SMEs to avail of these research opportunities and that no more can be done on their part to promote research collaborations. Therefore a study which incorporates the SME perspective would provide a more balanced view.

100% of the respondents in this research asserted that they do not feel that HEIs are solely responsible for the development of regional knowledge economies but that they amongst other stakeholders have a part to play.

They do not want SME research collaborations to be the driver of their strategy, fearing it would compromise their founding principle to educate and train graduates and could lead to a model of commercialisation. This research however, only represents the IOT perspective thus, a research study could be conducted across more diverse regions and more diverse HEIs. For example across the University sector which would have a larger



research mix and perhaps a great number of research collaborations with SMEs perhaps providing a different perspective.

It is also proposed that a comparative study be conducted between regional knowledge economies in Ireland and Finland focusing on HEI/SME innovation activities. According to Eurostat innovation-related indicators (2007), Finland has very strong innovation performance regularly outperforming most other EU Member States. Finland has successfully transformed itself into a knowledge economy and is now among the world leaders in the per capita amount spent on research. This study could provide Ireland with some valuable lessons to help the Government achieve its goal of investing 3% of GNP in research and in becoming Europe's leading knowledge economy by 2020 (Innovation Task Force, 2010).

## **Bibliography**

Arbo, P. and Benneworth, P. (2007) 'Understanding the Regional Contribution of Higher Education Institutions': Vol. 9, *OECD Publishing*.

Audretsch, D. B. (2004) 'Sustaining Innovation and Growth: Public Policy Support for

- Entrepreneurship', *Industry & Innovation*, Vol.11, No.3, pp 167–191.
- Baker, S. (2001) *The complete idiot's guide to business statistics*, Alpha Books.
- Birley, S. and Westhead, P. (1990), 'Growth and Performance Contrasts between 'Types' of Small Firms', *Strategic Management Journal*, Vol. 11, No.7, pp 535-57.
- Brower, E., Budil-Nadvornikowa, H., Kleinknecht, A. (1999) 'Are Urban Agglomerations a Better Breeding Place for Product Innovation? An Analysis of New Product Announcements', *Regional Studies*, Vol. 33, pp 541-549.
- Bryman, A. (1984) 'Debate about Quantitative and Qualitative Research: A Question of Method or Epistemology?' *The British Journal of Sociology*, Vol. 35, No. 1, pp 75-92.
- Bryman, A. and Bell, E. (2003) *Business Research Methods*, New York: Oxford University Press.
- Chatterton, P. and Goaddard. J. (2000) 'The Response of Higher Education Institutions to Regional Needs', *European Journal of Education*, Vol. 35, No. 4.
- Chia, R. (2002) *The Production of Management Knowledge: Philosophical Underpinnings of Research Design*, in Partington, D. 2002. *Essential Skills for Management Research*, London: Sage Publications.
- Cooke, P. (2002) *Knowledge Economies- Clusters, learning and cooperative advantage*, London: Routledge.
- Cooke, P., De Laurentis, C., Tödtling, F. and Trippel, M. (2007) *Regional Knowledge Economies*, Cheltenham: Edward Elgar.
- Crossan, F. (2002) 'Research Philosophy: Towards an understanding', *Nurser Researcher*, Vol.11, No.1, pp 46-55.
- Cox, S. and Taylor, J. (2006) 'The Impact of a Business School on Regional Economic Development: A Case Study', *Local Economy*, Vol. 21. No. 2: pp 117–35.
- Davies, J. (1998) 'The Public Role of the University: The Dialogue of Universities with their Stakeholders: comparisons between different regions of Europe'. *CRE (Association of European Universities)*, the European Commission.
- David, M. & Sutton C.D. (2004). *Social Research the Basics*. London: Sage Publications.
- Denscombe, M. (2005) *The Good Research Guide for small – scale social research projects*, (2<sup>nd</sup> Edn), Maidenhead: Open University Press.
- Department of the Taoiseach (2010) *Innovation Ireland: Innovation Task Force Report*. Dublin: Stationary Office Dublin.

Easterby-Smith, M., Thorpe, R. and Lowe, A. (1997) *Management Research – An Introduction*, London: Sage Publications.

Easterby-Smith, M., Thorpe, R. and Lowe, A. (2002) *Management Research – An Introduction*, (2nd Edn), London: Sage Publications.

Evers, H. (2008) 'Knowledge hubs and knowledge clusters: Designing knowledge architecture for development'. MPRA Paper 8778, University Library of Munich, Germany.

European Commission (2005) *Key Figures*, [online], available from: <ftp://ftp.cordis.lu/pub/indicators/docs/> [Accessed 3 January 2010]

Forfás (1998) *Annual Competitiveness Report, 1998*, [online], available from: <http://www.forfas.ie/ncc/reports/ncc/sme.htm>, [Accessed 4 November 2009]

Forfás (1999) *Report on social partnership*, [online], available from: <http://www.forfas.ie/ncc/reports/nccsp/index.html>, [Accessed 4 November 2009]

Forfás (1999) *Annual Competitiveness Report, 1999*, [online], available from: <http://www.forfas.ie/ncc/reports/ncc99/smes.htm#sp>, [Accessed 16 November 2009]

Forfás (2004) *Community Innovation Survey*, [online], available from: <http://www.forfas.ie/publications/show/pub300.html>, [Accessed 21 October 2009]

Forfás (2006) *Annual Report 2006*, [online], available from: [http://www.forfas.ie/publications/forfas\\_annrpt06/forfas-annual-report-2006-english.pdf](http://www.forfas.ie/publications/forfas_annrpt06/forfas-annual-report-2006-english.pdf), [Accessed 7 November 2009]

Forfás (2007) *Annual Competitiveness Report, 2007*, [online], available from: <http://www.forfas.ie/publications/show/pub282.html>, [Accessed 25 November 2009]

Gummesson, E. (2006) 'Qualitative research in management: addressing complexity, context and persona', *Management Decision*, Vol. 44, No. 2, pp 167-179.

Hollanders, H. (2007) 2006 European Regional Innovation Scoreboard (2006 RIS), *MERIT, Maastricht*.

Hughes, C. (2002) *Introduction to Research Methodologies* [online], available from: [http://www2.warwick.ac.uk/fac/soc/sociology/staff/academicstaff/chughes/hughesc/hughesc\\_index](http://www2.warwick.ac.uk/fac/soc/sociology/staff/academicstaff/chughes/hughesc/hughesc_index), [Accessed 3 March 2010]

Hussey, J., and Hussey, R. (1997) *Business Research: A practical guide for undergraduates and postgraduates*, Basingstoke: MacMillanBusiness.

Irish Central Statistics Office (2007) *Small Business in Ireland*, [online], available from: [http://www.cso.ie/releasespublications/documents/other\\_releases/smallbusiness.pdf](http://www.cso.ie/releasespublications/documents/other_releases/smallbusiness.pdf), [Accessed 7 November 2009]

Jankowicz, A.D. (2000) *Business Research Methods*, (3<sup>rd</sup> Edn), London: Thompson Learning.

Johnson, P., and Harris, D. (2002) Qualitative and Quantitative Issues in Research Design, in Partington, D.2002. *Essential Skills for Management Research*, London: Sage Publications.

Keeble, D., Wilkinson, F. (2000) *High-Technology Clusters, Networking and Collective Learning in Europe*, Aldershot: Ashgate.

Kenney, M. and Patton, D. (2005) 'Entrepreneurial Geographies: Support Networks in Three High-Technology Industries', *Economic Geography*, Vol. 81, No. 2, pp 201-228.

Kuratko, D.F. and Hodgetts, R.M. (1995) *Entrepreneurship: A Contemporary Approach* Dryden Press.

Kvale, S. (1996) *Interviews: an introduction to Qualitative research writing*, Thousand Oaks: Sage Publication.

Kvale, D. (1996). *Interviews*. London: Sage Publications.

Lewins, A. and Silver, C. (2007) *Using software for qualitative data analysis*, London: Sage Publications.

Mason, J. (2004) *Qualitative Research*. (2<sup>nd</sup> edn), London: Sage Publications.

McMahon, R., Holmes, S., Hutchinson, P. and Forsaith, D. (1993) 'Small Enterprise Financial Management: Theory and Practice' National Reform Programme (2006), *Lisbon Agenda*, [online], available from: [http://www.taoiseach.gov.ie/attached\\_files/Pdf%20files/lisbonagenda.pdf](http://www.taoiseach.gov.ie/attached_files/Pdf%20files/lisbonagenda.pdf), [Accessed 31 October 2009]

Miles, M.B., and Huberman, A.M. (1994) *Qualitative Data Analysis: An Expanded Sourcebook*, (2<sup>nd</sup> edn), USA: Sage Publications.

National Strategy for Science, Technology and Innovation (2006) [online], available from: <http://www.entemp.ie/publications/science/2006/sciencestrategy.pdf>

[Accessed 2 January 2010]

Nooteboom, B. (1994) 'Innovation and diffusion in small firms: theory and evidence', *Small Business Economics*, Vol. 6, No. 5, pp 327-347.

OECD (1997) *Globalisation and Small and Medium Enterprises (SMEs)*: OECD Publishing.

OECD (2001) *OECD Science, Technology and Industry Scoreboard, Towards Knowledge based Economy*, Paris: OECD [online] available from:

<http://www1.oecd.org/publications/ebook/>,

[Accessed 29 December 2009]

OECD (2002), *OECD small and medium enterprise outlook*: OECD Publishing.

OECD (2005), *OECD SME and Entrepreneurship outlook*: OECD Publishing.

OECD (2005), *Innovation Policy and Performance*: OECD Publishing.

OECD (2006) *The SME Financing Gap: Theory and Evidence*: OECD Publishing.

OECD (2007) *Higher Education and Regions: Globally Competitive, Locally Engaged*: OECD Publishing.

O' Gorman, W. (2007) *Creating an RTD Investment Policy for Regions in Emerging and Developed Economies*. European Research Area, Regions of Knowledge 2.

Patton, M. Q. (1990) *Qualitative Evaluation and Research Methods*, London: Sage Publications.

Pilbeam, S. and Corbridge, M. (2006) *People Resourcing: Contemporary HRM in practice* (3<sup>rd</sup> edn), Essex: Pearson Education.

Polonsky, M. J., and Waller, D. S. (2005) *Designing and managing a research project: A business student's guide*. Thousand Oaks, CA: Sage Publications.

Powell, R. (1997) *Basic research methods for librarians* (3rd edn), Greenwood publishing Group.

Remenyi, D., Williams, B., Money, A. and Swartz, E. (2005) *Doing Research in Business and Management: An introduction to process and method*, London: SAGE Publications.

Rosson, P. and McLarney, C. (2005) *Developing Clusters in Peripheral Regions: Biotechnology in Halifax*, Nova Scotia.

Saunders, M., Lewis, P., & Thornhill, A. (2003) *Research Methods for Business Students*,

(3<sup>rd</sup> Edn), London: Prentice Hall.

Schöllhammer, H. and Kuriloff, A. H. (1979) *Entrepreneurship and Small Business Management*, New York: Wiley.

Scott, M. (1991) 'A European View, Proceedings of the 1991 Conference of the Small Enterprise Association of Australia and New Zealand', *Wollongong: NSW*, pp10-19.

Seidel, J. (1991) 'Method and madness in the application of computer technology to qualitative data analysis' in N.G. Fielding & R.M. Lee (Eds.), *Using computers in qualitative research*, London: Sage.

Silverman, D. (2005) *Doing Qualitative Research*, (2nd edn), Great Britain: Sage Publications.

Simmie, J. (2003) 'Innovation and Urban Regions and National and International Nodes for the Transfer and Sharing of Knowledge', *Regional Studies*, Vol. 37, pp 607-620.

Southern and Eastern Regional Operational Programme (2007-2013) '*Supporting and Enabling Dynamic Regions*', EU Regional Policy, 2007-2013. [online], available from: <http://www.seregassembly.ie/> [Accessed 3 January 2010]

South East Regional Authority  
<http://www.sera.ie/> [Accessed 4 January 2010]

Statistics Finland Business Register (2005) [online], available from: <http://www.stat.fi/org/tilastokeskus/vuosikertomusen>. [Accessed 5 January 2010]

Storey, D.J., Keasey, K., Watson, R. and Wynarczyk, P. (1987) *The Performance of Small Firms*, London: Croom-Helm.

Storey, D. J. (1994) *Understanding the small business sector*, London: Routledge.

Storey, D. J. (1999) 'Six Steps to Heaven: Evaluating the Impact of Public Policies to Support Small Businesses in Developed Economies', in D L Sexton and H Landstom (eds.), *Handbook of Entrepreneurship*, Oxford: Blackwell, pp176-189.

Storey, D J (2008) *OECD Framework for the Evaluation of SME and Entrepreneurship Policies and Programmes*, OECD Publishing.

Swann, P., Prevezer, M. and Stout, D., (1998) *The Dynamics of Industrial Clustering: International Comparisons in Computing and Biotechnology*, Oxford University Press.

The Lisbon Strategy for Growth and Jobs 2008–2010, The Finnish National Reform Programme – Implementation Report 2009. Ministry of Finance, Economics Department. October 2009. Ministry of Finance publications 36c/2009.

Westhead, P. (1990) 'A typology of new manufacturing firm founders in Wales: Performance measures and public policy implications', *Journal of Business Venturing*, Vol. 5, No. 2, pp 103- 122.

Yates, S. (2004) *Doing Social Science Research*, London: Sage Publications.

Yin, R. K. (2003) *Case study research, design and methods* (3rd edn), London: Sage Publications.

Zimmerer, T.W. and Scarborough, N.M. (1994) *Essentials of Small Business Management*, New York: Macmillan.

## **Appendix A Personal Reflection**

Having been through the entire process of conducting this research, I can finally stand back and reflect on it and can honestly say it has been a journey of self discovery in many ways. There have been some great highs and some heart wrenching lows with some tears and some laughs along the way. I have discovered things about myself that I didn't know before embarking on this research and one such thing is that I possess tenacity and that I will keep on going no matter what is thrown in the way.

The topic I chose turned out to be a highly topical one, even though back in October 2009 it was not on the National Agenda, I persevered and believed that it warranted further research. On July 12<sup>th</sup> 2010, The Taoiseach announced that the Irish Government is to invest €250m over the next five years in an Innovation fund to boost Irish businesses. Although the main crux of my study was completed at this stage it reinforced my belief in my chosen topic and I was exhilarated that the topic I had been researching for the past number of months was coming to the fore and had become of major importance to the wider community. I began to think that all the hours I had been locked away upstairs working the into the early hours had been worth it as I had not gone off on some crazy notion picking a vague topic that would not hold any relevance.

Whilst working in the Research Support Unit in WIT over the past 6 years I have witnessed a number of research collaborations with SMEs but not nearly as many as a research provider such as ourselves should be engaging in. Being located in the South East region of Ireland, which is brimming with a pool of young entrepreneurial talent, HEI/SME collaborations should be a dominant distinguishing feature for this region but in reality this is not the case. And so I set out on a quest to find out as much as I possibly could about the reality of HEI/SME collaborations.

Since 2007 with the Introduction of the Enterprise Ireland Innovation Partnership Scheme Initiative (a tailored scheme set up specifically to encourage SMEs to engage in research within a HEI) I was curious as to how these collaborations emerged and also how they contribute to the development of regional knowledge economies. Within the WIT Strategic plan and our Research Strategy knowledge transfer is heavily mentioned and supporting collaborations with SMEs is touched upon, however I could see very little evidence within my department of these objectives actually being delivered so I felt it warranted further research attention.

Looking back on each phase of the process I would deem the literature review to be the one I had the least problems with. Before completing it, I had anticipated that I would have difficulty in writing it but in fact much to my surprise it turned out to be the most straightforward one for me.

As part of my work in the research office I am familiar with policy writing and reading as it is one of my everyday duties to keep on top of various National and International reports particularly those released by the European Commission. So perhaps this stood to me while gathering the literature and deciding the most relevant aspects for my study. Once I had streamlined the information from various Academic journals, Policy Documents and Reports I found this chapter came together quite quickly.



The Methodology Chapter on the other hand proved to be more difficult for me in that I researched the Research Philosophies a little too deeply and had to be reminded on many occasions that I was not doing a PhD. I had to cut back on this content and focus on operationalising the research much more which I found difficult to do. Finally, one rainy night back in April, the penny finally dropped on what was meant by operationalising the research and after many failed attempts I realised what was required. I needed to show the reader the What, When, How and Why aspect of my chosen methods but also to ensure that I could back it up by justifying the validity and reliability of the research. It was strange really as most of my class mates seemed to get to grips with this chapter pretty easily and they struggled with the literature review whereas I was having the opposite problem so it made me realise that it really depends on the individual researcher.

The most controversial part of this journey for me was conducting the primary research; I was super organised and secured interviews with key research personnel in WIT, DIT and CIT in March 2010 scheduled for the month of May 2010. Just before the CIT interviews were to take place I received an email from the organiser to state that they could not participate due to increased work load. I was later informed that all research personnel including the Head of Research, Technology Transfer Manager, Incubation Centre Manager and the Two Industry Liaison officers were busy and would not be able to partake.

I expressed my disappointment and was informed that they felt there was nothing in it for them and that they wouldn't tell me anything different to what I would find out in WIT and DIT. During this conversation I was informed that on a previous occasion a student from WIT had conducted interviews and promised them a copy of the report, which they did not receive so they felt such interviews were a waste of their time as they did not reap any benefit from them. I was very distressed at them pulling out so late into the primary research process as it was late May and many HEI staff were finishing up for Summer holidays. I feared I would not be able to secure interviews in time with another HEI.

I was really upset at this point firstly with CIT for withdrawing from the interview so late in the day and secondly with the student who did not deliver what was promised, their lack of follow up had impacted on me conducting the research which I felt was very unfair.

So I set off on another pursuit to try and secure interviews and thankfully managed to secure 3 interviews with research personnel in Dundalk Institute of Technology.

Looking back on the interviews I found the whole experience really enjoyable. The people I met in particular were very welcoming to me and extremely supportive of my study. The Head of Research in DIT informed me that he felt a PhD should be conducted

on the topic as it is of extreme relevance. The Incubation Centre Manager in DKIT welcomed me like one of his own staff members and the knowledge, advice and expertise each interviewee shared with me was incredible. I was surprised at how open and honest the respondents were and am so grateful to them for imparting this knowledge to me and for agreeing to give me so much of their time, which is so precious in such busy environments.

I was conscious that I had to make a good impression of WIT and of the Research Office in particular, I was highly aware that I was representing the Head of Research in WIT and wanted to ensure from the outset that I was professional and that my interview questions were of a high standard. I also enjoyed interviewing my colleagues in WIT, although I must admit interviewing people that you know very well can be a little daunting but all of my interviewees were professional and I need not have worried.

Experiencing this primary research, taught me not to dwell too much on the CIT mishap and keep focused and move on. To be honest I am glad this happened in one way as it tested my coping skills, I could have just given up and switched the focus of the study to a case study on DIT and WIT but deep down I did not want to do this. I was determined to keep searching for the third HEI and it paid off. I feel having this third HEI strengthened the validity of the research but it was also of real interest to me to go and meet these people and learn of their research activities and observe examples of best practice.

I also realised how vital it is when you promise outputs to interviewees to ensure that you deliver. I was cautious of what CIT had told me about not receiving a copy of the report from their interviewer so I took note to ensure DIT and DKIT are issued with a final copy of my thesis.

Although many of my class mates felt that transcribing the data was of the utmost importance, although I deem it to be highly necessary and beneficial I hold the opinion that this is only a small aspect of the research and that analysing the data is where the real challenge lies. I also feel that once the analysing has been completed, it is only then that the research process really gets under way as it is your chance as a researcher to communicate the important findings from your primary research.

Once, I reviewed my first draft I completely understood that I had not sufficiently presented "the meat" of the findings and realised that there were some important components missing and others that were nice to know but did not hold significance for the findings. I re-worked this chapter and was much happier with my second attempt and so I began to realise that it has taken me a few attempts to complete each of the chapters which in itself is all part of the research process.

The discussion chapter flowed pretty easily for me once I had completed the findings and probably because I enjoyed the literature review I didn't have much difficulty comparing and contrasting it with my findings. Finally, the conclusion and introduction took a bit of sitting back and taking out only what was relevant but again as the thesis was near completion I didn't really mind these chapters.

So looking back on this process, there are a few things I would do differently. I think I probably should have had SME input as I feel it could be deemed by some to be very one sided to just focus on the HEIs for this research. I would also be intrigued now to see what they would say differently to the HEIs. I would also spend less time on the research methodology and move more quickly into conducting the primary research.

Although CIT pulling out so late was beyond my control, I do think that I should have given more careful consideration to the length of the Academic year and the fact that some staff are on holidays during the summer months. I feel that I should have had a contingency plan to prevent what happened with CIT so I think my interviews should have been conducted much earlier in the year and perhaps then I could have secured a fourth HEI.

I think going forward this research will benefit me in many ways. Firstly, for my own professional development in my current role as Research Staff officer as the topic I researched is extremely relevant to my work. I have become more learned on various funding schemes, funding agencies and also on examples of best practice in Ireland and in Finland in particular. I brought some suggestions to the Head of Research to introduce specific HEI/SME policies, to redevelop our website to make it more SME friendly and also to reintroduce the whole area of HEI/SME research engagement on our Research agenda for the coming Academic year, all of which he has been very supportive of.

Not only have I learned more on the topics regional knowledge economies, HEIs and SMEs, I have gained a real life insight into the Institute of Technology sector as a whole and also into how the Research infrastructures in DIT and DKIT operate. This has helped me critically observe their operations and take note of good practice and also not to be so insular only focusing on WIT.

I have established contacts with some of the interviewees and have gained many other contacts through them which I am going to maintain into the future.

From a personal perspective, this research process has taught me quite a lot about myself. My critical thinking skills have drastically improved and so has my academic writing which is something that I will be able to transfer to other aspects of my life. I also think my confidence has grown over the past number of months and this became evident to me during the interview process. I conducted interviews in the past where I was very

nervous; this time around I conducted 11 interviews with very high level personnel and was much more confident, articulate and professional right throughout the process, which is definitely something that will benefit me in the future.

My coping skills have improved also and I have learned not to let one little set back put me off course and to sit back, re-evaluate and try again. Finally, having conducted this research on a part-time basis whilst working full time it has really tested my ability to work under pressure and effectively time and project manage. It has also taught me to achieve a healthy work life balance which is vital in this fast paced world in which we live and I am sure this will no doubt benefit me in later life.

## **Appendix B Research Contract**

May 2010

**Re: Standard Ethics Protocol – HEI / SME Collaboration**

Dear Interviewee,

Thank you for your willingness to participate in this research project.

Before we commence the interview, I would like to reassure you that as a participant in this project you have a number of options:

- Your participation in this interview is entirely voluntary;
- You are free to refuse to answer any question at any time;
- You are free to withdraw from the interview at any stage;

The contents of the interview will be kept strictly confidential and anonymous. Extracts of this interview may be included as part of the final research report, but under no circumstances will your name or any identifying characteristics be included. Any references to your name will be deleted from the interview transcript. Any tape recording of this interview will be destroyed on transcription.

I would be grateful if you would sign this form to indicate that I have read you its contents.

(Signed)\_\_\_\_\_ (Printed) \_\_\_\_\_

(Date) \_\_\_\_\_

Eimear Fitzpatrick: Masters in Business Studies: Management Stream 2010:  
[efitzpatrick@wit.ie](mailto:efitzpatrick@wit.ie)

## **Appendix C Interview Questions**

*Developing Regional Knowledge Economies: How Higher Education Institutions engage  
in SME collaboration – A Research Support Perspective*

### **Regional Knowledge Economy**

Q1 How do you define the region in which this Institute operates?

- Q2 Can you identify what the distinct characteristics of this region are?
- Q3 To what extent does this Institute draw upon the characteristics of this region?
- Q4 What do you understand by the term "regional knowledge economy"?
- Q5 What do you think is your Institute's role in contributing to the development of a regional knowledge economy?
- Q6 What other organisations do you consider key in driving the knowledge economy both nationally and regionally?
- Q7 To what the extent is the collaboration with these stakeholders driving this agenda?
- Q8 How do you think SMEs can contribute to the creation of regional knowledge economies?

**HEI and SME collaboration**

- Q9 Is there a common definition of an SME within this Institute?
- Q10 Can you outline any specific policies which this Institute has in place to encourage co-operative research with SMEs?
- Q11 What mechanisms are in place in this Institute/Department to develop research linkages with the SME sector?
- Q12 How effective do you think these mechanisms are?
- Q13 Is there a need for additional research infrastructure to enable the Institute to better respond to SME research needs?

- Q14 What do you think is the SMEs rationale for engaging in research?
- Q15 How do SME collaborations emerge?
- Q16 What specific mechanisms have been put in place to support the governance/ management of these relationships? (Contracts, Agreements, Arrangements).
- Q17 Is there dedicated space provided for R&D to promote collaborative initiatives between the Institute and SMEs?
- Q18 Do many SMEs use this space?
- Q19 How does your Institute / Department promote research access to SMEs?
- Q20 Are there any ways in which this promotion could be improved?
- Q21 Can you identify the key challenges preventing SMEs from engaging with HEIs?
- Q22 Is there a difference in the way you tailor your research support services towards SMEs and MNCs?
- Q23 At contract initiation stage, how are the SMEs managed in comparison to the larger MNCs in terms of their requirements, access to resources, payment schedules, IP, training etc?
- Q24 What do you perceive to be the benefits associated with HEI/SME collaborations for both the Institute and the SME?
- Q25 What do you perceive to be the barriers associated with HEI/SME collaborations for the Institute?
- Q26 Can you identify any ways in which these barriers could be reduced?

- Q27 Does the Institute provide any Seed funding initiatives to promote this HEI/SME research engagement?
- Q28 Can you outline any specific funding programmes which this Institute participates in to encourage co-operative research with SMEs?
- Q29 How does your organisation communicate or make SMEs aware of these programmes?
- Q30 Does the Institute / Department assist regional companies network with international partners?
- If so How?
- Q31 Can you outline any future plans this Institute / Department have to (further) promote/improve HEI/SME collaboration?

*Thank you for participating in this interview, a transcript will be provided for your review and agreement.*