Academic Entrepreneurship on the Island of Ireland: Re-Orientating Academia Within the Knowledge Economy

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ABSTRACT

The aim of the paper is to profile the current practice and understanding of entrepreneurship in the context of academic institutions on the island of Ireland. A qualitative, sense-making methodology is used involving a purposeful sampling of perceptions from staff at academic institutions in the Republic of Ireland and Northern Ireland. First, the concept of academic entrepreneurship is explored both from an individual and from a corporate perspective. Second, comparative evidence of academic entrepreneurship is presented to highlight significant differences between the Republic of Ireland and Northern Ireland. Recent contrasting policy differences are also identified. Third, a profile of the current state of academic entrepreneurship in Ireland is presented. The discussion then explores the main findings of the exercise and implications in terms of how academic institutions best engage with entrepreneurship. The conclusion outlines key areas for future

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research given the changing role of academic institutions in knowledge-based economies.

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INTRODUCTION

Academic institutions are not only important *for* national and regional economies; they are integral parts *of* such economies. Such a distinction may seem semantic at first reading but it captures the reality that policy-makers increasingly look to academic institutions to function more fully as parts of so-called knowledge-based economies. This is the explicit message in policy documents concerning higher education in both the Republic of Ireland (Enterprise Strategy Group, 2004) and the United Kingdom (DfES, 2003). Therefore, institutions are increasingly expected to demonstrate how they create value within such economies in addition to their established roles of teaching and research. They are after all the traditional organisational settings for the production and dissemination of new knowledge (i.e. knowledge produced from within a particular discipline context), what Gibbons et al. (1994) call mode 1 knowledge production. For academic institutions the recognition of such policy expectations is important in that it is invariably linked to future funding and measures of institutional success. For the practice of entrepreneurship, the recognition of academic institutions as reservoirs (or more proactively as generators) of new knowledge through innovation suggests the need for a re-evaluation of how such institutions best execute this function.

Entrepreneurship in academic institutions has conventionally been associated with entrepreneurship education and training in the context of small business start-ups (including academic spinout firms – Shane, 2004) and small business development. Indeed two publications explicitly reflect this emphasis and include Irish examples in a European context. (Henry et al., 2003; Hytti and Kuopusjarvi, 2004). Such a focus rightly addresses the important issue of how best to design and deliver programmes of education that effectively equip nascent and practicing entrepreneurs. However, there is a growing interest in thinking about entrepreneurship as

taking place within the context of established organisations – the concept of corporate entrepreneurship. Corporate entrepreneurship centres on the ideas of venturing, innovation and strategic renewal (Burgelman, 1984; Guth and Ginsberg, 1990; Sharma and Chrisman, 1999; Miles and Covin, 2002; Dess et al., 2003). The authors of this paper suggest that understanding academic entrepreneurship on the island of Ireland from an organisational/corporate perspective has significant merit given current policy aspirations and expectations. Furthermore, there is a need for more understanding of the phenomenon of academic entrepreneurs given the reported paucity of research in this area of entrepreneurship (Jones-Evans, 1997; Tidd et al., 2005).

The aim of this paper is to profile the current practice and understanding of academic entrepreneurship on the island of Ireland, and in particular to compare the situation north and south. The paper attempts to profile the current situation rather than further develop theoretical models or report on empirical research (see Brennan et al., 2005; Brennan and McGowan, 2006, for examples of such model building and empirical research). The paper is intended as a selective review of the organisational and policy contexts within which entrepreneurship takes place and is understood. This is an important point in that such a perspective recognises the underlying influence of academic institutional policies, structures and processes on entrepreneurship in higher education – an observation previously made with regard to teaching and research (Skilbeck, 2001). Such an approach is also consistent with the fundamental questions posed by the Global Entrepreneurship Monitor (GEM) research programme concerning county/jurisdiction/regional differences in entrepreneurship activity (Fitzsimons et al., 2004).

In Part 2, *Academic Entrepreneurship – an Integrated Approach*, an attempt is made to explore the domain of academic entrepreneurship and demonstrate how the role of academic institutions is changing from one that is primarily concerned with entrepreneurship education and to a lesser extent spinouts, to one that sees the institution as part of an entrepreneurship system (Neck et al., 2004) with an increased mission to encompass economic and social development in addition to the traditional teaching and research missions – what

Etzkowitz (2003a) called the entrepreneurial university. In this paper the authors consider academic entrepreneurship as a phenomenon that takes place in universities, institutes of technology and higher education colleges. The authors also argue that academic entrepreneurship needs to consider three issues more fully in order to understand entrepreneurship in the context of such academic institutions. These issues centre on:

- the commercialisation of discipline knowledge
- the changing role of academic organisations in society
- the nature of knowledge- and technology-based firms

Part 3, *Academic Entrepreneurship on the Island of Ireland – the Evidence*, presents selected published research that compares the Republic of Ireland and Northern Ireland, including findings from a GEM survey. It also highlights recent policy initiatives that are of particular relevance to academic entrepreneurship. Such a consideration demonstrates the existence of significant differences in terms of the practice of entrepreneurship but also similarities in terms of recent policy emphasis.

Part 4, *Academic Entrepreneurship Potential,* presents an attempt to characterise the capacity for academic entrepreneurship on the island of Ireland with reference to key measures and through the questioning of key informants. Part 5, the *Discussion*, explores the findings from the research and relates these to previous evidence. In particular, the merit of understanding academic entrepreneurship as a multi-layered phenomenon is addressed. In addition the need to more clearly link entrepreneurship to academic innovation is highlighted. Part 6, the *Conclusion*, summarises the outcomes of the study and suggests areas for future research in the context of a new approach to understanding the evolving nature of the entrepreneurial academic institution.

As a final introductory point the authors' definitional understanding of entrepreneurship and entrepreneur is acknowledged as:

> Entrepreneurship encompasses acts of organisational creation, renewal, or innovation that occur within or outside an existing organisation (Sharma and Chrisman, 1999: 18).

Further that:

> Entrepreneurs are individuals or groups of individuals, acting independently or as part of a corporate system, who create new organisations, or instigate renewal or innovation within an existing organisation (Sharma and Chrisman, 1999: 18).

For this study the authors suggest that the organisational context of the academic institutional setting is central in understanding how academic entrepreneurship takes place.

ACADEMIC ENTREPRENEURSHIP – AN INTEGRATED APPROACH

Individual Typologies

Previous research on academics involved in the practice of entrepreneurship (as opposed to teaching the subject) has tended to focus on those individuals from science- or technology-based disciplines. For example, in a study of technical entrepreneurs Jones-Evans (1997) found that the occupational/work background of the entrepreneur was an important factor in understanding how such individuals approached entrepreneurship. The *research entrepreneur* was identified as the category of technical entrepreneur most likely to be involved in a university/academic setting. This type of individual was described as having

> … a knowledge-oriented, science and technology background having worked in higher education/academia or in a non-commercial laboratory (Cooper, 2000: 237).

Dickson et al. (1998) identified three types of entrepreneur based on a perceived transition from a posture of being purely academic to one of exploiting science. First, the *academic entrepreneur* was identified as someone who engaged in entrepreneurial endeavours, but only as an adjunct to their academic work. Second, the *entrepreneurial scientist* was described as a scientist operating full-time in a business venture whilst still essentially dedicated to scientific interests. Third, the *scientific entrepreneur* was identified as someone

with both science and business qualifications, operating in a venture and regarding science as business.

Birley (2002) suggested a typology based on distinct types of spinouts: first, the ***orthodox spinout***, described as a company formed by one or more academics who leave their host university to form the company (interestingly, in a seeming contradiction to the Dickson et al. (1998) description, Birley identified these founders as academic entrepreneurs). Second, the ***technology spinout***, described as a situation where an outside investor/manager buys or leases the intellectual property (IP) from the university and forms a new company. The inventor academic was described as having no involvement with the running of the company. Third, the ***hybrid spinout,*** identified as the predominant form of spinout in Imperial College London – the focus of the Birley study. It was also suggested that in the hybrid form of spinout there was a combination of inventor and founding academics with varying degrees of involvement with spinout companies. In the context of promoting entrepreneurship amongst academics, Birley also reported a shift in university policy:

> … from a technology transfer strategy that focused upon licensing technologies to large organisations and positively discouraged faculty entrepreneurial activity to one that focuses upon actively encouraging the creation of new ventures from faculty research (Birley, 2002: 135).

In a more recent paper Meyer (2003) identified the entrepreneurial academic as one who differed from the classic entrepreneur in that the vehicle for entrepreneurship – the spinout – was from a university or public sector research organisation. He distinguished between such entrepreneurial academics and academic entrepreneurs in that the latter was characterised by not necessarily being growth oriented or aware of their innovation and development needs. In other words, he suggested that academic entrepreneurs appear to be less engaged with the practice of entrepreneurship when compared to entrepreneurial academics.

What is clear from the above is that there are differing and, to some extent, contradictory definitions of what is academic entrepreneurship

and who are the academic entrepreneurs. What is also apparent is that entrepreneurship related to academia is perceived as being different from normal or classic entrepreneurship. In an attempt to reconcile the apparent difficulties Brennan and McGowan (2006) have suggested a way of accommodating the nature of academic entrepreneurship based on the idea of 'switching' behaviour between different forms of knowledge production (i.e. between discipline-based mode 1 knowledge production and interdisciplinary mode 2 knowledge production). Such switching behaviour takes place through opportunity, novelty and advantage seeking processes. The particular emphasis in such behaviour is suggested as an explanation and reconciliation of the different typologies apparent in the existing literature.

Institutional Perspectives

An alternative to understanding academic entrepreneurship as an individual endeavour is the emerging concept of the entrepreneurial university. The purpose of the entrepreneurial university is to transform academic knowledge into economic and social utility (Clark, 1998). On the basis of a review of five leading European universities judged as entrepreneurial, Clark further identified pathways important for academic organisations to be considered as entrepreneurial:

- a strengthening steering core – an entrepreneurial university has a strong body that governs with vision and sets out a strategy
- boundary spanning structures (e.g. a technology transfer office) and mechanisms to interact with the 'outside' world (region and industry)
- a diversified funding base – an entrepreneurial university does not entirely rely on government funding but has a balanced portfolio of first, second and third income streams
- a strong academic heartland – inter-/multi-/trans-disciplinary research is a necessity to be among the best of universities
- an integrated institutional entrepreneurial culture

In a similar way Etzkowitz (2003b) explained academic entrepreneurship as encompassing more than individual academics and the

nature of their involvement with spinout firms. Indeed he characterised some groups of academic researchers as exhibiting the characteristics of 'quasi-firms'. He also argued that such groups played a transformational role in how universities operate as regional innovation organisers. What is interesting, from a knowledge economy perspective, was the idea presented which viewed the transformation role of the university in terms of a form of holding company for a pool of intellectual property en-route to market.

Etzkowitz (2003a) also developed an understanding of academic entrepreneurship through the concept of the entrepreneurial university. This is described as having five key elements:

1. the organisation of group research
2. the creation of a research base with commercial potential
3. the development of organisational mechanisms to move research out of the university as protected intellectual property
4. the capacity to organise firms within the university
5. the integration of academic and business elements into new formats such as university–industry research centres

The value of the work developed by Clark and Etzkowitz is in expanding the idea of academic entrepreneurship to encompass both the individual with entrepreneurial inclinations *and* the academic organisation with a requirement to demonstrate engagement with entrepreneurship.

An Integrated Approach

The growing interest in corporate entrepreneurship, as an alternative to the dominant perception of entrepreneurship as an individual endeavour, is not simply a re-badging of the term *intrapreneurship* (i.e. being entrepreneurial within an existing organisation) popularised by Pinchot (1986). It can be considered as the working out of an inner logic of understanding on the nature of entrepreneurship as a basic philosophy (Kao et al., 2002). Kao et al. explored the historical understanding of entrepreneurship from a view that emphasised self-employment/small business, to one that focused on action orientation and job creation, and ultimately to an emphasis on the creation of socio-economic value.

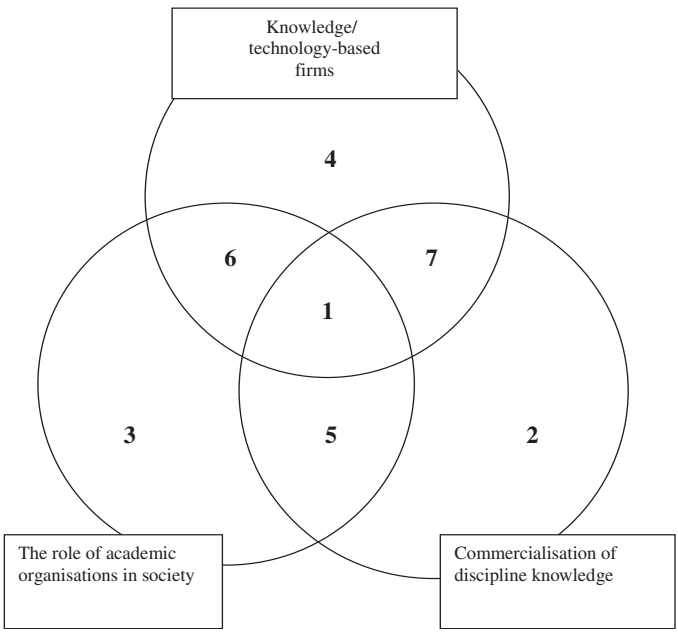
A corporate entrepreneurship perspective can therefore be construed as a frame of reference with which to understand how socio-economic value is created in organisations (i.e. through venturing, innovation and strategic renewal).

Applying the above argument to academic institutions allows the identification of three overlapping elements that represent and bound the domain of academic entrepreneurship:

1. knowledge/technology-based firms (i.e. venturing)
2. commercialisation of discipline knowledge (i.e. innovation)
3. the role of academic institutions in society (i.e. strategic renewal)

A series of seven component phenomena can be identified by combining the elements, and viewing them from a corporate entrepreneurship perspective. These are illustrated in Figure 1. The

Figure 1: The Domain of Academic Entrepreneurship



Source: Brennan et al. (2005: 311).

component phenomena of academic entrepreneurship can be identified as follows:

1. the academic entrepreneur who balances disciplinary considerations with the technology transfer strategy of a host academic institution and opportunities arising from exploiting intellectual capital through knowledge/technology-based firms
2. a discipline context that determines academic credibility, especially in terms of innovation
3. an academic organisation context that increasingly recognises organisational knowledge capital as well as individual knowledge capital
4. knowledge/technology-based firms with a competitive position reliant on specialist knowledge
5. academic organisation interventions to commercialise organisational knowledge
6. academic organisation interventions to create/support/own science-, engineering- and technology-based firms
7. academics who engage with knowledge/technology-based firms independent of a host academic organisation (after Brennan et al., 2005: 312)

The above takes place in the knowledge-based economy in which academic organisations, markets and policy-makers exist.

The authors suggest that the complexity of academic entrepreneurship is perhaps best understood in terms of such complementary and overlapping components. In this way the organisational influence of the academic institution can be taken into account while still recognising the central role of the individual academic.

ACADEMIC ENTREPRENEURSHIP ON THE ISLAND OF IRELAND – THE EVIDENCE

Previous evidence of academic entrepreneurship on the island of Ireland has been fragmentary and couched in general terms – often as part of wider studies. Such studies have themselves suffered from

a lack of clarity due in part to the nature of the subject. Tidd et al. (2005) put the case succinctly:

> There are relatively few data on the characteristics of the academic entrepreneur, partly due to the low numbers involved, but also because the traditional context within which they have operated…has meant that many have been unwilling to be researched (Tidd et al., 2005: 528).

Not withstanding the above point, the following is offered by way of demonstrating the reported differences in academic-related entrepreneurship on the island of Ireland.

In a review and comparison of seven EU regions Jones-Evans (1997) investigated universities, technology transfer and spin-off activities. The study is of value for two reasons. First, it re-affirmed the notion that academic entrepreneurship is much more than an investigation of academic spinout firms. Second, it presented information that allowed an historical comparison of the Republic of Ireland and Northern Ireland. Tables 1 and 2 present key aspects of that comparison:

Table 1: A Comparison of Academic Entrepreneurship

Involvement by Academics in Entrepreneurship Activities	Republic of Ireland (%) *N* = 663	Northern Ireland (%) *N* = 538
1. Large-scale science	68	50
2. Contracted research	69	56
3. Consulting	68	51
4. Patent/licensing	26	17
5. Spin-off firms	19	13
6. External teaching	73	42
7. Sales	6	6
8. Testing	40	35

Source: Adapted from Jones-Evans (1997: 63).

Table 2: Comparisons of Organisational Background and Context

Background of Individual Academic and Perception of Institutional Context for Entrepreneurship	Republic of Ireland (%) *N* = 663	Northern Ireland (%) *N* = 538
Previously employed full time outside the university sector	63	57
Industrial experience		
• No direct industry contact in last five years	28	32
• Approached industrial organisation	52	46
• Approached by industrial organisation	56	50
View of the university environment for entrepreneurship		
• Supportive	58	51
• No effect	33	34
• Hindrance	10	18
University industrial liaison office		
• Awareness of existence	71	62
• Have used to develop external linkages	22	33

Source: Adapted from Jones-Evans (1997: 57, 61, 64, 65).

Three significant differences are immediately apparent from the above: first, the greater involvement of Republic of Ireland academics in large-scale science projects; second, a greater involvement in contracted research; and finally, much more evidence of external teaching.

An examination of the organisational background and context in Table 2 highlights the noticeable differences that are apparent in terms of the amount of industrial experience of Republic of Ireland academics in comparison to those from Northern Ireland and the presence of a more positive attitude to institutional support in the Republic.

Overall the study found that at a European level, common barriers existed to universities developing increased collaborative links with industry:

- lack of internal resources, especially time from normal academic duties
- differences in culture between academia and industry
- lack of a reward system for academics involved in collaborative projects (Jones-Evans, 1997: 38)

The need to address these barriers and the case for considering academic entrepreneurship as an important phenomenon was strongly supported by the report *Entrepreneurship on the Island of Ireland 2003* (Fitzsimons et al., 2004). The report was based on the findings of the 2003 Global Entrepreneurship Monitor research exercise and the Republic of Ireland–Northern Ireland comparison continued to highlight significant differences. For example, the total entrepreneurial activity (TEA) rate was higher in the Republic of Ireland (8.1 per cent) compared to Northern Ireland (5.2 per cent). Furthermore, the higher entrepreneurial activity rate in the Republic of Ireland was attributed to a much higher rate of participation in entrepreneurial activity amongst those with higher levels of education. Finally, the cultural context for entrepreneurship was also identified as being particularly strong in the Republic of Ireland and less well developed in Northern Ireland.

The comparison of entrepreneurship activity by education level is produced in Table 3 and serves to clearly demonstrate the divergence of experience at the graduate and postgraduate levels. This is particularly important because the report suggested that opportunity-based entrepreneurship (rather than necessity-based entrepreneurship) was more likely to be associated with those with higher education. Further, it was noted that those with higher qualifications create businesses with higher growth potential.

Overall, for both jurisdictions the report highlighted a series of policy recommendations of which one-third are directly related to academic institutions:

- harness the resources of the education and training sector

Table 3: Entrepreneurship Activity Rates by Education Level Attained

	Republic of Ireland (%)	Northern Ireland (%)
Some second level	4	4
Completed second level	6	5
Third level	13.5	4.5
Postgraduate	12.5	7

Source: Adapted from Fitzsimons et al. (2004: 15).

- maximise the number of innovative and high-growth new ventures
- support the development and exploitation of research

It is suggested that these recommendations have received little support thus far from political parties.

Policy Perspectives

The GEM policy recommendations highlighted above reflect a broadly held perception that academic institutions have the potential to do more in terms of entrepreneurship. Extracts from recent policy reviews serve as a final source of evidence for considering academic entrepreneurship.

Republic of Ireland

The Enterprise Strategy Group (2004) identified two issues requiring particular attention within the academic community: the need for better and more effective interaction between higher education and business; and the need for academic institutions to address internal structural and management systems in order to better facilitate increased interaction:

> Higher education should be underpinned by a coherent policy approach that includes the public and private sector (including the universities, institutes of technology, colleges of education and private higher education colleges). A cohesive policy should be agreed between education, enterprise, and government to

> ensure that the skills necessary for enterprise success are developed … (Enterprise Strategy Group, 2004: 74).
>
> The structures and management of higher education are no longer adequate to meet the complex demands of society in general, and enterprise in particular. Governing bodies are too large to permit flexibility and responsiveness (Enterprise Strategy Group, 2004: 75).

Northern Ireland

The policy perspective in Northern Ireland reflects what is happening in a wider UK context. Implicit in such policy discussions is the need for the government–industry–higher education 'triple helix' to be re-assessed and developed in order to be more responsive to the needs of modern economies:

> Universities will have to get better at identifying their areas of competitive strength in research. Government will have to learn to do more to support business–university collaboration. Business will have to learn how to exploit the innovative ideas that are being developed in the university sector (Lambert, 2003: 2).
>
> In a knowledge-based economy both our economic competitiveness and improvements in our quality of life depend on the effectiveness of knowledge sharing between business and higher education (DfES, 2003: 36).

A Comparison

As a final observation, a review of funding of higher education in Northern Ireland (ERINI, 2004) suggested the need for greater insight into a number of issues applicable to both parts of the island:

- the need for better understanding of the benefits of cooperation between universities to achieve a critical mass of postgraduate training and research (ERINI, 2004: 38)
- consideration of bench-marking regional federations and mergers (ERINI, 2004: 38)
- better understanding of the merits of the different approaches to research funding (comparing a utilitarian approach to research in

> the United Kingdom to a transactional approach in the Republic of Ireland) (ERINI, 2004: 41)

It is clear from such policy-related reports that there is a perception that academia is not maximising its potential in terms of relevancy to the knowledge-based economy and that much work needs to be done to engender more entrepreneurial activity within academia. The following section attempts to scope the nature of that potential.

ACADEMIC ENTREPRENEURSHIP POTENTIAL

In the previous section an attempt was made to draw on published evidence to gain an understanding of the recent interest in academic entrepreneurship. The evidence suggested that the experience of academic entrepreneurship is different when comparing the Republic of Ireland and Northern Ireland. However, what is shared is a policy context that requires (perhaps even demands) that academic entrepreneurship increases significantly in both jurisdictions. This section builds on such insights by profiling the nature and scope of that academic entrepreneurship potential. Two stages were involved in this part of the research:

1. a profile of academic entrepreneurship capacity – that is, what is the nature and scope of the academic capacity available on the island?
2. the views of key informants – that is, what do academics think about entrepreneurship and higher education?

A Profile of Academic Entrepreneurship Capacity

An assessment of the academic capacity of direct relevance to entrepreneurship proved difficult to undertake. This was due to the variety of methods used for collecting information in different jurisdictions, the inevitable delays in collating information at an institutional level, and the dynamic nature of the phenomena under consideration. Table 4 captures some key parameters that the authors felt were indicators of academic entrepreneurship capacity. It is readily acknowledged that such a profile is very much an estimate but it was felt to have merit in capturing the scope of the capacity.

Table 4: A Profile of Academic Entrepreneurship Capacity

Element	Republic of Ireland	Northern Ireland	Ireland Total
Institutions (2004)			
• Universities (plus the Open University)	7	2	10
• Institutes of Technology	14	0	14
• Further Education Colleges	21	14	35
(InterTradeIreland, 2004)			
Research and contract income (2001/2002)			
• Euro (thousands)	322	56	378
• Pounds (thousands)	216	38	254
(ERINI, 2004)			
Academic experts (2005)			
• Entrepreneurship	37	22	59
• Enterprise	185	21	206
• Small Business	69	23	92
(Expertiseireland.com, 2005)			
Student numbers (2002/2003)			
• Undergraduate	143,076	52,692	195,768
• Postgraduate	24,811	11,738	36,549
(ERINI, 2004)			
Incubation spaces (2005)			
• available/planned	350	100	450
Spin-off firms	39	32	71
(Enterprise Ireland, 2005; Blair, 1999)			

In aggregate there are almost sixty academic organisations with a combined student population of over 225,000 and a research/contract income in excess of €378 million. Over 350 academics are explicitly involved in teaching and researching entrepreneurship. In

addition there are in excess of 450 campus incubation spaces and over seventy spinout firms. Such rudimentary profiling demonstrates the considerable capacity of higher education in a knowledge-based economy and its potential as a key organiser for entrepreneurship.

The Views of Key Informants

The second stage of understanding academic entrepreneurship potential was a series of interviews undertaken with key informants. A purposeful selection strategy was used to identify practicing academics with a recognised interest in entrepreneurship. A total of twenty-nine individuals were questioned during the first six months of 2005 – seventeen from the South and twelve from the North. A 'sense-making' approach (Weick, 1995) to the research was taken, involving the tasks of information gathering, summary and synthesis. Such an approach was felt appropriate given the reportedly underdeveloped nature of the study of academic entrepreneurship (Tidd et al., 2005). Questions were asked in four general areas:

- what makes an academic institution entrepreneurial?
- what does entrepreneurship mean to you as a practicing academic?
- what do students gain from entrepreneurship?
- what are the enablers and barriers to entrepreneurship within academic institutions?

The first three questions were intended to investigate academic entrepreneurship as a multi-layered phenomenon. In this way key informants were first asked about their experience of entrepreneurship at the level of the organisation. The second question was aimed at their experience of entrepreneurship at a personal level. The third question was aimed at capturing their perception of entrepreneurship as it relates to the student population. The fourth and final question asked respondents to identify enablers and barriers to the development of entrepreneurship within academic institutions. Interviews were taped, transcribed and explored using thematic analysis. The key outcomes are presented below for each question area, in order of most frequency, followed by a brief description of the results.

Entrepreneurship and the Academic Organisation

The predominant observation concerning the factors that make academic institutions entrepreneurial was the linkage between entrepreneurship and innovation. Several respondents commented on the need to widen the concept of entrepreneurship from a focus on small businesses and spinout firms to an understanding that explicitly encompassed innovation as an academic activity. In particular, the relationship between innovation and entrepreneurship as a means of adding value was seen as important. Institutions with units and/or individuals dedicated to facilitating and encouraging the innovation–entrepreneurship link were seen as being particularly important. A variety of organisational activities and approaches were seen as supporting such a stance with the need to cultivate linkages/alliances with other economic partners seen as a crucial activity, especially for senior managers. This applied not only to partners outside the institution but also to cooperation within institutions. Several respondents commented on inter-discipline rivalry and the need to 'span' discipline-based faculty knowledge silos. Institutions that encouraged such activity through structures, systems and an appropriate reward structure were seen as entrepreneurial in their approach.

Entrepreneurship and the Academic

At the level of the individual academic, respondents identified entrepreneurship as a powerful way of engaging with key economic partners. Such engagement took place through a number of mechanisms. The focus on value creation was reported as creating credibility with colleagues within the institution, with full-and part-time students, and with a wide range of organisations in the broader economy. The increasing emphasis on entrepreneurship as a cultural and social phenomenon was also seen as reinforcing the relevance of academics as producers of knowledge. Entrepreneurship education was seen as particularly powerful as a mechanism for linking new knowledge production to application through venture projects – both as new start-up ventures and as corporate ventures within existing organisations. Several respondents commented on the ability of entrepreneurship to encompass theory and practice in a holistic way.

Entrepreneurship and the Student

Respondents reported that they felt students benefited from entrepreneurship in a variety of ways. In terms of personal development the linkage between entrepreneurship, innovation and creativity was seen as particularly important. Venture project activity was seen as being demanding by students but also of immense value in terms of career planning and the practicalities of individual career profile development and employability. Students were reported to have commented on the relevance and applicability of entrepreneurship both as an academic topic and as a practical learning experience. Some respondents commented on student perceptions of the need for institutions to make more from the knowledge available for exploitation.

Enablers and Barriers to Entrepreneurship in Academic Institutions

When asked about what institutions should do to enable more entrepreneurship, respondents commented on the need to have alternative organisational structures in addition to traditional faculty structures. A move to academic 'quasi-firms' supported by smaller, central administrations was identified as reflecting trends in other knowledge-based organisations. The need to reframe attitudes to research in order to encompass creativity, innovation and entrepreneurship was seen as an important cultural change that ought to be supported and developed. The role of the institution was seen as particularly important in this regard in terms of support and reward strategies. Traditional faculty structures were perceived as unintentional barriers to entrepreneurship. Respondents mentioned the need for mode 2 knowledge production (i.e. knowledge produced outside traditional discipline fields) as important in complementing traditional mode 1, discipline-based knowledge production. Institutions as hierarchical structures were also perceived as barriers to entrepreneurship. The need for flatter structures and more responsive organisational units was seen as imperative in fulfilling the expectations of policy-makers and the wider societal partners. In addition there was an identifiable need for institutions to communicate internally in terms of promoting entrepreneurship.

DISCUSSION

Entrepreneurship in higher education is not well understood and increasingly entrepreneurship researchers are moving from a consideration of entrepreneurship education and academic spinout firms to a wider concept of entrepreneurship. That wider concept sees academic institutions as knowledge organisations that play a central role within knowledge-based economies. It is suggested in this paper that a corporate entrepreneurship perspective supports such a view and encompasses issues of real concern to higher education:

- the commercialisation of discipline knowledge
- the strategic renewal of academic institutions within modern economies
- the support of knowledge/technology-based firms

The interplay between the above issues allows the identification of several phenomena that form the domain or area of interest for academic entrepreneurship (see Figure 1). The authors suggest that understanding academic entrepreneurship as a broad phenomenon is the first step in re-orientating academia within the knowledge economy. Such a re-orientation takes into account new modes of knowledge production outside traditional discipline structures and the reality of funding for academic organisations.

Previous research into academic entrepreneurship on the island of Ireland has demonstrated a noticeable difference in terms of the experiences of individual academics and their host institutions. However, what is clear from policy-makers and GEM research is the need for academia to become more entrepreneurial – in both the Republic of Ireland and Northern Ireland. This is clearly an opportunity for academic institutions and individual academics to create and exploit a new ‘space’ within the economy. The profile of academic entrepreneurship capacity detailed in Table 4 demonstrates the resources and potential available on the island. However, there is a real need to address the issues raised by key informants in terms of what needs to be done to promote and develop entrepreneurship within academia.

Table 5: The Entrepreneurial Academic Institution

Academic Entrepreneurship	Paradigm	
	The Managerial Institution	The Entrepreneurial Institution
Work relationships	Individual entrepreneurship	Corporate entrepreneurship
Knowledge production	Discipline focus (Mode 1)	Inter-discipline focus (Modes 1 and 2)
Knowledge acquisition	Central gatekeepers	Multiple gatekeepers in a knowledge market
Organisation orientation	Internal–external (Dichotomous thinking)	The entrepreneurial system ('Trialectic' thinking)

Source: Adapted from Brennan and McGowan (2006).

Other research by Brennan and McGowan (2006) and the outcomes of the current paper suggest that the presence of entrepreneurship activity within an academic institution does not necessarily make it entrepreneurial. In particular it is suggested that the four paradigmatic issues identified in Table 5 need to be addressed at a fundamental level:

1. the reality of academic work relationships suggests the need to view entrepreneurship as corporate rather than simply an individual phenomenon
2. the inter-discipline aspect of mode 2 knowledge production suggests the need for thinking outside the rigours of individual disciplines whilst still recognising the fundamental role such disciplines have for academic innovation
3. attempts to funnel interaction with partners in the wider knowledge economy through central units can be counter-productive. Multiple gatekeepers need to be welcomed and reflect the reality of interdisciplinary knowledge production
4. the dichotomous thinking that simplifies academia into theory (inside the institution) and practice (outside the university) does not reflect the nature of academic entrepreneurship. 'Trialectic'

thinking, encompassing the idea of multiple parts that attract, and the triple helix concept of multiple relationships, offer a more meaningful framework for understanding academic entrepreneurship

Underpinning the above is the belief that the ways in which knowledge is produced, shared and exchanged has changed fundamentally in a competitive global economy.

CONCLUSION

The subtitle of this paper – re-orientating academia within the knowledge economy – is based upon the belief that academic institutions need to reassess their roles, systems, structures and approaches given the imperative for greater value and wealth creation by academia. Such a view is supported by both academic theory (the concept of corporate entrepreneurship) and by public policy pronouncements. Research on entrepreneurship education and spinout firms is an essential part of the new agenda for academic entrepreneurship but that agenda requires a broader understanding of academic context and in particular:

1. the commercialisation of discipline knowledge
2. the role of academic organisations in society
3. the interaction between academics and knowledge/technology-based firms

The idea of a need for a re-orientation of academia in terms of entrepreneurship reflects what has previously been suggested for the broader study of innovation. Rothwell (1992) argued that models of innovation evolved from linear type, fourth generation models to a fifth generation with a focus on systems integration, extensive networking, flexibility and customised response. In the same way the authors of this paper suggest that a re-orientation of academia on the island of Ireland can be thought of as moving from a view of academic organisations as the final stage in a process of preparing individuals for work, to a position where such organisations are seen as elements of an entrepreneurial system. Indeed the space occupied by such organisations in a

knowledge economy could be argued as being central to such an economy.

In terms of future research, the authors suggest the following:

1. there needs to be greater understanding of the interaction of the seven component elements suggested as representing the domain of academic entrepreneurship
2. the Jones-Evans study of 1997 should be updated to reflect the current emphasis on knowledge-based entrepreneurship
3. there should be a detailed investigation into the widely different experiences of graduate entrepreneurship when comparing North and South
4. the contrasting utilitarian and transactional approaches to university research merits investigation
5. there needs to be fuller understanding of entrepreneurial potential at the level of individual academic institutions

A clear opportunity exists to undertake the above through comparing the very different experiences in the Republic of Ireland and Northern Ireland. Such a comparison will itself allow the development of new knowledge networks and the sharing of best practice that will allow academic institutions to effectively function as integral parts of a knowledge economy.

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