

Innovation in Small and Micro-Enterprises in Donegal; Nice Idea or Commercial Reality?

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ABSTRACT

Context and Purpose:

This dissertation was based on the authors own practical experience of working with small and micro-enterprises (SaMEs) over eighteen years. In his experience, many business development models, originally developed around large firms, do not take account of the needs and characteristics of SaMEs, including innovation theories and models which base their research on large multinational organisations with apparently little consideration for how innovation is developed, managed or measured in SaMEs. Therefore, the author decided to undertake research into innovation in SaMEs in Donegal. The three overall objectives of this research study were to:

- Identify what SaMEs in Donegal understand by the term ‘innovation’
- Investigate innovation practice(s) in SaMEs in Donegal
- Identify how innovation can be effectively measured within SaMEs.

Design / Methodology / Approach

In a process similar to Andrews *et al.* (2008), a detailed literature review was undertaken which guided subsequent research activities where data was collected using in-depth interviews. The two stages of data collection were:

1. Literature review supported by in-depth interviews with key informants (government bodies, agencies) who provided an insight to innovation practices within the county
2. In-depth interviews which provided a comprehensive view of the understanding, practice, motivations, behaviours and attitudes towards innovation and its measurement amongst SaMEs in Donegal

Findings:

While very few SaMEs are aware of innovation theories, processes and procedures, practically all of them engage in some form of innovative activity. They possess a broad understanding of the 'concept' of innovation and are aware of its benefits. Enterprises engage in a wide range of innovations across products, processes, people, marketing, etc. and innovation is very important to them. However, innovation is not a managed or systematic process and while this is often due to lack of resources, the small size and flexible nature of SaMEs also means that innovative proposals with merit can be assessed and acted upon quickly.

Many enterprises in Donegal do not engage with existing innovation networks/clusters as they feel that they are not suited to their needs. The main innovation barriers include lack of time and management support for innovation, the financial risk associated with innovations, poor ICT infrastructure, complacency amongst SaMEs and high costs of innovation including prototyping, IP, etc. Few SaMEs measure innovation activities and some only measure innovation because management accounts provide them with the information to facilitate this. A significant point to emerge from the study was the benefits of management accounts to SaMEs.

Research Limitations:

Very little information exists on innovation in micro enterprises. Furthermore, innovation is a very broad subject and while a number of significant themes emerged from the literature review, it was not feasible, as part of a Masters dissertation, to investigate these issues by means of an extensive quantitative survey with SaMEs.

Originality / Value

This paper seeks to provide an insight into the understanding which regionally-based, SaMEs have of innovation and whether, given their unique characteristics, they can practically use accepted innovation management theories, tools, etc. It also seeks to inform support organisations and other enterprises as to the challenges faced by regionally-based SaMEs in trying to implement innovation activities and whether current

support structures adequately address their needs. Finally, it seeks to establish whether innovation in SaMEs is effectively measured and whether innovation metrics have benefits for such organisations.

Suggestions for Further Research:

Further consideration should be given to whether recognised innovation management systems, models and structures as opposed to flatter, more organic innovation models are best suited to SaMEs. Also, can current support structures, networks, clusters, etc., be effectively tailored so that they are responsive to the real needs of SaMEs, and can current support organisations and policy makers present innovation more simply to SaMEs in a way which is easy to understand and practical to manage and which can demonstrate clear growth benefits. The benefits of effective management accounting systems which accrue to SaMEs in terms of knowledge management, innovation management and marketing activities should also be considered. Finally, as little research exists in relation to innovation in micro enterprises further studies should be undertaken in this area.

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LIST OF ABBREVIATIONS

BMW:	Border Midlands Western
CEB:	County Enterprise Board
CRM:	Customer Relationship Management
CSO:	Central Statistics Office
CTO:	Chief Technical Officer
EC:	European Commission
EU:	European Union
EUR:	Euro (€)
GM:	General Motors
IBM:	International Business Machines
ICT:	Information and communication Technologies
IP:	Intellectual Property
IT:	Information Technology
LYIT:	Letterkenny Institute of Technology
MD:	Managing Director
MIS:	Management Information Systems
NPD:	New Product Development
P&G:	Proctor and Gamble
R&D:	Research and Development
SaMEs:	Small and Micro Enterprises
SMEs:	Small and Medium-sized Enterprises
TTP:	Technological Product and Process
USA:	United States of America
UK:	United Kingdom

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Chapter 1 Introduction

1.1 Introduction and Context

For almost twenty years the author has worked with small and micro enterprises (SaMEs) on a range of business development issues and has often encountered a divide between the perceived best practice in the management of these issues and the difficulties associated with their practical implementation amongst SaMEs. In recent times he has seen significant differences between those accepted theories and practices in the field of innovation and innovation management and how it is actually understood, implemented and measured within enterprises. Nicholas *et al.*, (2011), amongst others, also identify gaps between what researchers and practitioners understand to be new product development (NPD) best practice, and claims there is limited value in developing theories and models about the “best” ways to manage NPD unless these model and theories are fully diffused and can be made useful to NPD practitioners. As a result of this experience the author set out to examine innovation in SaMEs in Donegal, to assess the understanding of innovation amongst these enterprises and to identify whether innovation in these enterprises is effectively practiced and measured.

Many authors have highlighted the importance of innovation and according to Bessant *et al.* (2005) cited by Rowley *et al.* (2011):

“Innovation represents the core renewal process in any organisation. Unless it changes what it offers the world and the way in which it creates and delivers those offerings it risks its survival and growth prospects (p. 1366)”

Recent policy and innovation literature highlights innovation as a key area for the Irish economy as set out in the Irish Government’s Action Plan for Jobs (2012, p. 23/24) and the European Commission’s Framework Programme for Research and Innovation, entitled Horizon 2020. However, in March 2011, Forfás (Ireland’s policy advisory board

for enterprise, trade, science, technology and innovation) published a report entitled 'Analysis of Ireland's Innovation Performance' which stated:

"...there are notable weaknesses in innovative activity, particularly on the part of small indigenous firms." (p4).

The report highlights that smaller firms (particularly indigenous firms) are less likely to innovate. 40% of small firms undertake some form of innovation, compared to 61% of medium-sized firms and 76% of large firms. Furthermore, small firms tend to focus on process innovation which is generally less resource intensive and are overall less likely to engage in more than one innovation mode. Motivations for innovation can vary, with high value-added sectors such as chemicals and ICT focusing on long-term product innovation with other sectors placing emphasis on pursuing process innovations as a means of reducing costs. Innovation approaches can therefore vary between the more offensive and strategic, and the more defensive and tactical. In terms of measuring innovation, the report highlights that there is very little data available to measure/monitor the effects of innovation activities. This negatively impacts innovation in Irish firms because:

"...in the absence of a broader evidence base on the outcomes of innovation, it becomes more difficult to incentivise non-innovation-active firms, particularly those who face high barriers to innovation such as small firms, to make investments in upgrading their products or processes." (p5).

There is very little literature on innovation in micro enterprises. The Forfás study is based on the Community Innovation Survey and to facilitate international comparisons companies of less than ten employees are not considered (Oslo Manual 2005). Contact with the CSO (June 2013) confirmed that information sources on innovation in micro-enterprises are very limited. One of the few sources available is the BMW Regional Assembly Audit of Innovation (2011), which interviewed 159 companies in relation to innovation, of which 60% were micro enterprises.

Many studies allude to the difficulties and challenges faced by SaMEs in trying to effectively manage innovation and the barriers they encounter especially when located in less developed regions.

1.2 Research Objectives and Methodology

Arising from the authors experience and with regard to innovation in the context of SaMEs as outlined above, a number of research objectives/questions were put forward for consideration in this report.

The specific research objectives were as follows:

- Identify what small and micro enterprises (SaMEs) in Donegal understand by the term 'innovation'
- Investigate innovation practice(s) in SaMEs in Donegal
- Identify how innovation can be effectively measured within SaMEs.

Further questions to be addressed as part of the research include:

Understanding of Innovation:

- What do SaMEs in Donegal understand by the term 'Innovation'?
- Are SaMEs in Donegal aware of accepted Innovation Management Theories / Processes / Procedures and do these suit the needs of SaMEs?
- What types of innovation do SaMEs in Donegal engage in?
- Do SaMEs in Donegal view innovation as important to their activities?

Practice of Innovation:

- To what extent do SaMEs in Donegal involve themselves in Innovation?
- What are the barriers to Innovation in Donegal's SaMEs?

- Are SaMEs in Donegal in a position to effectively manage Innovation?

Measurement of Innovation:

- Are recognised Innovation metrics/measurement tools suitable for the measurement of Innovation in Donegal's SaMEs?
- Can levels of Innovation in SaMEs be accurately measured?
- Have SaMEs in Donegal undertaken an Innovation audit?

The first phase of the research process was the exploration of existing literature which set out to verify the authors proposed areas for investigation and to explore the key themes and issues around innovation in SaMEs. The literature review was also instrumental in establishing an effective structure for other elements of the research. The second phase set out to describe the situation with regard to innovation in SaMEs in Donegal. This involved primary research, in the form of in-depth interviews with thirteen such enterprises.

1.3 Value of the Research

As confirmed with the Central Statistics Office (CSO) (June 2013) there is very little information available on innovation in micro enterprises and much of the published literature on innovation focusses on large multi-national organisations. Furthermore, the delivery of innovation policy at a national level does not fully consider the needs and characteristics of SaMEs which are trying to engage in innovative actions. This paper seeks to provide an insight into innovation within regionally-based SaMEs, how it is understood, managed, measured and supported and the challenges and difficulties faced by SaMEs in trying to implement innovation activities. A number of conclusions are derived and recommendations put forward as to how innovation in SaMEs might be better supported.

1.4 Chapter Outline

Chapter 2, the literature review, considers a wide range of published articles and literature on innovation including the main themes arising and most particularly in relation to this research report, how innovation is understood, practiced and measured.

Chapter 3 sets out the research methodology and specifically addresses the research objectives as well as providing detail on research design, data collection methods and analysis.

The findings and analysis section in Chapter 4 details the research findings and provides feedback gathered during in-depth surveys with owner/managers and senior managers of thirteen SaMEs as well as senior representatives of three business support organisations operating in County Donegal.

Chapter 5 provides detailed conclusions on the research objectives/questions which were set out at the beginning of this research study and outlines some recommendations which can be considered in terms of supporting innovation within SaMEs in County Donegal.

Chapter 2 Literature Review

2.1 Introduction to the Literature Review

The literature review undertaken for this research comprised a mix of academic and journal papers as well as policy and strategy documents by national and international organisations. In an approach somewhat similar to Andrews *et al.* (2008), the literature review supported the author's primary research activities (Ritchie and Lam, 2006) and this is further discussed in Section 3.5. Having reviewed the literature it was to be seen that 8 main innovation themes emerged, including:

- Innovation in SMEs and Micro Enterprises
- Forms / Types of Innovation
- Innovation Management Systems / Human Aspects of Innovation
- Innovation Barriers
- Innovation Metrics
- Company Strategy and Innovation and Open / Collaborative Innovation
- Motivations / Opportunities for Innovation
- Regional Innovation

While the scope of each of these innovation themes is very wide in its own right, the author felt that the literature review should consider all of these elements in the context of SaMEs as they have causal relationships and can impact on one another. Innovation barriers, for example, are emphasised differently within SaMEs when set in a regional context as opposed to large urban, knowledge centres, and while regional innovation is not investigated in great depth in this research report, it does have an important impact on innovation in SaMEs in areas like Donegal. Similarly, different types of innovation can require different metrics and different strategies in each enterprise, while

open/collaborative innovation also requires different management systems and metrics and therefore it was important to consider each of these issues.

2.2 How is Innovation defined in the Literature?

Sawhney *et al.* (2006) look at innovation broadly terming it 'business innovation' and define it as "...the creation of substantial new value for customers and the firm by creatively changing one or more dimensions of the business system..."(p. 76). It has three characterisations including:

- Business innovation is about new value, not new things
- Business innovation comes in many flavours
- Business innovation is systemic

For the latter point Sawhney *et al.*, (2006) say that "...when innovating, a company must consider all dimensions of its business systems..."(p. 77). This systemic approach to innovation is a theme which regularly appears in the literature and its benefits are well argued and presented. It is also an interesting point in a Donegal context as it is anticipated that innovation, within SaMEs, will refer to much more than just new product development (NPD) and that it will also address other forms of innovation including processes, organisational, management, production, commercial/marketing and services. Davila *et al.*, (2006) take a similar broad view of innovation. They say that innovation, like other business functions, is a process of management requiring specific tools, rules and discipline and that it is not mysterious. It is also their view that innovation requires measurement and incentives in order to deliver to a consistently high standard, and that enterprises can use it to redefine an industry by employing combinations of business model and technology innovation.

Another definition of innovation is that "...an innovation is the implementation of a new or significantly improved product, or process, a new marketing method, or a new

organisational method in business practices, workplace organisation or external relations...”, (Oslo Manual 2005).

Rowley *et al.* (2011) in their paper on extant models and frameworks of types of innovations provide a comprehensive overview of innovation types, the relationships between them and how innovation is managed and practiced within organisations. They have comprehensively examined various types and frameworks for innovation developed over forty years and have come up with a suggested innovation-type mapping tool and according to Bessant *et al.* (2005) cited by Rowley *et al.* (2011):

“Innovation represents the core renewal process in any organisation. Unless it changes what it offers the world and the way in which it creates and delivers those offerings it risks its survival and growth prospects (p. 1366)”

In the same paper, Kelley and Littman (2006) suggest;

“A great product can be one important element in the formula for business success, but companies that want to succeed in today’s competitive environment need much more, they need innovation at every point of the compass, in all aspects of the business and among every team member. Building an environment fully engaged in positive change, and a culture rich in creativity and renewal, means creating a company with 360 degrees of innovation (p. 6)”

This ‘360 degree’ view of innovation also appears in Sawhney *et al.* (2006) who propose 12 Dimensions of Business Innovation or the Innovation Radar including dimensions such as product/service offerings to customer, organisation, structure and processes, supply chain, presence, networking and branding. Therefore, innovation amongst enterprises today is potentially very diverse, impacting on all aspects of business. Indeed the Rowley *et al.* (2011), innovation-type mapping tool, offers insights into the definitions of different innovation types and specifically, the relationships between them. They identify eleven unique types of innovation drawn from previous frameworks including:

“Product, service, hybrid, technical, administrative, organisational structure, organisational, management, production, business system and commercial / marketing (p 82)”

In common with Sawheny *et al.* (2006), Rowley *et al.* (2011) suggest that no innovation is isolated and that innovation in one area is likely to result in other innovations. A product innovation in one area for instance might lead to other production or marketing innovations.

2.3 Innovation in Ireland

Innovation is important in an Irish context although its application, management and impact across Irish enterprises varies’ for many reasons such as scale, management abilities, structure and geography. In March 2011, Forfás (p. 2 – 6) published a report entitled ‘Analysis of Ireland’s Innovation Performance’ which stated:

“Ireland’s performance is encouraging at an international level, with a high proportion of firms engaged in innovation activity, and high level of innovation expenditure. However, when one looks more closely at the results at a domestic level, there are notable weaknesses in innovative activity, particularly on the part of small indigenous firms”.

The report highlights that smaller firms (particularly indigenous firms) are less likely to innovate. 40% of small firms undertake some form of innovation, compared to 61% of medium-sized firms and 76% of large firms. Furthermore, small firms tend to focus more on process innovation which is generally less resource intensive and are overall less likely to engage in more than one innovation mode. Motivations for innovation can vary with some sectors focusing on long-term product innovation and other sectors emphasising process innovations as a means of reducing their cost base. Innovation approaches can

therefore sometimes vary between the more offensive/strategic, and the more defensive/tactical.

An important element in innovation performance nationally is the way in which economic development is regionally dispersed. According to McAdam *et al.* (2004), low levels of innovation within indigenous SMEs can be regarded as a factor in regions which show poor levels of economic development. Within such enterprises there are significant barriers to innovation and consequently these SMEs have difficulties in growing and exporting or being part of successful supply chains. Buhalis and Main (1998), cited by McAdam *et al.* (2004) found that there is a tendency for peripheral SMEs "...to maintain a traditional management approach...", as distinct from embracing innovative best practices and according to Anderson *et al.* (2001) peripheral regions can be "...hostile environments for new and small firms...".

In regions such as the North West of Ireland, a possible solution to low scale innovation is networking via regional innovation structures which have proven successful in other areas, (Cooke 1996), although the drivers behind such structures can vary depending on location, Cook and Memedovic (2003). A regional innovation approach, it is argued, could have significant benefits for this region as in other parts of Europe which have dynamic regional economies. While efforts have already been undertaken to maximise the range of innovation assets available to enterprises in the region, the work is ongoing and requires considerable input from key organisations (particularly public bodies). The ability of SaMEs to engage with and utilise these supports, when their focus is often on survival and the related day-to-day management issues makes this challenge even greater.

The Irish Government's Action Plan for Jobs (2012, p. 23/24) highlights the need for innovation amongst Ireland's indigenous enterprises particularly through linkages with Higher Education Institutions and other research bodies whereby they may licence innovation or collaborate on R&D activities. Another specific target is the need for enterprises to effectively absorb new technologies into their business so as to improve performance in winning new markets. Innovation is also to be a core component of the

European Commission's Framework Programme for Research and Innovation, entitled Horizon 2020 (2012) which hopes to help innovative enterprises to develop technological breakthroughs into viable products with real commercial potential.

2.4 Understanding Innovation in Small and Micro Enterprises

According to the Official Journal of the European Union (20.5.2003L 124/36), the Commission Recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises states that:

"...a small enterprise is defined as an enterprise which employs fewer than 50 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 10 million..." and "...a microenterprise is defined as an enterprise which employs fewer than 10 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 2 million"

Much of the academic literature is seemingly based on large multi-national organisations and the applicability of the findings of such research to SaMEs, while by no means impossible, is questionable. Andrew and Sirkin (2003) for example write of Polaroid and Whirlpool, Drucker (2002) speaks of Ford and IBM, Kanter (2006) talks of P&G, Honeywell and GM, etc., etc. Cooper (2001) and Cooper *et al.* (2002) put forward product innovation processes and theories which focus on large multinational organisations. Furthermore, according to Salavou *et al.*, (2004), empirical evidence in existing studies draws mainly from samples of large firms in advanced countries, such as the USA, Japan, UK, Germany, etc. and few studies have appeared in the literature utilising data from smaller countries in various stages of development. Soderquist *et al.* (1997) also state that there is a paucity of studies on innovation within SMEs in peripheral regions, while Battisti *et al.*, (2010), tells us that there is a lack of empirical evidence on innovation in SMEs in New Zealand, a country which shares many similar regional and economic characteristics with Ireland.

According to Nicholas *et al.*, (2011), there is a gap between what researchers and practitioners understand to be innovation/NPD best practice and that furthermore, there is limited value in developing theories and models about the “best” ways to manage innovation/NPD unless they are fully diffused and can be made useful to practitioners. Andrews *et al.*, (2008), claim that some theories can be of limited applicability (while some are found to be very useful indeed), while according to Kumar (2009), “...despite the talk of the strategic value of design innovation, very few innovators know “how” to practice this kind of innovation repeatedly and reliably...”!. Despite their extensive innovation mapping activities, Rowley *et al.*, (2011), also acknowledge that there is considerably more work to be done in the area of innovation types before researchers and practitioners are able to communicate clearly on the subject, particularly since innovation types are inter-related. If this is true what then for SaMEs where “...managers can be swayed by “time, financial constraints and environmental uncertainty to take a partial view of their environment...”?, Ambler *et al.*, (2001, p. 7), cited by Brooks and Simkin (2012). Do these enterprises fully understand innovation and are they aware of accepted innovation management theories, processes and procedures? Do they understand, practice and measure innovation?

According to the BMW Regional Assembly Audit of Innovation (2011), 70% of respondents undertook product/service innovation activities. Marketing innovation also received a high number of responses (58%), whilst organisational/social innovation was less common (45%). The 2011 Forfás report found that small firms (particularly indigenous firms) are less likely to innovate with only 40% of small firms undertake some form of innovation, compared to 61% of medium-sized firms and 76% of large firms. Reasons for these differences include variations in budgets; scope for innovation due to a greater range of products, services and processes; skills, capabilities and knowledge and these issues are addressed in more detail in the findings and analysis section of this report. We cannot simply say that SaMEs do not view innovation to be an important part of their activities. Perhaps they can only participate in certain types of innovation depending on the structures, resources and assets available to them. If they were better

resourced in terms of finance, knowledge, skills, time, networks, etc., and if they had more time to focus on strategy and planning rather than day-to-day activities, then, perhaps, instances of innovation within SaMEs would increase.

2.5 Practice and Management of Innovation

2.5.1 Importance of Innovation

According to Baregheh *et al.*, 2012, innovation is increasingly recognised in terms of its importance in making a contribution to organisational success, performance and survival, and from the literature, it is clear that many other authors also see innovation as being very important. Zahra and Covin (2004) cited by Rowley *et al.* (2011) state that “Innovation is widely considered as the life blood of corporate survival and growth (p. 138)”, while Bessant *et al.* (2005) cited by Rowley *et al.* (2011) suggest that “Innovation represents the core renewal process in any organisation (p. 1366)”. Today, great value is placed on intangibles such as brands, market relationships, intellectual property, knowledge and human capital when compared to tangible or physical assets or resources, and in such an environment, wealth, according to Kilroy (1999), “will only be created for shareholders if management delivers performance in excess of expectations or if it convinces the capital markets that it has the ability to do so”. This, he says, “...is virtually impossible without the injection of new ideas or the adoption of a new and higher value strategy...”.

2.5.2 Managing Innovation: Systems and People

According to much of the literature, for innovation to be successfully incorporated into any enterprise, it must be actively and effectively managed. Unfortunately, it can be seen that many SaMEs do not have the knowledge, abilities or resources to properly

implement innovation systems and, as well as anecdotal evidence, reports such as the Forfás report bears this out, although the BMW (2011) report counters this somewhat. In addition, many companies have a narrow view of innovation and associate it simply with NPD or traditional R&D activities (Sawhney *et al.* (2006)), whereas in reality it has a much wider impact as outlined by several researchers such as Rowley *et al.* (2011), Bessant *et al.* (2005) and Kelley and Littman (2006). Sawhney *et al.* (2006), Kanter (2006), Hargadon and Sutton (2000), Hering and Phillips (2006), Cooper (2001), Peebles (2003), Kumar (2009) and Takeuchi and Nonaka (1996) all emphasise the need for systems, structures and organisation if innovation is to be effectively and successfully developed and managed.

It seems that innovation, in order to be truly effective for any enterprise, must be all pervasive and should be incorporated into all activities of business from concept to commercialisation, as well as being engrained into organisational culture. Sawhney *et al.* (2006) present 12 Dimensions of Business Innovation including product/service offerings to customer, organisation, structure and processes, supply chain, presence, networking and branding, while Rowley *et al.* (2011) identify eleven unique types of innovation including: product, service, hybrid, technical, administrative, organisational structure, organisational, management, production, business system and commercial/marketing. As highlighted previously, an innovation in any one of these areas typically impacts on other areas and so management also need structures to examine and address the causal relationships involved in innovation.

The first step in creating a systemic and systematic approach to innovation management is a management philosophy and recognition amongst owner/managers and key personnel that innovation really does have benefits which are worth pursuing and Kilroy (1999) argues that shareholder wealth creation is a creative endeavour on the part of the management and staff of an organisation. However, given the influence of owner/manager personalities on SaMEs, the creative potential of enterprises can only be unlocked if these key people believe in and drive creativity and innovation and Hargadon and Sutton (2000), emphasise the need for the right people with the right attitudes. In

today's fast moving business environment, change comes in all shapes and forms due to globalisation, shorter product lifecycles, technological advances, etc. and as By (2005) suggests, "...few would dispute that the primary task for management today is the leadership of organisational change...", a role which requires significant leadership, communication and people skills. Burnes (2004), also tells us that it is of vital importance to organisations that people are able to undergo continuous change.

Once management believe in the potential of innovation the literature proposes that they then need a system whereby they can implement and manage it. Innovation needs to be planned, ideas and concepts need to be developed, evaluated, trialled and commercialised and all of this requires people, systems and controls. Leavy (2005) outlines the need for management to find a balance between corporate creativity and efficiency in order to turn innovation into commercial reality while Drucker (2002) also suggests a need for "functional inspiration" in order to fully capitalise on an attractive opportunity. As Andrew and Sirkin (2003) point out, "there's an important difference between being innovative and being an innovative enterprise" - the former generates a lot of ideas while the latter generates a lot of cash. Indeed, creativity can be destructive to businesses – it needs a degree of structure to succeed, Levitt (2003). In addition to Sawhney et al. (2006) and Rowley *et al.* (2011), other authors also highlight the need for innovation systems which take a broad view of innovation. Kanter (2006) highlights the need for an 'Innovation Pyramid' as used by many successful innovators where large, small, radical and incremental innovations are combined across all organisational activities and functions.

People with the proper skills and capabilities (interpersonal and technical) are essential. Cross-discipline teams and overlapping relationships between functional and technical abilities are very important according to Kanter (2006) and Takeuchi and Nonaka (1986), while good interpersonal communication is a must. Although SaMEs may encounter barriers in terms of time, resources and capacity to manage innovation, the primary research demonstrates that their flexibility, ability to communicate quickly and personally, simplified processes and ability for adaption often supports the

implementation of innovations. Creative thinking and idea generation need to be combined with logical analysis – described as “hybrid thinking” by Kilroy (1999) whereby an intuitive idea is first considered as a potential value proposition and is eventually developed into commercial reality. Ideas that at first appearance seem unsuitable need to be reimagined and considered for other uses and management processes must allow for that and must not strangle innovation through the use of restrictive controls, Kanter (2006). Hering and Phillips (2006) call for transparency in the evaluation of ideas and concepts, as contributors need to know on what basis ideas are accepted or rejected, or they will be unlikely to contribute ideas into the future.

The ‘Innovation Pyramid’ shares characteristics with the ‘Innovation Factory’ proposed by Hargadon and Sutton (2000) which highlights the importance of people and systems. They suggest the need for a constant flow of good ideas, which need to be kept alive while new uses are imagined for old ideas and that all this is achieved through effective knowledge sharing and communications. Hering and Phillips (2006) also emphasise the need to generate good ideas, and as well as using people internal to the organisation to do this they also propose the incorporation of ‘lead users’ such as customers and online communities while Cooper *et al.* (2002) also suggest ‘camping out’ and working with lead / innovative customers. Kumar (2009) alludes to this when he says that companies “...to stay competitive,... need to switch their innovation focus, paying more attention to creating offerings that fit people’s daily lives...”. The attention he says “...is shifting from achieving efficiency to creating desirable user experiences and thereby greater adoption...”.

Coopers (2001) Stage-Gate plan for innovation provides a comprehensive framework for innovation management. The first element is discovery or idea generation, followed by scoping of the idea, building a business case, development, testing and validation and commercial launch with the final stage being post-launch review. Before progressing to each stage, however, the concept/product must pass through a series of gates or assessment metrics. Failure at any of these gates means the project is killed off or, possibly, redeveloped in such a way that it meets the basic development metrics. Like

Kanter (2006), Takeuchi and Nonaka (1986) and Hargadon and Sutton (2000) who emphasise the need for flexibility and accommodation, Cooper stresses that the Stage-Gate process is not a functional, phased review system, neither is it rigid or bureaucratic (and this can be seen from the primary research as enterprises mainly approach innovation in an ad hoc manner). The key success factors he argues are homework or predevelopment activities, research and knowledge acquisition; multidisciplinary and cross-functional teams working in parallel on the various development stages; strong market and customer focus, proper product definition and at all stages there should be an emphasis on quality of execution. Other authors make similar suggestions with Kumar (2009) suggesting that companies need to ensure that their innovations are purposefully built around people's experiences and that they can provide real value, while Low et al. (2007) suggest that innovation is positively correlated to market orientation and that both of these activities are, in turn, positively correlated to firm performance and the degree of change in the firm's competitive environment

2.5.3 Barriers to Innovation

Talk of systems, structures, multidisciplinary approaches, flexibility, creativity and innovation portfolio management is sound in theory and seems sensible and practical for companies with enlightened management, skilled staff, budgets, networks, specific functions, etc. What about SaMEs, however, who have small numbers of staff carrying out different functions, small budgets, lack of ability or knowledge to benefit from networking opportunities and management who are preoccupied with day-to-day survival rather than the development of an innovation or any other strategy? Can they realistically follow the stage-gate product innovation process as set out by Edgett and Jones (2002 – 2012)? What of these types of enterprises which are found in less well developed economic regions? Do they innovate at all? If so, what level and what types of innovation do they engage in and what are the barriers to innovation in SaMEs? According to Salavou *et al.* 2004, the innovative behaviours of SMEs can be determined by specific national contexts. If we look at the literature in the context of SMEs in

Donegal, anecdotal evidence, observation and some literature (BMW Assembly Report (2011) and McAdam *et al.* (2004)), would indicate that there are many potential barriers when it comes to developing and managing innovation including:

- Unavailability of time / capacity
- Operational focus with short time spans rather than strategic views
- Lack of consultative management style/structure
- Lack of suitably qualified personnel and ability to attract same
- Lack of finance coupled with high costs of innovation (particularly IP) resulting in possible risk aversion and inability to build on innovations
- Inadequate ICT / other infrastructure and information on technology
- Lack of suitable partnership / alliance opportunities and fear of partnerships due to possible exploitation
- Dominant competitors
- Inadequate information on issues such as market requirements and opportunities, potential innovation benefits, etc.
- Potential cost of 'failed' innovations
- Lack of information and difficulty in accessing state / EU support

Importantly, however, some of these factors are (amongst others) also highlighted as enablers of innovation, such as finance; state grants / loans, advisory services and training supports; 3rd level courses; own staff and partnerships / linkages. Furthermore, the flexibility of SaMEs, their ability to communicate quickly and personally, simplified processes and ability for adaption can actually support innovation implementation. At an EU level, issues such as lack of access to finance, costly IP, unrealistic regulation and targets and lack of common standards are seen as innovation barriers which need to be addressed, Reinstaller *et al.* (2010). By addressing these barriers there could be wider benefits for Irish SMEs as the report shows that internationalisation and innovation are closely related. Therefore, by resolving innovation barriers it should also be possible to resolve parallel internationalisation barriers. Away from urban, centralised regions, innovation infrastructures external to the firm are usually less developed, Gatrell (2001):

cited in McAdam et al. (2004), and skills and market access are more difficult to obtain, Anderson *et al.* (2001), cited in McAdam et al. (2004), while as previously mentioned, Anderson *et al.* (2001) tell us that peripheral regions can be “hostile environments for new and small firms”.

McAdam *et al.* (2004) identify several barriers to innovation including a lack of innovation culture amongst SMEs, insufficient organisational structure, owner-manager leadership issues and a failure to encourage, facilitate and reward staff in the development and application of innovation. It is important to note some of the specific findings from this study as it was conducted in Northern Ireland which shares many regional and economic characteristics with Donegal. One significant barrier was the lack of a culture which facilitated innovation. According to de Sousa, (2006), a culture of organisational learning is essential to ensuring sustainable innovation. Many owner/managers, however, have an authoritarian or direct management style which does not encourage innovation, flexibility or risk-taking, thereby dampening any innovative or creative flair amongst staff. This is further compounded where owner/managers employs family members. While owner/managers could be effective at changing things quickly and efficiently, this is primarily related to mechanistic, operational issues rather than learning-related or people-related change. Furthermore, where there was no creative culture within an organisation there was consequently, no structure to facilitate or reward innovation where employees could bring ideas, from the ‘bottom-up’ to management. Very often in such organisations the focus is on day-to-day issues so as to ensure marketplace survival and all staff members are under pressure to perform. In such situations there is often little focus on strategic issues such as innovation and according to Amabile *et al.*, (2003), this does not lead to successful innovation outcomes. Furthermore, as owner/managers potentially focus less on innovation or other strategic management issues it is difficult to recruit persons with the required levels of creative and innovative knowledge, skills and attitudes. The McAdam study (2004) found that manufacturing was the worst performing sector, primarily because of a lack of leadership in terms of supporting new ideas and where there was a very traditional way of working. Perhaps the consequences of this can be seen in parts of Donegal where a host of manufacturing businesses have closed over

the last decade or more. If more dynamic, skilful persons can be introduced into manufacturing businesses, then perhaps their level of innovation will improve as people with diverse skills and talents help challenge the status quo, Peebles (2003). Thomke (2001) also calls for enlightened experimentation where the new and the traditional can be combined. Where it may not be possible to directly employ creative and innovative people due to lack of finance, appropriate labour skills, etc., then creativity and know-how may be brought into the organisation via inbound open innovation, Schroll and Mild (2011).

Interestingly, a further study by McAdam *et al.* (2007) demonstrated that SMEs, which have high levels of innovation improvement, took a broad process based approach to innovation rather than a narrow technical approach and included a process of critically reflective action learning to ground the innovation in organisational practice. Pearson (2003), Brown (2003) and Peebles (2003) also look at innovation in broad terms arguing the need for both a 'top-down' (management) and a 'bottom-up' (employee) dimension as well as the need to look for innovation amongst customers and competitors as well as within one's own business, because innovation is everywhere and innovation opportunities may have been overlooked by competitors. Macmillan and McGrath (2001) demonstrate how elements of the consumption chain can provide innovation opportunities including purchase, delivery, after-sales, exchange/returns, repairs/servicing and disposal, while Doran (2012) investigates differing forms of innovation in Irish firms' production functions and whether organisational change is required to facilitate innovation as well as whether organisational or process innovation should be incentivised. In today's ultra-competitive, globalised, technology-based marketplace, companies need to employ innovative and creative persons, help and facilitate them in bringing ideas forward, reward them for doing so and they also need to participate in innovation enabling networks.

McAdam *et al.* (2004) support the concepts of cluster-networks and linkages between SMEs and higher education and research institutions so as to overcome resource and knowledge deficits amongst SMEs, a concept which has proven to be successful in many

areas previously, Cooke (1996). The concept of collaborative/open innovation is clearly evident in the literature with Chesbrough ((2007), Chesbrough and Appleyard (2007), Schroll and Mild (2011), Rigby and Zook (2002) and many others having conducted research into the area. Open/collaborative, innovation has many potential benefits for enterprises, especially those in peripheral regions. Innovation can be brought in from elsewhere and developed/used internally or it can be created internally and developed/used by other partners and through open innovation and alliances, companies may become more aware of innovation opportunities. However, as suggested by Schroll and Mild (2011), not every process is suitable for every enterprise, and while the likes of P&G make extensive use of open innovation there are instances where firms have lost business because of their open innovation strategy. So, while open innovation, networks and alliances have many potential advantages for SaMEs, many of them are still reluctant to engage because they fear they will be exploited in some way by a superior partner in the alliance.

2.6 Measurement of Innovation

As outlined, there is little research information available on innovation in micro enterprises. The Oslo Manual (2005) provides an international source of guidelines for the collection and use of data on innovation activities but only considers enterprises with 10 or more employees, while the 2011 Forfás report highlights that there is very little data available to measure and monitor the effects of prior or current innovation activities in Irish firms. This negatively impacts innovation because:

“...in the absence of a broader evidence base on the outcomes of innovation, it becomes more difficult to incentivise non-innovation-active firms, particularly those who face high barriers to innovation such as small firms, to make investments in upgrading their products or processes...(p 5)”.

One of the biggest problems for companies seeking to increase their growth through innovation is, according to Anthony *et al.* (2008), that they often use the incorrect metrics which leads them in the wrong direction. The suggestion by Ambler *et al.* (2001, p.7.) cited by Brooks and Simkin (2012) is well made, where they say that managers of SMEs can be swayed by “...time, financial constraints and environmental uncertainty to take a partial view of their environment” and that as a result they tend to measure what is “easily measured..” as opposed to what is “...useful to measure...”. However, should we be surprised at this when many SMEs simply focus on being competitive and on day-to-day survival? How can owner/managers devote sufficient time to managing innovation and measuring its impact when they have all the other business functions such as marketing to manage also? In addition to innovation metrics, Brooks and Simkin (2012), note a possible 250 different marketing metrics which could be adopted by SMEs. Anthony *et al.* (2008), suggest that the metrics which matter depend very much on the circumstances, capabilities, values, aspirations and strategic objectives of specific companies as well as the industry in which they operate.

In addition to the innovation barriers highlighted in the previous section, Brooks and Simkin (2012), identify specific problems when it comes to measuring innovation in SMEs. They include underdeveloped MIS resulting in limited, unreliable and intermittent multi-year data, a small number of customers accounting for significant portions of business therefore ‘skewing’ data, agreed strategies being overtaken by ‘events’ in the environment, ad hoc budgeting, a need for quick results over long term investments and a focus on operational rather than strategic issues and the organisational culture fostered by owner/managers. Another important consideration here is that where innovation metrics are used they tend to focus on outputs/outcomes and financial metrics whereas inputs and processes also need to be measured as well as softer issues such as customer satisfaction. According to Chan *et al.* (2008), “...companies reporting the highest contribution to growth from their innovation actions measure their innovations as a portfolio and use metrics across the whole innovation process...” while also benchmarking their metrics.

If used across the whole innovation process, metrics can assist in improved strategic focus, improved resource allocation and improvements in overall performance. Chan *et al.* (2008) and Anthony *et al.* (2008), suggest a number of input, process and output/outcome metrics and these are assessed amongst SaMEs in Donegal as part of the primary research activity for this dissertation.

2.7 Summary of the Literature Review

Over 60 academic and policy papers on innovation were reviewed and in addition to contextualising the current situation amongst SaMEs within Donegal as to their understanding, practice and measurement of innovation, a number of significant innovation themes emerged as follows:

- The unique characteristics of innovation in SME and Micro Enterprises
- Differing forms / types of Innovation
- The need for innovation management systems and human aspects of innovation
- Innovation barriers
- Innovation metrics
- Strategic approaches to innovation and open / collaborative innovation
- Motivations / opportunities for Innovation
- Regional innovation

The findings of the main areas of the literature review are summarised below:

How is Innovation defined in the literature?

- The literature looks at innovation in broad terms and Sawhney *et al.* (2006) define it as “...the creation of substantial new value for customers and the firm by creatively changing one or more dimensions of the business system...” and “...when innovating, that a company must consider all dimensions of its business systems...”.

- Rowley *et al.* (2011) citing Kelley and Littman (2006) suggest that “... companies that want to succeed in today’s competitive environment ... need innovation at every point of the compass, in all aspects of the business and among every team member...”.

Innovation in Ireland

- Innovation is important in an Irish context. However, the application, management and impact of innovation across Irish enterprises varies for many reasons such as scale, management abilities, structure budgets, skills, partnerships, etc., with the result that 40% of small firms undertake some form of innovation, compared to 61% of medium-sized firms and 76% of large firms (Forfás 2011).
- Small firms tend to focus more on process innovation which is generally less resource intensive and are overall less likely to engage in more than one type of innovation
- Low levels of innovation within indigenous SMEs can be regarded as a factor in regions which show poor levels of economic development where such enterprises face significant barriers to innovation and consequently they have difficulties in growing and exporting or being part of successful supply chains. McAdam *et al.* (2004)
- A regional innovation approach can have significant benefits for this region as has been the case in other parts of Europe which have dynamic regional economies and regional innovation structures may provide a solution to low levels of innovation activity, Cooke (1996), although their impact can vary depending on location
- Government and EU policy seeks to promote innovation activity amongst SMEs.

Understanding of Innovation in Small and Micro Enterprises

- Much of the academic literature on innovation (Andrew and Sirkin (2003), Drucker (2002), Kanter (2006), Cooper (2001)) is based on large multi-national

organisations and the applicability of the findings of such research to SaMEs, while by no means impossible, is questionable.

- There is a paucity of studies on innovation within SMEs in peripheral regions, Soderquist *et al.* (1997)
- There is a gap between what researchers and practitioners understand to be innovation/NPD best practice and furthermore, there is limited value in developing theories and models about the “best” ways to manage innovation/NPD unless they are fully diffused and can be made useful to practitioners, Nicholas *et al.* (2011)

Practice and Management of Innovation

- Innovation is important in making a contribution to organisational success, performance and survival, Bessant *et al.* (2005) cited by Rowley *et al.* (2011)
- Many SaMEs do not have the knowledge, abilities or resources to properly implement innovation management systems and have a narrow view of innovation
- To be truly effective, innovation must be all pervasive and needs to be incorporated into all activities of business as well as being engrained into the culture of an organisation. In order to be successful SaMEs need a management philosophy and recognition amongst owner/managers and key personnel that innovation really does have benefits which are worth pursuing.
- Once management believe in the potential of innovation they then need a system by which they can implement and manage it. Innovation needs to be planned, ideas and concepts need to be developed, evaluated, trialled and commercialised and this requires people, systems, structures and controls. They must also, however, be careful not to ‘strangle’ innovation with overly rigid or bureaucratic rules and controls
- People with the proper skills and capabilities (interpersonal and technical) are essential and they need to be allowed to consider innovation across the whole organisation. Cross-discipline teams, strong communications and overlapping relationships between various functional and technical abilities are very important

- Innovation features causal relationships with innovation in one area often resulting in innovations in other areas.
- Market-focus is vital for innovation in enterprises, Kilroy (1999).

Barriers to Innovation

- There many potential innovation barriers for regionally-based SaMEs including:
 - lack of an innovation or learning culture and lack of innovation management structures (an ad hoc approach)
 - lack of consultative management style/structure and lack of suitably skilled personnel
 - lack of finance (internal, external and within partnerships) coupled with high costs of innovation (particularly IP), lack of adequate ICT infrastructure and lack of information on technology
 - lack of suitable partnership / alliance opportunities and fear of being exploited by partners or dominant competitors
 - lack of information on issues such as market requirements and opportunities, potential innovation benefits, etc.
- External innovation infrastructures in regional areas are usually less developed than in central regions, Gatrell (2001): cited in McAdam et al. (2004), and requisite skills and market access are more difficult to obtain, Anderson *et al.* (2001), cited in McAdam *et al.* (2004)
- In terms of innovation, cluster-networks and linkages between SaMEs and higher education and research institutions (open innovation) can, potentially, overcome resource and knowledge deficits
- Some sectors such as manufacturing can be less innovative than others where lack of leadership in terms of supporting new ideas and a very traditional way of working exist, McAdam *et al.* (2004)
- Innovation in SMEs needs both a 'top-down' and 'bottom-up' dimension as well as the need to look for innovation amongst customers and competitors as well as within one's own business, because the potential to innovate is everywhere.

Measurement of Innovation

- There is very little data available to measure and monitor the effects of prior or current innovation activities, Forfás (2011). This negatively impacts innovation because “...in the absence of a broader evidence base on the outcomes of innovation, it becomes more difficult to incentivise non-innovation-active firms...”
- Many companies use incorrect metrics, Anthony *et al.* (2008), and with many SMEs simply focused on being competitive and on day-to-day survival many simply measure those areas that can easily be measured
- To be effective, metrics need to consider the circumstances, capabilities, values, aspirations and strategic objectives of specific companies as well as the industry in which they operate. They need to focus on objective measures for inputs, processes, outputs and outcomes while also considering subjective issues such as customer satisfaction
- If used across the whole innovation process, metrics can assist in improved strategic focus, improved resource allocation and improvements in overall performance.

In conclusion, innovation is a very broad subject and it impacts on all aspects of the organisation as outlined by Rowley *et al.* (2011), and others. How can SaMEs manage all of these elements effectively? Do they understand them and their relationships? The remaining chapters of this report analyses the understanding, practice and measurement of innovation in SaMEs in Donegal, The primary research findings are analysed and conclusions are drawn from this process with recommendations being made as to how innovation in Donegal’s SaMEs could be better supported.

Chapter 3 Methodology

3.1 Methodology Introduction

This chapter sets out the methodology used in conducting this research including a statement of the research objectives, an overview of the research design and the data collection methods, and measurement techniques used during the research phase.

3.2 Research Objectives

The overall aim of this research activity was to look at innovation in the context of small and micro enterprises (SaMEs) in Donegal and the three main objectives were as follows:

- Identify what SaMEs in Donegal understand by the term ‘innovation’
- Investigate innovation practice(s) in SaMEs in Donegal
- Identify how innovation can be effectively measured within SaMEs.

In order to properly analyse innovation in the context of SaMEs in Donegal it was necessary to further subdivide these three objectives into ten specific research questions as follows:

Understanding of Innovation

- What do SaMEs in Donegal understand by the term ‘Innovation’?
- Are SaMEs in Donegal aware of accepted Innovation Management Theories / Processes / Procedures and do they suit the needs of SaMEs?
- What types of Innovation do SaMEs in Donegal engage in?
- Do SaMEs in Donegal view innovation as an important to their activities?

Practice of Innovation

- To what extent do SaMEs in Donegal involve themselves in Innovation?
- What are the barriers to Innovation in Donegal's SaMEs?
- Are SaMEs in Donegal in a position to effectively manage Innovation?

Measurement of Innovation

- Are recognised Innovation metrics/measurement tools suitable for the measurement of Innovation in Donegal's SaMEs?
- Can levels of Innovation in SaMEs be accurately measured?
- Have SaMEs in Donegal undertaken an Innovation audit?

3.2.1 Impact of the Literature Review on the Research Objectives

The literature review provided some interesting insights into these research questions as well as highlighting issues to be addressed in the primary research. The original research questions are expanded upon (below) to note particular issues arising from the literature review and which were subsequently addressed in the primary research.

Understanding of Innovation

- The research study sought to identify what SaMEs in Donegal understand by the term 'innovation'? According to the literature, innovation is very broad with many types of innovation, although innovation and research on innovation in an Irish SaME context is limited
- Are SaMEs in Donegal aware of accepted innovation management theories / processes / procedures and do they suit their needs? According to Nicholas *et al.* (2011), there is a gap between what researchers and practitioners understand to be innovation/NPD best practice and furthermore, there is limited value in developing theories and models about the "best" ways to manage innovation/NPD unless they are fully diffused and can be made useful to practitioners, including SaMEs.

- What forms of innovation do SaMEs in Donegal engage in? According to the Forfás study (2011), small firms tend to focus more on process innovation which is generally less resource intensive and they are less likely to engage in more than one innovation mode. The literature, however, makes it clear that in order to be truly effective, innovation must be all pervasive and needs to be incorporated into all activities of business as well as being engrained into organisational culture. Innovation does not occur in isolation and innovation features causal relationships, where innovation in one area generally results in innovations in other areas. The research study set out to identify if this is true of SaMEs in Donegal
- Do SaMEs in Donegal view innovation as an important part of their activities? Rowley *et al.* (2011) citing Kelley and Littman (2006), Forfás (2011), the Irish Government and the ECs Framework Programme for Research and Innovation, all give prominence to the importance of innovation. However, do SaMEs within Donegal attach the same importance to innovation?

Practice of Innovation

- To what extent do SaMEs in Donegal involve themselves in innovation? Do they concentrate on process innovation as highlighted in the Forfás study (2011) and do issues such as scale, management abilities, finance, structure and geography impact on the application and management of innovation. In regional areas such as Donegal, innovation infrastructures external to the firm are usually less developed than in central regions, Gatrell (2001): cited in McAdam *et al.* (2004) and requisite skills and market access are more difficult to obtain, Anderson *et al.* (2001), cited in McAdam *et al.* (2004). Furthermore, some sectors are less innovative than others such as in manufacturing. This research study set out to examine if such trends are evident in Donegal.
- This research study also set out to examine the innovation barriers in Donegal's SaMEs. According to the literature there are many barriers as outlined in Sections 2.5.3 and 2.7.

- Are SaMEs in Donegal in a position to effectively manage innovation in terms of resources, capabilities, structures, etc? The literature suggests that many SaMEs do not have the knowledge, abilities or resources to properly implement innovation management systems and have a narrow view of innovation whereas, in order to be successful, SaMEs need a management philosophy and a recognition that innovation really does have benefits which are worth pursuing. According to the literature SaMEs need systems to implement and manage innovation across all elements of their organisation and the primary research investigates if this is true in the case of Donegal enterprises.

Measurement of Innovation

- Are recognised innovation metrics/measurement tools suitable for the measurement of innovation in Donegal's micro enterprises? The 2011 Forfás report states that there is very little data available to measure and monitor the effects of prior or current innovation activities in Irish firms, while according to Anthony *et al.* (2008), many companies use incorrect metrics and with many SMEs simply focused on being competitive and on day-to-day survival many of them simply measure those areas that can easily be measured. However, to be effective, metrics need to consider the circumstances, capabilities, values, aspirations and strategic objectives of specific companies as well as the industry in which they operate. Inputs/processes as well as outputs/outcomes and financial metrics need to be measured in terms of innovation as well as softer, subjective elements such as customer satisfaction
- Can levels of innovation in SaMEs be accurately measured?
- It was not evident from the literature review whether SaMEs in Donegal had undertaken an innovation audit and so this was investigated as part of the primary research.

3.3 Research Design

Descriptive research may be an extension of, or a forerunner to, exploratory research (Saunders *et al.*, 2007). In this study the nature of the research undertaken may be classified as both exploratory and descriptive. The objective of exploratory research is to explore a problem or situation and to provide insights and understanding (Malhotra, 1999), and Saunders *et al.* (2007) note that an advantage of exploratory research is that it is flexible and adaptable to change. In this study, the exploration of existing literature provided information which was used in structuring the primary research so as to adequately describe innovation activities amongst Donegal enterprises. This inductive approach to the research allowed the author to assess the environmental context in which innovation happens in SaMEs.

According to Ritchie and Lam (2006), "...researchers need to utilise more effectively prior research to inform their own research and more effort is needed to integrate existing research within the relevant theme or field...". For this study the literature review explored the key themes and issues around innovation in SaMEs. It addressed innovation types, theories and practices which exist at present in relation to innovation and examined whether they consider the needs and characteristics of SaMEs in terms of the implementation, understanding and measurement of innovation. As previously highlighted, over 60 academic and policy papers on innovation were reviewed and in addition to contextualising the current situation with regard to innovation amongst SaMEs within Donegal, a number of significant themes emerged as previously noted in Sections 2.1 and 2.7. These findings from the literature review were 'integrated' into the authors, own primary research as suggested by Ritchie and Lam (2006).

The second phase, involving primary research, set out to describe the situation with regard to innovation in SaMEs in Donegal and consisted of in-depth interviews. This flexible approach provided the author with a detailed insight into innovation amongst such enterprises and allowed him to delve into important issues with follow-up questions when necessary. According to Saunders *et al.*, (2007) an interpretivist approach is

appropriate in business research as it is relatively flexible and focuses on the meanings behind the research as opposed to a positivist approach which sees the use of a highly structured methodology to facilitate replication (Gill and Johnson, 2002, cited by Saunders *et al.* 2007). The unique nature of each SaME, their characteristics, and the challenges that they face in effectively developing and managing innovation when compared to large, multi-national businesses, merited such a flexible, interpretivist approach.

3.4 Data Collection

Qualitative research collects and analyses data that cannot be meaningfully quantified in statistical form (Parasuraman *et al.*, 2004). It provides insights into and understanding of a problem (Malhotra, 1999) and allows the researcher to explore motivations, attitudes, behaviours and actions. On the other hand, quantitative research is characterised by structure and large representative samples (Parasuraman *et al.*, 2004). It seeks to quantify data and typically applies statistical analysis of some form (Malhotra, 1999) with methods including surveys and observation. Qualitative research may be used to improve the efficiency of quantitative research and according to Malhotra (1999) it is a sound principle of research to view both methods as complementary rather than in competition with each other. Marshall and Reason (2006), advocate a “multi-dimensional attention” to research.

The author initially conducted an extensive review of published innovation literature comprising over 60 documents. The information gathered was analysed with the intention of providing a structure for the design of the primary research in both quantitative and qualitative forms. The research objectives and questions were set out in a tabulated format and were assessed as to whether they could be effectively researched using any of three sources including literature review, questionnaire or in-depth interview (see Appendix 1).

Subsequently it was identified that two of the initial research questions did not merit extensive consideration and were amended. Having amended the research questions (see Appendix 2) it was clear that they were comprehensively addressed in the published literature. Furthermore, the literature provided eight main innovation themes as previously outlined in Sections 2.1 and 2.7.

Having considered the emerging literature themes against the initial research questions, the researcher was able to identify over 90 questions which could possibly be used in a quantitative survey. Obviously, a survey of this size and detail would not be feasible as part of a Master's dissertation and the author attempted to refine these initial questions into a more manageable structure. However, while the survey was refined it was felt that it was still not in a format which would encourage acceptable response rates as it ran to eight pages in total and would take respondents over 30 minutes to complete. Given the time and resource pressures experienced by SaMEs (Ambler et al. (2001)), it was anticipated that the target audience would be unlikely to respond in sufficient numbers and to ensure a satisfactory response rate would require significant resources in terms of time (follow-up calls to encourage completion and answer queries) and finance (telephone calls and pre-paid envelopes) and such resources were not available to the author.

It was not possible to further refine the draft survey without removing questions related to specific innovation themes. This, however, was deemed to be unsatisfactory as it would result in significant research gaps on important innovation issues and so it was decided to use the draft survey as the basis for conducting in-depth interviews (see Appendix 3). This template allowed a mix of structured and unstructured questions and facilitated both qualitative and quantitative analysis on certain issues. According to Carson (1990), cited by Doohan (2008), small firm researchers are urged to conduct studies that are sensitive to the unique characteristics of small firms. As a result, in-depth surveys were selected in order to investigate innovation in SaMEs as they are thought to be one of the best methods to investigate an individual's behaviour and attitudes and the underlying reasons and motivations for same, and semi-structured or unstructured

interviews have also been found to be particularly effective for collecting data from owner/managers of small enterprises. The in-depth interviews considered innovation in a very broad sense and the views of state agencies/bodies supporting innovation in the county was also investigated in order to assess the current situation, to verify the academic literature in a Donegal context and to provide an insight into the practice and understanding of innovation and its measurement. This inductive approach to the research allowed the author to accurately assess the context in which innovation activities take place in SaMEs in Donegal and the small sample of subjects was considered appropriate in this instance.

3.5 Access and Ethical Considerations

Prior to the research study an outline of the research proposal was submitted to the Ethics Committee of LYIT, which was approved. Interviewees were initially contacted by letter (Appendix 7) with follow-up contact by telephone. Prior to all meetings assurances were given to participants that information disclosed would be treated as sensitive and confidential and a confidentiality agreement was provided in this regard (Appendix 4). All participants also signed interview consent forms (Appendix 5).

3.6 Measurement Techniques

The initial research objectives and research questions were set out in a tabulated format (see Appendix 1) and were assessed as to whether they could be effectively researched using any of three sources including literature review, survey or in-depth interview.

Eight key themes emerged from the literature review and these were considered against the ten initial research questions. As a result of this process the author identified over 90 possible questions which could be used in a quantitative survey. However, it was anticipated that few people would take the time to participate in such a detailed survey

and subsequently this draft survey was used as the baseline for conducting in-depth interviews (see Appendix 3) with thirteen company interviewees and three support agency interviewees. This template allowed for a mix of structured and unstructured questions and facilitated both qualitative and quantitative analysis on certain issues.

A one-to-one, personal interview technique was used and administered by the author with the baseline providing guidance, thereby ensuring consistency and uniformity of the research. With one exception, all interviews were face-to-face at the respondent's place of work. Where relevant, key terms were explained to respondents to ensure a common understanding of the terminology being used thereby ensuring that a comparative analysis could be undertaken.

3.7 Data analysis

The in-depth surveys provided qualitative and quantitative information. Responses to unstructured or open-ended questions are illustrated in Section 4 in a narrative form using quotations where possible. Quotations are not directly attributed to any particular respondent as confidentiality in respect of respondents was assured at the outset. Some information provided was in a format which could be analysed quantitatively and was analysed using Excel software. Depth interviews were recorded and analysed prior to incorporation into the final report.

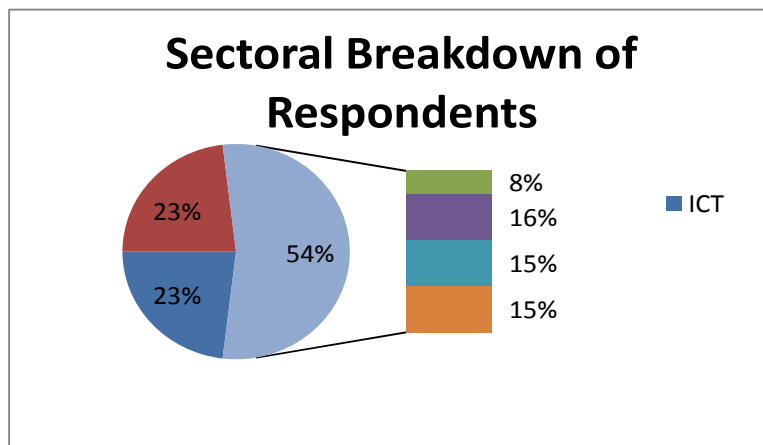
A somewhat similar approach can be identified in Andrews *et al.* (2008). Guided by previous literature the authors interviewed practicing managers to explore questions such as which theories and approaches to organisational change were useful in practice, the difficulties associated with implementing change and how they had coped with them. They then put forward recommendations regarding the study and teaching of organisational change theory so as to increase its practical use.

4. Findings and Analysis

4.1 Introduction

The following section sets out the findings from the in-depth interviews with thirteen small and micro businesses across a range of sectors in Co. Donegal. Based on the findings a number of conclusions and recommendations are outlined and these are dealt with specifically in Section 5. Of the thirteen companies interviewed during the research five could be classified as micro enterprises while the remaining eight could be classified as small enterprises as defined in the Official Journal of the European Union (20.5.2003L 124/36) (see Appendix 6). The business sectors represented by the respondents are outlined in the diagram below.

Figure 1: Sectoral Breakdown of In-depth Survey Respondents



While manufacturing makes up over 50% of the companies surveyed it is important to note that this category features companies engaged in specific manufacturing activities

including food, textiles and engineering. Each of these sectors is representative of traditional manufacturing sectors in Co. Donegal.

4.2 Understanding of Innovation

4.2.1 What do Donegal Enterprises understand by the term Innovation?

It is both interesting and encouraging to note that SaMEs in Donegal have a broad view of innovation. Innovation is not simply associated with NPD or a traditional R&D view of technological product and process (TTP) improvements. In the words of two interviewees:

“...it’s what we do nearly every day of the week here..., ...we take a design from a client company and develop processes...” (so that it can be produced effectively). (Founder / Director of a manufacturing business with 45 employees)

“...its identifying better ways to do things,...how the business can do things better and I’m not just talking about the products, it’s from marketing to PR to product. Innovation in my world is doing things better but it has to be part of the culture...” (MD of IT Business with 18 employees)

As suggested in the literature, respondents view innovation as being important in terms of NPD, processes, management structure, knowledge management, administration, organisational systems and structure and they innovate constantly in terms of commercial/marketing activities. While over 75% of companies were involved in manufacturing or product development it is important to note that all respondents also view service provision as a key part of their offerings. In order to be competitive in today’s challenging business environment all respondents identified a market/customer

focus as being essential for business survival and it is this focus and service provision which allows them to differentiate and be successful:

“... find the market first and then build the product and develop value innovation for your customer...” (Joint Founder and CTO of IT Business with 8 employees)

4.2.2 Are Small and Micro Enterprises in Donegal aware of Innovation Theories and Tools?

While having a broad understanding of innovation, innovation terminology and the use of recognised innovation theories, tools, etc. is clearly something that many companies are not familiar with, as suggested by Nicholas et al. (2011). Only three of the thirteen respondents were aware of specific innovation theories, terminology or tools. Of these, two are currently engaging in post-graduate studies at Masters’ level where innovation modules are a key component while the third is a regular subscriber to the Harvard Business Review and had visited Hershey in the USA where innovation is a major part of business activities. One of these respondents is currently using the Alex Osterwalder Business Model Innovation tool for all business development activities:

“...it drives what we do and what we develop...”. (Joint Founder and CTO of IT firm with 8 employees)

While most respondents are not aware of recognised innovation theories, terminology, and tools it is important to note that the majority of them engage with them every day. According to agency representatives the word ‘innovation’ is, at the level of small and micro enterprise owner/managers, still associated with advanced technology, huge budgets and ‘white coats’ and SaMEs do not fully appreciate that they participate in a wide range of innovative activities every day. In addition to the three respondents who were aware of recognised innovation theories, terminology and tools, another five claimed to understand the general concept or principles behind innovation. Of the five

(38%) who claimed not to know of innovation theories, etc., a review of their activities demonstrated that all were regularly engaged in some form of innovation activity.

4.2.3 Types of Innovation undertaken

All respondents were asked whether they engaged in different types or forms of innovation with the innovation mapping tool of Bessant *et al.* (2005), cited in Rowley *et al.* (2011), used as a basis for the question. According to this mapping tool, process innovation is a combination of production innovation, management/administration/organisational innovation, people and organisational structure innovation. Over 90% of respondents engaged in production or management/organisational innovation with the remaining enterprises planning such innovations pending the successful outcomes of other product innovations recently developed. All companies engaged in product/service innovation (or a hybrid of both) and they identified service provision as allowing them to differentiate and be successful. This was seen as essential by all respondents as it allowed them to establish a relationship with their client base. This customer/market focussed approach (position innovation) provided respondents with the information which supported other innovations in being commercially successful. Each of the enterprises interviewed have undertaken elements of people innovation whether that be through recruitment practices, training or professional development. However, four respondents (31%) did say that such development has been limited in recent years and it is interesting to note that three quarters of these companies have less than five full-time employees. It is very difficult for such companies to justify the time and cost commitment associated with people development.

Only 15% of respondents had not engaged in some form of organisational structure innovation and it is interesting to note that both of these companies again had less than five full-time employees. While it is not possible to say that any of those surveyed were involved in paradigm innovation many of them claimed to have developed 'new to the

world' products. It was beyond the scope of this research study to verify these claims but in six cases, (46%), respondents claimed to have developed products for clients, which (despite extensive research), had not been available to the clients previously. All respondents engage in incremental innovation:

"...innovation is constant development... a smarter and simpler way to do things..."

(Founder and MD of IT Business with 26 employees)

Two respondents initially engaged in radical innovation whereby they introduced products which were significantly and uniquely different to those which existed in the marketplace at the time.

4.2.4 Importance of Innovation

All respondents were asked how important innovation was for their enterprise and also whether they felt innovation was important for other enterprises within the county. As suggested by Bessant et al. (2005): cited by Rowley et al, (2011) and Kelley and Littman (2006), the majority felt that innovation was vital or very important.

Figure 2: Importance of Internal Innovation (survey participants)

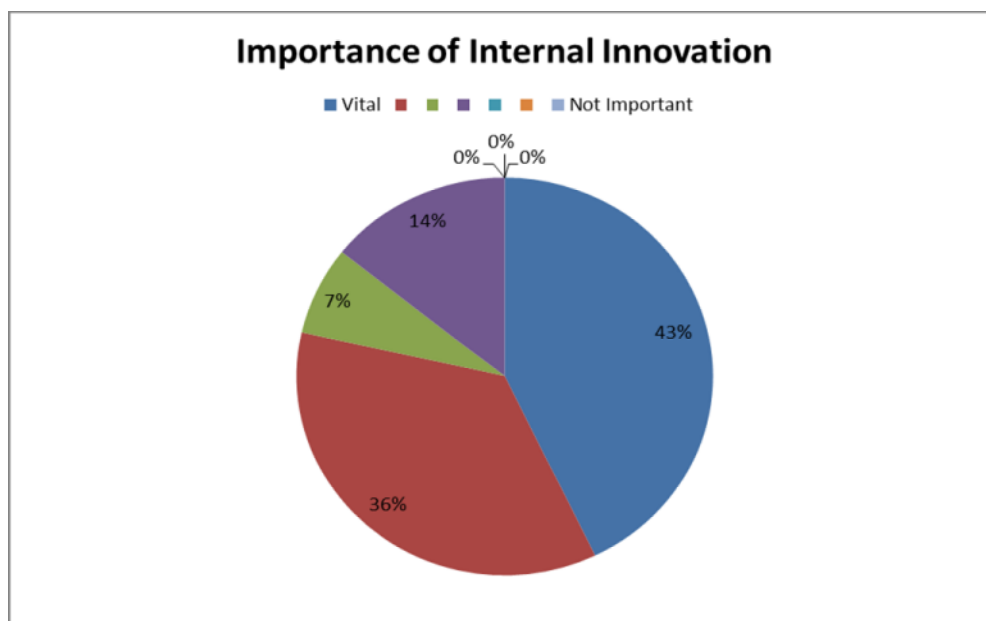
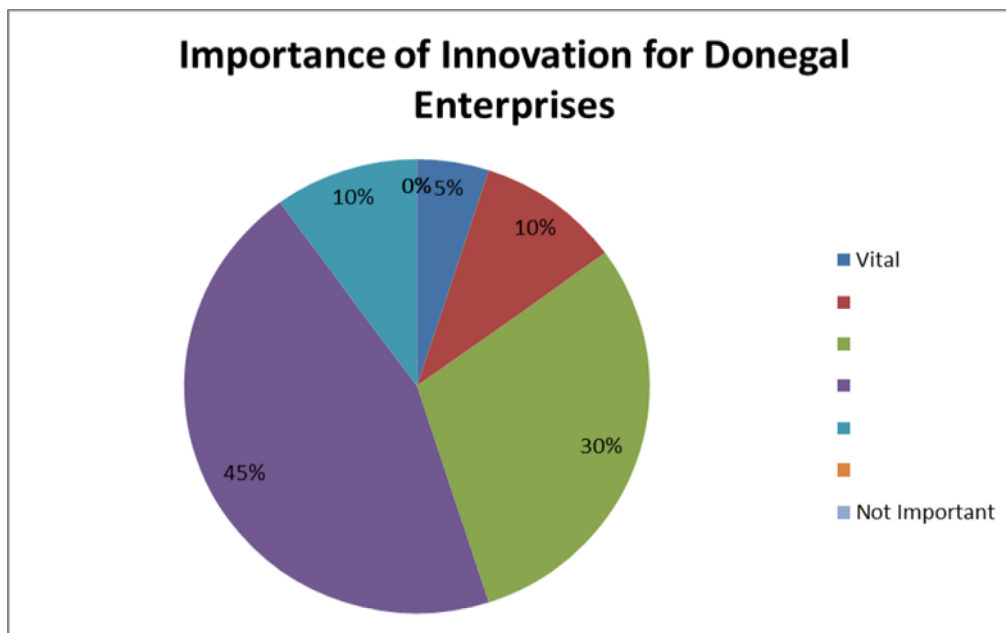


Figure 3: Importance of Innovation for all Donegal Enterprises

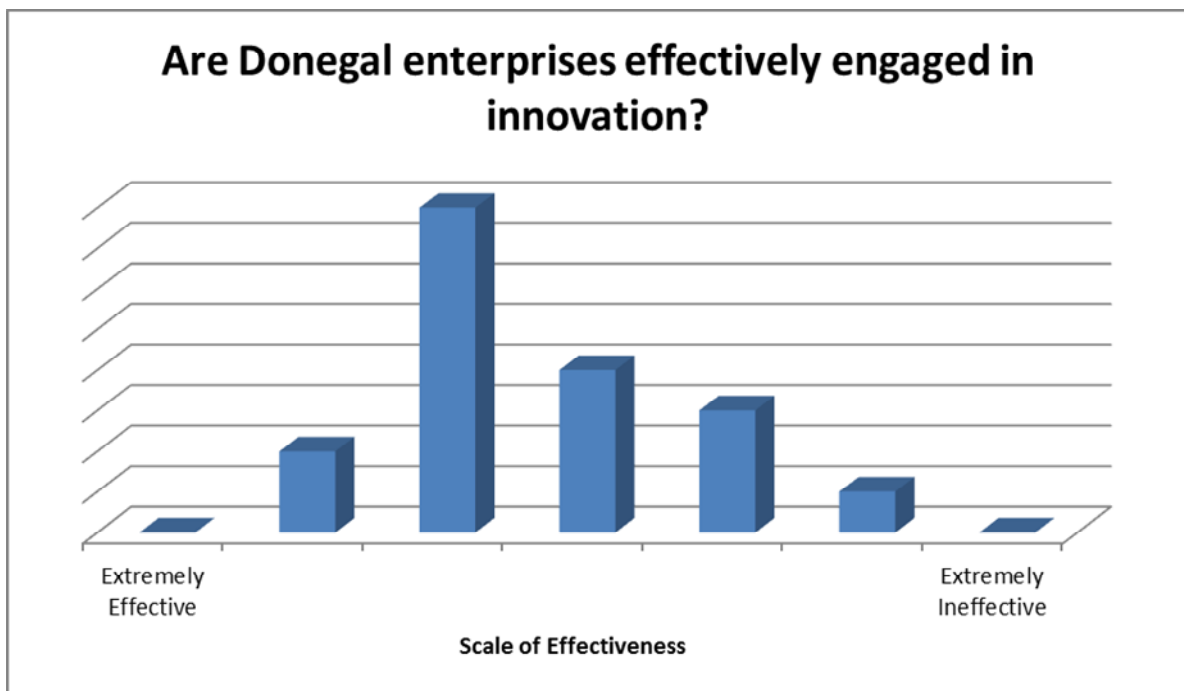


4.3 Practice of Innovation

4.3.1 Innovation activity in Donegal’s Small and Micro Enterprises

While 75% of respondents believe innovation in Donegal is undertaken in an ad hoc manner in that there is no formal or structured innovation management system in place, it can be seen from Figure 4 that the majority of respondents believe that SaMEs are reasonably effective when engaging in innovation while support agency representatives interviewed during this process also concurred with this view. This seems to contradict the literature where Sawhney *et al.* (2006), Kanter (2006), Hargadon and Sutton (2000), etc., all emphasise the need for systems, structures and organisation if innovation is to be effectively and successfully developed and managed.

Figure 4: Are Donegal enterprises effectively engaging in innovation?



Respondents indicated that when potential opportunities arise they are carefully evaluated in terms of the possible benefit to the enterprise. Typically, these evaluations consist of a simple cost-benefit analysis exercise assessing input and process costs against projected income, while a trial sales period will determine whether the project is pursued or not. Other respondents undertake specific R&D or feasibility study projects (often with agency support) which have defined budgets, resources and projected outcomes. In some instances, enterprises engage sub-consciously in a type of Stage-Gate process similar to Cooper (2001) although they have not studied this model.

4.3.2 Collaborative Innovation

As outlined in the literature, regional support systems are essential in supporting innovation in less well developed areas such as the BMW Region of Ireland (2011), which includes Donegal. Therefore it was important to examine the extent to which regional

support networks, clusters, 3rd level partnerships, etc., support and foster innovation in Donegal.

Participants were asked if they were aware of any networks, clusters or any 3rd level or other support organisations which facilitated innovation and whether they engaged with them. Just over 60% of those surveyed indicated that they did not participate in any innovation networks or clusters. While some indicated that time was a barrier to participating in such clusters, others felt that such networks were of limited benefit given their specific area of business. Those in IT and engineering manufacturing in particular felt that networks or clusters did not provide them with any particular benefits:

“...the (IT) community is pretty weak here ... I look to events in Dublin ... there is a need for a forum (of shared experiences and knowledge) ...” (Founder and MD of IT Business with 26 employees)

There was a strong level of awareness of company specific support programmes such as Enterprise Ireland/Údarás na Gaeltachta R&D or feasibility study supports (60%) although this was often as a result of direct promotion by the agencies involved. Many of those surveyed indicated that while such programmes were often very beneficial, there were also many occasions when the structures of available programmes did not always meet their unique requirements.

“...the very process that the state puts you through to give support for a small company is such that that becomes a process in its own right and it sucks in management time to such a degree that we have used it but we don't use it anymore...” (MD of Manufacturing Business with 12 employees)

During the course of the research study at least four individuals indicated that they had specific development opportunities (see Section 5.2.3) but that the supports they required to progress the ideas were not readily available to them.

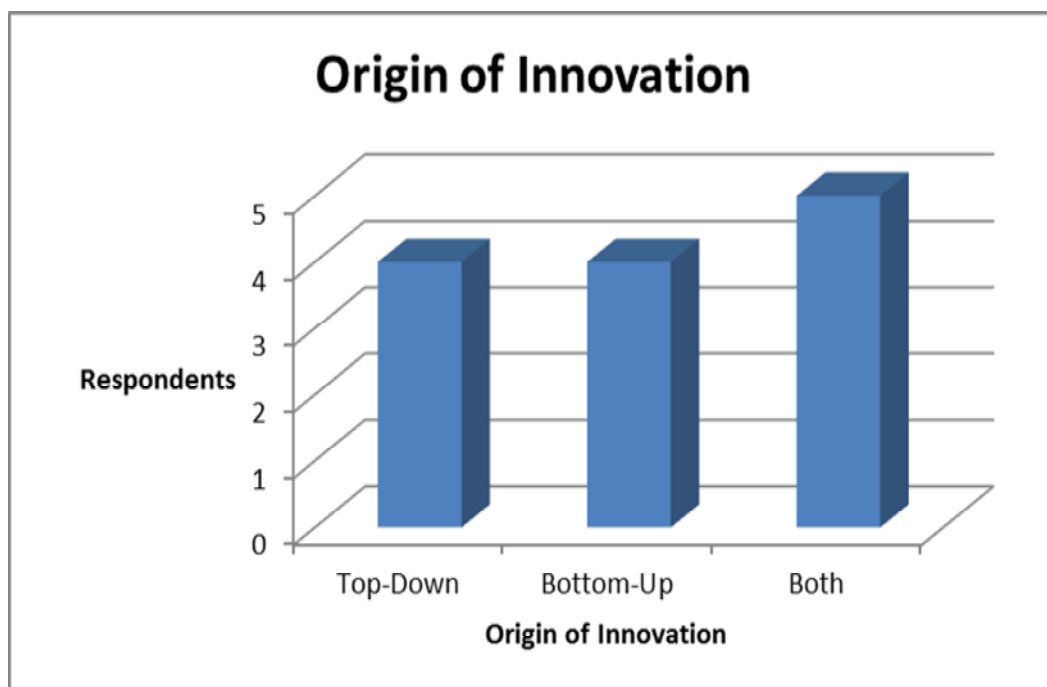
4.3.3 Innovation management in Donegal's Small and Micro Enterprises

100% of respondents agreed that innovation was a role for all employees and that in the case of SaMEs it should not be separated out from other parts of the business. However, four respondents indicated that perhaps innovation activities should be considered and assessed in isolation before being incorporated fully into the business. All but one respondent (92%) agreed that they encouraged employees to bring new ideas forward. Similarly, only one company indicated that they did not provide feedback to employees who came up with innovative ideas although it is important to note that the majority of feedback given by other companies was primarily on an informal basis during one-to-one or staff meetings. The enterprise which did not provide any feedback stated that an idea was simply implemented or dropped.

While four respondents (31%) specifically stated that they did not have a system or pathway whereby employees could bring innovative ideas forward, three of these stated that the small size of the company and the flat organisational structure meant that owner/managers or decision makers were easily accessible to all employees either informally or during regular meetings. Indeed, of the remaining 69% of respondents, the innovation pathway primarily consisted of either informal or regular scheduled meetings. Recognised innovation management systems such as Coopers Stage Gate Process (2001) or the Innovation Radar of Sawhney *et al.* (2006), were not a feature amongst those surveyed. The regular, scheduled meetings typically took place in the small enterprises (> 10 employees) while the informal, one-to-one discussions were common across all respondents. Only one had a more structured system where, in addition to regular meetings, employees could use a suggestion box system to put ideas forward. This same company provided a financial reward to employees for good ideas – one of two to do so. Just over 60% of the remaining respondents simply provided recognition or acknowledgment for individuals who came up with ideas. All respondents facilitated teamwork and were satisfied that staff are both experienced and skilled enough to come up with commercially viable innovations.

In terms of management style, all respondents felt that they adopted a supportive/consultative role although five respondents (almost 40%) specifically indicated that they also adopted an authoritative approach where necessary. This is understandable for many reasons. Micro enterprises in particular feature strong interpersonal relationships due to the small number of employees involved, but for both the small and the micro enterprises interviewed there exists a predominantly flat organisational structure where decisions are arrived at through consultation and consensus. However, where disagreement exists, the founder or owner/manager makes the final decision. When asked whether innovation was a top-down (management-led) or a bottom-up (staff-led) process, there were a range of views as outlined below.

Figure 5: Origin of Innovation



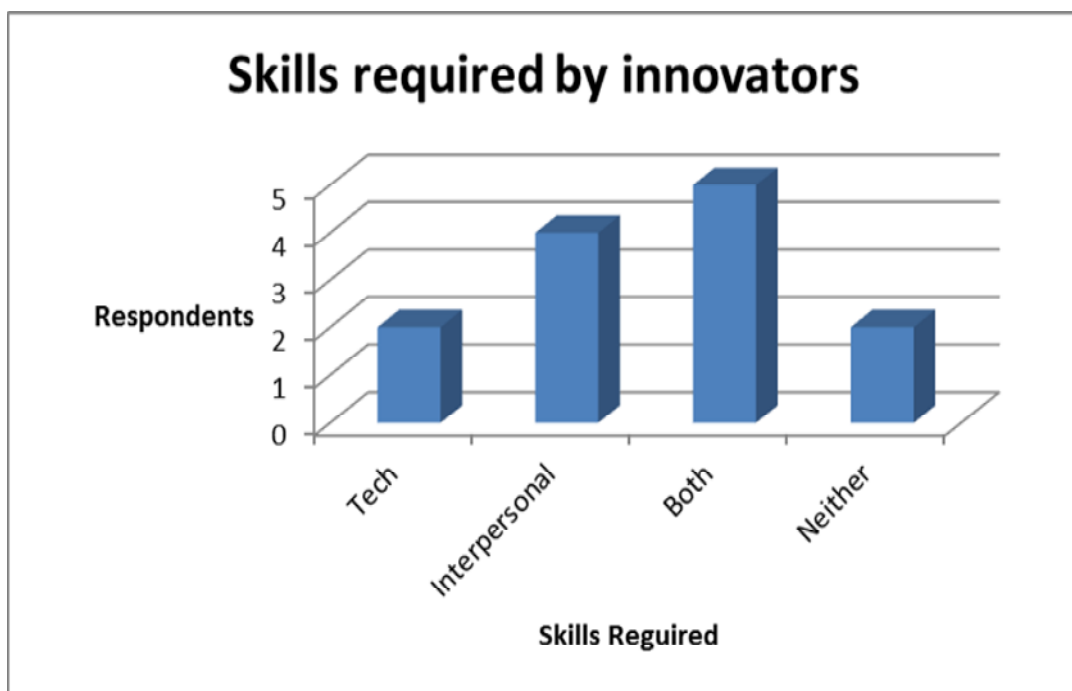
It is important to note that those who indicated that innovation was top-down did not seek to 'impose' innovation upon staff, rather they indicated that it was the role of management to foster, encourage and create a culture of innovation. Over 90% of those interviewed felt that theirs was a learning organisation where employees could discuss and challenge activities being undertaken and gained knowledge from both positive and

negative experiences. The only enterprise which did not claim to be a learning organisation was in the textile manufacturing area where the majority of staff consists of machine operatives. Almost 55% of respondents felt that people could innovate when under pressure:

“...you need to be out of your comfort zone and then you find that your mind works a lot better...” (Founder and MD of Service Business with 14 employees)

The remaining respondents indicated that such pressure points provided knowledge and experience which could be reflected upon by staff and used subsequently to innovate in a range of areas.

Figure 6: Skills required by innovators



In terms of skills required by innovators it can be seen from the chart above that interpersonal and communications skills were viewed as very important by almost 70% of respondents.

4.3.4 Barriers to Innovation

Based on the literature review (Section 2.5.3 and 2.7) it can be seen that there are many potential barriers to innovation. In addition to the obvious issue of time constraints, the research study attempted to identify the top five barriers identified amongst SaMEs in Donegal as outlined below:

Table 1: Barriers to Innovation

Barrier	Ranking
Negative Management Style	1
Financial Risk of Innovation	2
Poor ICT infrastructure	3
Complacency	4
High Costs of Innovating	5

The most significant barrier according to the survey was a negative management style which did not encourage or support innovation. 92% of owner/managers indicated that they encouraged staff to come forward with innovative ideas and all indicated that they adopted a style which was supportive / consultative. However, most respondents also indicated that such an approach was challenging and required significant effort on their part in order to ensure that they did not become complacent and/or ignore business development opportunities. Therefore, it is not surprising that complacency in terms of innovation development was also seen as a significant barrier. All acknowledged that they constantly have to review markets, customers, competitors and internal activities, not only to be innovative, but also to survive. Complacency on any of these areas could easily put the business at risk and where enterprises are restricted in terms of time, finance, and capacity this is always a challenge

The second most significant barrier was the financial risk of innovation. While respondents previously indicated that they conduct cost-benefit analysis on planned activities or that they have specific budgets for R&D or feasibility studies, the uncertainty

of a positive financial outcome can prevent enterprises from undertaking innovations. In addition, the high costs associated with innovation (mainly in terms of finance and time where key people are taken away from other activities), was also seen as a significant barrier. If enterprises had improved innovation management structures such as Coopers Stage-Gate Model (2001), then perhaps the risk associated with such ventures could be better assessed and potential pitfalls avoided (although most of those surveyed successfully innovate without management systems). Poor ICT infrastructure was also seen as a significant barrier.

Interestingly, funding was not considered a significant barrier as many of those surveyed indicated that if a sufficiently strong business opportunity was identified then the money to implement it would be sourced. Alternatively, the potential opportunity would be postponed until such time as the resources could be allocated to it. Finally, fear of collaboration or exposing internal activities to outsiders was considered to be the least significant barrier to innovation. Businesses accept that efforts will be made by competitors and others to take elements of their ideas and use them elsewhere. Indeed, many respondents also engage in this activity themselves.

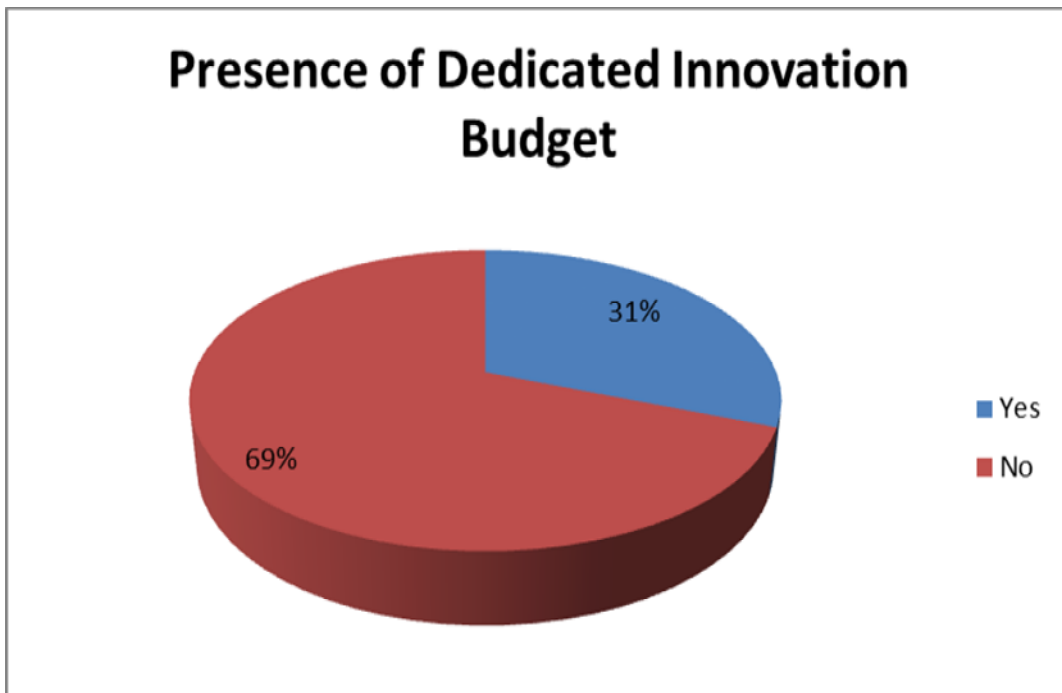
4.3.5 Financing Innovation

While the financial risk associated with innovation was seen as a significant innovation barrier, most of those surveyed indicated that funding innovation was not a major barrier as previously noted in 4.3.4. Also, of those who indicated that they did have an innovation budget, it is important to note that three-quarters based their budget on available government funding for specific R&D or technology development projects. Only one respondent had an innovation budget which was based upon a percentage of the previous year's sales or a similar metric.

As previously noted, some funding programmes did not always meet the requirements of participating enterprises and where this occurred projects were usually postponed until

such time as suitable funding became available. In addition, there were some instances where respondents did not have the capacity to undertake new projects due to time, skills deficit or insufficient infrastructure and again, in such instances, the innovations were postponed.

Figure 7: Presence of Dedicated Innovation Budget in Small and Micro Enterprises



4.4 Measuring Innovation

4.4.1 Measurement of Innovation in Donegal's Small and Micro Enterprises

Unsurprisingly, given the lack of recognised innovation management systems such as Coopers Stage Gate Model (2001), or the 'Innovation Radar' proposed by Sawhney *et al.* (2006), amongst those surveyed, only 31% of respondents said that they specifically measured innovation using objective measures. Half of these used management accounts to gather this information. The significant benefits which accrue from good management

accounting practices is an interesting feature of this study. Regular management accounts provide owner/managers with a very powerful tool whereby they can assess progress within their organisations. 54% of those surveyed can be said to indirectly measure innovation as they regularly use accounting information to assess their products, markets, sales, profits and costs. Such information gives them an indication of the success or otherwise of their product range and how it is meeting annual growth targets. This information supports future planning activities. It is also interesting to note that these enterprises incorporated management accounts as the business grew and developed and as the need for timely and accurate management information became a pressing issue, it may be that innovation and metrics may also grow in importance:

“...that would be stuff that it’s only now I can see the need for...” (MD of Manufacturing Business with 12 employees)

All enterprises use customer satisfaction as a subjective measure but this is hardly surprising due to the importance they attributed to markets and customers.

4.4.2 External Innovation Measurement Tools

As with internal innovation metrics, only 31% of those surveyed indicated that they had participated in an innovation audit undertaken by an independent third party and 75% of these undertook the audit to secure external funding support for specific R&D activities. Some of the programmes within the county which feature innovation audits include:

- ProfitNet (Donegal CEB)
- iFactory Programme run by NORIBIC and WESTBIC (Centre for Competitiveness 2013)
- Some R&D Programmes of Enterprise Ireland

While each of these programmes brings potential benefits for participants, the providers regularly need to approach the companies in order to get them to take part. As outlined previously some of those surveyed indicated that time was a barrier to participating in such activities while others felt that they were of limited benefit and so did not proactively assess the opportunity unless directly contacted by the promoting body.

4.4.3 Potential Use of Innovation Metrics

The final area examined whether SaMEs could effectively use innovation metrics as proposed in the literature review by Chan *et al.* (2008) and Anthony *et al.* (2008). Only 31% specifically measured innovation using objective measures whereas all used the subjective measure of customer feedback. However, 54% of those surveyed can be said to indirectly measure innovation as they regularly use management accounts to assess their products, markets, sales, profits and costs. This information gives them an indication of the success or otherwise of their product range and how the product portfolio is meeting annual growth targets. Respondents felt they were currently able to measure the innovation areas below through the use of management accounts:

Table 2: Innovation Metrics for Small and Micro Enterprises in Donegal

	Area of Measurement	Frequency
1	Customer satisfaction with new product/service	100%
2	The % of innovations meeting their development schedule	61%
3	Amount of R&D spending as a % of sales	61%
4	Number of new products / services launched	54%
5	% of sales/profits/market share from innovations in a given time period	54%

When looking at these measures one can see that, as suggested by Brooks and Simkin (2012), they are relatively easily measured in the case of SaMEs. Customer satisfaction for example can be gauged by telephone, email or direct contact, while those undertaking

funded feasibility study and R&D projects can measure the amount of R&D spending as a % of sales as well as the % of these innovations meeting their development schedule. These are specific activities with a specific budget and time frame. The number of new services/products launched is also easy to measure in the case of SaMEs and as 54% of those surveyed regularly use accounting information to assess their products, markets, sales, etc. it is not surprising to see a similar number indicating that they can currently measure the percentage of sales/profits/market share from innovations over a given time period.

When asked if they could incorporate innovation measurements into their business, 92% or more of those surveyed felt that they could measure the following:

Table 3: Potential activities for Innovation Measurement

	Area of Measurement	Frequency
1	Customer satisfaction with new product / service	100%
2	Range of innovation portfolio elements in the pipeline or developed	92%
3	The % of innovations meeting their development schedule	92%
4	% of sales/profits/market share from innovations (in a given time period)	92%
5	Potential of entire new products/service portfolio to meet growth targets	92%
6	Amount of financial resources dedicated to all types of innovation	92%

Again, items 1 to 3 above can be relatively easily measured, while a good management accounting system would facilitate measurement of most of the other areas. Finally, those elements which were least used to measure innovation and which are unlikely to be used by respondents in the future include:

- Number of IP measures undertaken
- Outbound innovation activities (sales of patents, licences, etc.)
- Number and level of external innovation collaborators

Given the lack of participation of those surveyed in innovation networks and clusters as well as the focus on company specific R&D and feasibility study projects, this outcome is hardly surprising.

4.4.4 Summary of Findings and Analysis

In Section 5.1, detailed conclusions are drawn out in respect of each of the original research questions set out in this dissertation. However, in summary, it can be seen that the main points to emerge from this research activity are as follows:

- Despite the research and literature on innovation theories, procedures, etc. very few SaMEs are aware of them. However, practically all SaMEs engage in innovation and possess a broad understanding of the concept
- As suggested by Sawhney *et al.* (2006), Kelley and Littman (2006), Baregheh *et al.* (2012) and others, innovation is very important to SaMEs in Donegal. It is essential for their survival and they engage in a wide range of innovations across products, processes, people, marketing, etc.
- While Cooper (2001), Kanter (2006), etc., call for systems, structures and organisation, only one respondent had an innovation management system. While the lack of such systems is often due to lack of resources, conversely, the small size and flexible nature of SaMEs also means that innovative proposals with merit can be assessed and acted upon quickly. Although 75% of respondents felt that SaMEs managed innovation in an ad hoc fashion, they (and agency respondents) felt that SaMEs managed it effectively. Therefore, perhaps SaMEs do not require innovation management systems in order to innovate successfully?
- Many owner/manager/directors of SaMEs interviewed are positively disposed to innovation and facilitate it where possible and they feel that they have good staff who can be innovative as opportunities arise
- Despite the importance attributed by McAdam *et al.* (2007) and others to regional innovation systems, most enterprises do not engage with the current innovation

networks, clusters or support structures which exist within the county as they do not feel that they are suitable to their needs

- The main innovation barriers identified amongst SaMEs in Donegal are lack of time and management support for innovation, the financial risk associated with innovations, poor ICT infrastructure, complacency regarding innovation amongst SaMEs and high costs of innovation including prototyping costs, IP, etc.
- The literature points to the importance of innovation metrics and although they can see the merit in measuring innovation activities, less than a third of respondents do so and some only measure innovation because management accounts provide them with the information to facilitate this
- A major point to emerge from the study was the usefulness of management accounts to SaMEs and the high level and quality of information which they provide

5. Conclusions and Recommendations

5.1 Conclusions

5.1.1 Introduction

The research question posed at the outset of this study was *“Innovation in Small and Micro Enterprises in Donegal, Nice Idea or Commercial Reality?”* The research demonstrates that it is indeed a commercial reality and that innovation for these enterprises is a fact of daily business activity and is essential if they are to survive in an extremely challenging and competitive business environment.

“...it drives what we do and what we develop...”.

In the main, innovation is not a well-defined or managed process within these enterprises although some do use business innovation management tools. All respondents engage in some type of innovation activity. A market / customer focus was highlighted as being very important to all those surveyed, and it is interesting to note that all enterprises constantly seek innovations in terms of their commercial and marketing activities. Each of the research questions set out at the beginning of the dissertation are outlined below and conclusions are drawn in respect of each of these questions based on the research undertaken.

5.1.2 What do Small and Micro Enterprises in Donegal understand by the term ‘Innovation’?

Despite extensive research and literature on innovation, few of the respondents were able to provide a comprehensive definition of innovation. While approximately half had a

narrow definition of innovation focussing on specific areas such as NPD, process improvement, etc., the other 50% had a more complete or holistic view of innovation. Importantly, however, those who indicated a more narrow understanding of innovation were actually engaged in a wide range of innovative practices and actions. It is reasonable to conclude therefore that while innovation is widely practiced, a simple, universal understanding of the term is not widespread.

5.1.3 Are Small and Micro Enterprises in Donegal aware of accepted Innovation Management Theories / Processes / Procedures and do they suit the needs of Small and Micro Enterprises?

As outlined in 5.1.2 above, a simple, universal understanding of the term innovation and its associated theories, tools, etc. is not widespread amongst Donegal enterprises despite extensive literature on the subject. Less than a quarter of respondents understand such theories and tools. There is a need, therefore, for researchers, development and support agencies and indeed some practitioners to use less 'technical' language when discussing innovation. Such a change in approach could possibly encourage more SaMEs to adopt innovative practices and systems, thereby significantly enhancing their business activities.

5.1.4 What types of Innovation do Small and Micro Enterprises in Donegal engage in?

The Forfás (2011) reports that small businesses engage primarily in process innovation, although enterprises in this study engage in a wide range of innovation types including product, people, management, process, etc. and this is supported by the BMW report (2011) which researched innovation in SaMEs. Most of this activity is incremental and consists of measures which are 'new to the firm' although some companies have engaged in radical (15%) and 'new to the world' (77%) innovation. This is not surprising as most of those surveyed operate in very competitive business sectors and while product, process and management innovation are common, commercial/marketing innovation is vital for

many enterprises in Donegal. SaMEs are flexible in terms of their ability to adapt to new market conditions and to undertake innovative actions as a result.

5.1.5 Do Small and Micro Enterprises in Donegal view Innovation as important to their activities?

In common with the literature, almost 80% of companies surveyed indicated that innovation was a vital or extremely important part of business activities, a point with which development agency representatives agreed. Despite the importance attached to innovation, however, it did not result in any obvious structured innovation management strategy on the part of those interviewed.

5.1.6 To what extent do Small and Micro Enterprises in Donegal involve themselves in Innovation?

Both company and support agency representatives were of the opinion that SaMEs were quite effective at engaging in innovative actions. However, more than 75% were strongly of the view that the approach to innovation was more ad hoc rather than planned or structured and that enterprises innovated as opportunities arose rather than as a result of a specific innovation strategy or management system. In the case of SaMEs this may not be a negative thing. As mentioned by one respondent:

“...we need to be more ad hoc because our market is disrupted so frequently you have to be able to pivot quite quickly...”

In the context of SaMEs, this contradicts much of the research of Sawhney et al. (2006), Kanter (2006), Kumar (2009), etc. who call for systems or systematic structures. The benefits or otherwise of such systems or structures for SaMEs might be an area which

could be considered in future studies although McAdam *et al.* (2004) do call for flatter, more organic innovation models in SaMEs.

5.1.7 What are the barriers to Innovation in Donegal's Small and Micro Enterprises?

There are very many potential barriers to innovation in Donegal as outlined in Section 2.5.3, with the main barriers to innovation-enabling activities centred on management and resource issues including a lack of time and a lack of financial resources to devote to innovation. While many potential barriers were considered, the other key barriers according to respondents suggested that a negative managerial approach and complacency in terms of innovation were also significant issues. The uncertainty of positive financial outcomes from innovation activities was also significant while poor ICT infrastructure was also perceived to be a barrier to innovation. However, where a sufficiently strong business opportunity arose and the associated risk could be well managed - the funding to implement the opportunity would be sourced. Finally, fear of collaboration or exposing internal activities to outsiders was considered to be the least significant barrier.

While not directly highlighted as a barrier to innovation, all agencies and bodies engaged in business development activities should consider the structure of their support services. According to the survey, enterprises, generally speaking, do not fully utilise the networks, clusters, etc., that currently exist even though these support mechanisms could support their development. As currently structured, many such supports do not meet the needs of SaMEs. They need to be holistic and enterprise-centric as programmed approaches are not always suitable. Support organisations need to address this issue.

5.1.8 Are Small and Micro Enterprises in Donegal in a position to effectively manage Innovation?

Despite the worst recession in living memory all of these businesses have survived and indeed many of them have grown in recent years. This cannot happen without these businesses being creative or innovative in everything that they do and yet only one respondent explicitly uses a business innovation management tool. In the case of SaMEs the question then arises as to what actually constitutes effective innovation? Undoubtedly, these enterprises innovate to great effect and avail of opportunities which match and benefit their own unique circumstances at any given time, even though, contrary to the literature, they do not possess innovation management systems. The benefits or otherwise of such systems or structures for SaMEs might be an area which could be considered in future studies.

5.1.9 Are recognised Innovation Metrics / Measurement tools suitable for the measurement of innovation in Donegal's Small and Micro Enterprises?

Despite the importance of innovation metrics according to Forfás (2011), Brooks and Simkin (2012), etc., few (31%) respondents claimed to specifically measure innovation within their enterprises although many of those surveyed measure innovation indirectly. It is clear from the survey that regular management accounts provide owner/managers with a very powerful tool whereby they can objectively measure progress. All respondents use customer satisfaction as a subjective measure but this is hardly surprising given the importance they attach to a customer/market-led approach to their activities.

5.1.10 Can levels of Innovation in Small and Micro Enterprises be accurately measured?

There is a lack of measurement of innovation in micro enterprises at a national and European level (Oslo Manual 2005) and therefore it is difficult to accurately measure the level of innovation in SaMEs. Furthermore the absence of innovation management systems at company level usually means that objective analysis and measurement are difficult to undertake. The research demonstrates that those SaMEs which produce regular management accounts are best placed to measure their success across business inputs, processes, outputs and outcomes.

5.1.11 Have Small and Micro Enterprises in Donegal undertaken an Innovation audit?

Just over a third of the enterprises surveyed have undertaken innovation audits but this was primarily to secure programme funding. Having reviewed a number of tools used for innovation audits it can be seen that the majority of them do not fully consider the nature and characteristics of micro enterprises.

5.1.12 Summary and areas for Further Study

This research study has provided a number of interesting insights as outlined below:

- Practically all SaMEs engage in some form of innovation and possess a broad understanding of the 'concept' of innovation thereby confirming the importance of innovation as outlined by Bessant et al. (2005) and Kelley and Littman (2006) cited by Rowley *et al.* (2011). However, despite the vast range of innovation theories, terminology and tools which exist, very few SaMEs are aware of them and one must question whether there is merit in the development of such theories, etc., if they cannot be practically implemented as suggested by Nicholas *et al.*, (2011)

- While some studies such as Forfás (2011) would seem to indicate that enterprises mainly engage in process innovation this research indicates that SaMEs in Donegal engage in a wide range of innovations across products, processes, people, marketing, etc.,
- The literature suggests that innovation management requires systems and management structures. However, innovation in Donegal's SaMEs is, in the majority of instances, not a managed or a systematic process and this is primarily due to lack of resources in terms of time, capacity, skills and finance. Nevertheless, they are successful in implementing innovative actions as their small size and flexible nature means that innovative proposals can be discussed and those with potential can be acted upon quickly
- Despite the importance attributed to regional structures in supporting innovation, many enterprises do not engage with current innovation networks or clusters which exist within the county as they do not feel that they are suitable to their needs. Support providers need to provide tailored, customer-centric supports to select enterprises.
- The main innovation barriers identified amongst SaMEs in Donegal are lack of time, lack of management support for innovation, the financial risk associated with innovations, poor ICT infrastructure, complacency amongst SaMEs and high costs of innovation including time, finance, prototyping costs, IP, etc.
- Although they can see the merit in measuring innovation activities, less than a third of respondents do so and some of these only measure innovation because management accounts provide them with the information to facilitate this. This finding ties in with the existing literature (Forfás (2011), Anthony *et al.* (2008), Ambler *et al.* (2001, p.7.) cited by Brooks and Simkin (2012)).
- A major point to emerge from the study was the usefulness of management accounts to SaMEs and the high level and quality of information which they provide

As a result of this research a number of areas for further potential study emerge. The first is whether flatter, more organic innovation models are better suited to SaMEs as

opposed to more widely recognised innovation management systems, models and structures. Another is whether support organisations and policy makers can present innovation to SaMEs in a non-theoretical way which is easy to understand and practical to implement. This would demonstrate clear growth benefits, thereby improving the implementation of innovation within these organisations with a resulting growth in revenue, jobs and profits. Similarly, can current support structures, networks, clusters, etc., be effectively tailored so that they are responsive to the real needs of SaMEs? What are the benefits of a long-term support strategy as opposed to current programme-based supports? The merits of good management accounting systems are evident from this research study and it may be possible to undertake a detailed study into the exact benefits of effective management accounting systems and the benefits which accrue as a result. Finally, as little research exists in relation to innovation in micro enterprises further studies should be undertaken in this area.

5.2 Recommendations

Based on the research undertaken, the author has identified some possible areas below where improvements can be made in terms of innovation within SaMEs in Donegal and further afield.

5.2.1 Development Agencies need to Innovate in terms of their Services

All agencies and bodies engaged in business development activities should consider the way in which their support services are structured. The survey indicates that enterprises, generally speaking, do not fully utilise the networks, clusters, etc., that currently exist within the county even though they could support their development. As programmed approaches are not always suitable, supports need to be holistic and enterprise-centric.

While supports as currently constituted (e.g. Innovation Vouchers, Profitnet, etc., etc.) do, undoubtedly, fulfil an important role, agencies need to consider tailoring supports around specific enterprise needs. Developing programme and support concepts and expecting companies to come forward and avail of them achieves limited results. The `one size fits all` approach does not work in many instances while cut-off dates for some such support programmes are not helpful. National programmes and structures which work in large urban areas, with a concentration of third level institutions, multi-nationals and many more enablers of innovation present, will not automatically succeed in more rural sub-regions. Development organisations should consider more direct engagement with enterprises in order to assess specific needs and opportunities which may result in the delivery of tailored supports best suited to that company thereby increasing employment and wealth opportunities for the wider community.

As a result of state policy many successful and innovative businesses (e.g. retail businesses) do not qualify for state support. The research indicates, however, that via a number of progressive and flexible agency approaches, projects with good potential, irrespective of their business sector, can be supported, and more should be done in this regard.

5.2.2 Simplify Innovation

As noted in Section 4, many enterprises still regard innovation as a complicated activity associated with high-level technology research and development. As suggested by Nicholas *et al.* (2011), innovation needs to be presented by researchers and support organisations in a way and using language which clearly demonstrates the practical benefits for those enterprises engaging in innovation.

5.2.3 Innovation Brokering Facility

Companies with growth potential should be pro-actively identified and a range of measures developed to support their innovation and market capacity. The development of an innovation and business brokering facility, facilitated by the support bodies operating within the county, should be investigated. During the research process the author identified four different business ideas which respondents wanted to develop but could not do so at present for various reasons. One promoter had an idea which did not form part of core business activity and he was seeking to licence the idea out. Another promoter was faced with a similar product situation with the potential to generate significant revenue and jobs and while they were willing to invest in the idea they did not have sufficient funds to invest in this non-core activity. Two other promoters came up with an idea for sectors in which they did not have the required expertise and they were seeking business partners to develop the ideas. Given the number of small and micro enterprises in Donegal (CSO 2013) it is reasonable to expect that there are many similar opportunities which exist.

The brokerage facility could start very simply with development executives in six key support bodies contacting up to ten of their most progressive client companies at two given times during the year in order to identify possible innovation opportunities. The executives would then come together to discuss opportunities arising. With the agreement of the companies, they could use their knowledge and networks to identify innovative ways in which the opportunities could be developed (e.g. licencing, joint ventures or tailored financial and capacity building packages). If successful, this system could develop into an 'Innovation Angel' facility, similar to the business angel concept, where the development executives direct possible opportunities through an agreed intermediary. This activity could be funded through a 'finder's fee' for projects with a successful outcome.

This process, however, needs animation and initially it requires goodwill and willingness on the part of the development organisations to both co-operate and proactively identify

innovation or business opportunities within existing enterprises. If done successfully, this will provide the agencies with investment opportunities and hopefully create additional wealth and employment opportunities within the county.

5.2.4 Delivery of Innovation Programmes to Small and Micro Enterprises

As outlined in Section 4, two owner/managers who studied innovation as part of their respective Masters programmes were introducing significant changes within their businesses and were experiencing positive outcomes as a result. A third owner/manager who regularly read the Harvard Business Review had also incorporated innovation management activities into his business with positive results.

If a suitable structure could be identified, it may be possible for organisations such as LYIT to take specific innovation modules and offer them independently, over the course of a semester, to businesses throughout the county and beyond. This could generate income for the providers while also equipping participating enterprises with specific new skills to grow and improve their businesses. This would require a more direct, targeted approach from training providers as they would need to directly communicate with prospective participants as to the programme benefits. The delivery of modules independently from current post-graduate programmes could act as a selling point for full programmes. The result for SaMEs would be an improved approach to innovation and innovation-enabling activities which would increase growth prospects.

5.2.5 Incorporation of Monthly Management Accounts

From the research, the benefits which accrue to those organisations which have implemented monthly management accounting systems is clear. Very few organisations surveyed incorporated specific innovation metrics but those who utilised management accounting systems had access to invaluable information about their business and they

were clearly able to identify information in relation to specific products, markets, sales figures, etc. This, in turn, provided metrics in relation to NPD, process innovations, commercial/market innovations, etc.

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Appendix 1: Research Sources:

- Investigate the understanding of innovation in small and micro enterprises in Donegal
- Outline the practice of innovation in these small and micro enterprises
- Identify how innovation is measured and how it can be effectively measured within small and micro enterprises.

Research Questions:

Practice:

	Lit	Q	DI	Comment
Are micro enterprises in Donegal effectively involved in innovation?				
What is the level of innovation in micro enterprises in Donegal?				
What are the barriers to innovation in Donegal micro enterprises?				
Do micro enterprises in Donegal demonstrate any 'innovative' innovation practices (entrepreneurial innovation)?				

Understanding:

	Lit	Q	DI	Comment
What do micro enterprises in Donegal understand by the term 'innovation'?				
Are micro enterprises in Donegal aware of accepted innovation management theories / processes / procedures?				
Do micro enterprises in Donegal view innovation as an important part of their activities?				

Measurement:

	Lit	Q	DI	Comment
Do accepted innovation management theories / processes / procedures 'fit' the needs and characteristics of Donegal's micro enterprises?				
Are current innovation audit tools suitable for the measurement of innovation in Donegal's micro enterprises?				
Can levels of innovation in micro enterprises be accurately measured?				

Key

Lit = Literature Review

Q = Questionnaire

DI = Depth Interview

Appendix 2: Revised Research Sources:

- Investigate the understanding of innovation in small and micro enterprises in Donegal
- Outline the practice of innovation in these small and micro enterprises
- Identify how innovation is measured and how it can be effectively measured within small and micro enterprises.

Research Questions:

Understanding:

	Lit	Q	DI	Comment
What do micro enterprises in Donegal understand by the term 'innovation'?				
Are micro enterprises in Donegal aware of accepted innovation management theories / processes / procedures and do they suit the needs of micro enterprises?				
What forms of innovation do micro companies in Donegal engage in?				
Do micro enterprises in Donegal view innovation as an important part of their activities?				

Practice:

	Lit	Q	DI	Comment
To what extent do micro enterprises in Donegal involve themselves in innovation?				
What are the barriers to innovation in Donegal micro enterprises?				
Are micro enterprises in Donegal in a position to effectively manage innovation in terms of resources, capabilities, structures, etc.				

Measurement:

	Lit	Q	DI	Comment
Are recognised innovation metrics / measurement tools suitable for the measurement of innovation in Donegal's micro enterprises?				
Can levels of innovation in micro enterprises be accurately measured?				
Have micro enterprises in Donegal undertaken an innovation audit?				

Key

Lit = Literature Review

Q = Questionnaire

DI = Depth Interview

Appendix 3: In-depth Interview Baseline Sheet

Innovation in Small and Micro Enterprises in Donegal, Nice Idea or Commercial Reality?

Interviews / Depth Surveys

Date:					
Company:					
Interviewee:					
Position:					
Address:					
Size (employees):					
Year Established:					
Structure (flat / hierarchy)					
Family members?					
Business Sector					
Significant recent change?					
Importance placed on education / training?					
Education Level					
Turnover:	€0 – 500K	€500K– 1MI	€1MI – 3MI.	€3MI - €5MI	€5MI +

Understanding of Innovation:

Q1. What do you understand by the term ‘innovation’ (**Discussion on what Innovation is – leading to Q2**)?

What do you think of when I say innovation?

Q2. Are you aware of different innovation types, innovation management theories / processes / procedures / practices and their ‘fit’ with the needs and characteristics of micro enterprises in Donegal (e.g. Coopers Stage Gate Model of Innovation, Open Innovation, Innovation Metrics, etc.): (**Awareness – Yes / No – if yes, view on suitability**)

Q3. Have you engaged in the following forms / types of innovation (**Leading from Q1 above**)? (Francis and Bessant)

	Comment
• Product/Service/Hybrid Innovation	
• Process Innovation	
Production Innovation	
Mgt. / Admin / Organisational Innovation	
People Innovation	
Organisational Structure Innovation	
• Position Innovation	
Commercial / Marketing Innovation	
• Paradigm Innovation	
• “New to the firm / world” products	
• Incremental / Radical Innovation	
• Other	

Q4. Is innovation an important part of business activities (**your business and in Donegal generally**)?

1 (vital intern)	2	3	4	5	6	7 (not imp)
(vital extern)						(not imp)

Practice of Innovation:

Q5. In your opinion, are micro enterprises effectively engaging in innovation and what is their approach?

1 (very innovative)	2	3	4	5	6	7 (not at all innovative)
Ad hoc	Well defined	Incremental	Radical / breakthrough	As industry leader	As a fast follower	As a Laggard

Q6. Are there networks / alliances / 3rd level partnerships / collaborations / sectoral clusters / Communities of Practice / in Donegal which support and foster innovation and do you engage with them?

Q7. In relation to management of innovation (have you adequate structures, capabilities and resources)?:

	Comment
Do you encourage employees to bring forward new ideas?	
Do you provide feedback and reward employees for innovative ideas?	
Do employees have a pathway / system by which they can bring innovations forward?	
Are employees experienced / skilled enough to be able to come up with innovations?	
Do you enable teamwork?	
Is your organisation a learning organisation?	
Is your management style as autocratic / authoritarian or supportive / consultative?	
Can people innovate when 'under pressure'?	
Should innovation be separated out from other parts of the business?	
Do innovators need strong technical or strong interpersonal skills?	
Is innovation a 'top-down' or 'bottom-up' process?	
Should innovation be the role of an innovation department / person or of all employees?	
Have you ever used crowdsourcing?	

Q8. Do the following act as barriers to innovation in Donegal micro enterprises?

Potential Barrier (1 to 5 with 1 being a major barrier)	Comment
Finance (internal, external/grant, within partnerships/clusters)	
Suitable management structure/style	
Lack of innovation partnerships / clusters / linkages	
Poor ICT infrastructure	
High costs (patents, prototyping, reward systems, etc.)	
Dominance of competitors / established enterprises	
Fear of losing internal advantages to 'outsiders'	
Complacency / no need due to prior innovations / no innovation demand	
Lack of qualified personnel	
Lack of information on technology	
Lack of information on markets / market opportunities	
Uncertain demand for innovative goods/services (financial risk of innovation)	

Q8a. Have you ever made the following innovation mistakes????

	Comment Yes / No / N/A
Prematurely rejected opportunities that seemed, at first glance, too small?	
Assumed that only new products count – and ignored other forms of innovation such as new services or processes?	
Assumed innovation was to do with nurturing solitary genius and good fortune rather than organisation, attitude and actively 'managing' innovation?	
'Strangled' innovation with overly tight planning, control and budgets?	
Failed to maintain a 'portfolio' of innovations (from small to large across all aspects of the business)?	
Undertook innovations without firstly having the proper / accurate information?	
Undertook innovations without having a market-driven or customer focus and launched too many (confusing) product extensions?	
Lost opportunities for innovation development through lack of a systemic innovation management process?	
Rewarded managers for only doing their job – and discouraged them from making changes where possible?	
Isolated innovation (created an innovation silo) and left it to a small number of individuals separating it from other aspects of the enterprise?	
Allowed innovators to drift away from teams too quickly?	
Assumed that innovation teams should be led by technical people?	
Used only objective measures to measure innovation and failed to include subjective measures?	
Failed to use IT effectively or Over-relied on IT?	

Q9. Do you have an innovation budget and how is it allocated?

Budget Allocation Method	Comment
Based on previous years innovation spending (and success of same)	
As a % of previous year's sales	
Relative to competitors innovation spending	
Based on available government / other external funding programmes	
Ad hoc	
Other (please note)	

Measurement of Innovation:

Q10. Do you measure innovation in your business? Do you use metrics for inputs, outputs, processes, all of these stages or none of these stages?

Q11. Have you participated in any business development programmes or activities where you were required to undertake an innovation audit? (If yes, get details on the organisation conducting the audit, the audit tool and whether they found that the audit tool used to be relevant and suitable to their organisation?)

Q12. Do you / could you use the following innovation metrics / measurements in your organisation?

Dev. Stage	Metric / Measurement	Comment on understanding and potential use (U / NU and App N/App)
Input related	Amount of financial resources dedicated to all types of innovation	
Input related	Level of human resources (at all levels) dedicated to innovation	
Input related	Number of Intellectual Property measures undertaken	
Input related	Amount of R&D spending as % of sales	
Input related	Number of new innovations sourced externally (patents, licences, mergers, etc.)	
Input related	Number and level of external innovation collaborators	
Input / Process	Range of innovation portfolio elements in the pipeline or developed	
Process related	The % of innovations meeting their development schedule	
Process related	Distinct systems for different types of innovation opportunities	
Process related	Reduction of business costs per employee	
Output related	Number of new products / services launched	
Output related	% of sales / profits / market share from innovations (in a given time period)	
Output related	Return on investment / NPV of entire innovation portfolio	
Output related	Customer satisfaction with new product / service	
Output related	Ability of innovations to secure funding (grant, VC, other)	
Output related	Outbound innovation activities (sales of patents, licences, open source, etc.)	
Output related	Potential of entire new products / service portfolio to meet growth targets	

Appendix 4: Confidentiality Agreement

CONFIDENTIALITY AGREEMENT

The results of this research study may be published. However, all information gathered during this research process will be treated in the strictest confidence. All information will be aggregated and no comments, feedback, etc. will be attributed to any individuals or organisations unless specifically requested by the contributor. Accordingly, I, Ultan Faherty, agree as follows:

- 1. That I will not disclose any confidential information pertaining to the companies participating in the research study on *Innovation in Small and Micro Enterprises in Donegal, Nice Idea or Commercial Reality?***

- 2. That I will strictly preserve the confidentiality of any information coming to my knowledge relating to the affairs of the companies participating in the research study entitled *Innovation in Small and Micro Enterprises in Donegal, Nice Idea or Commercial Reality?***

Signature: _____

Date: _____

Appendix 5: Consent Form

A chara,

My name is Ultan Faherty and I am currently participating in an MSc in Marketing Practice at Letterkenny Institute of Technology. As part of this master’s programme I am required to complete a dissertation. The title of my dissertation is ***Innovation in Small and Micro Enterprises in Donegal, Nice Idea or Commercial Reality?*** My supervisor is Dr. Simon Stephens.

The theme for this dissertation was based on my own practical experience of working with small/micro enterprises over many years and the way in which many business development models, developed around large firms, apparently do not take account of the needs and characteristics of small and micro enterprises. In recent times I have focussed on innovation in small/micro enterprises and was able to identify how many innovation theories and models based their research on large multinational organisations with apparently little consideration for how innovation developed, is managed and measured in small/micro enterprises. The three overall objectives of this research study are as follows:

- Investigate innovation practice(s) in small and micro enterprises in Donegal
- Identify what small and micro enterprises in Donegal understand by the term ‘innovation’
- Identify how innovation can be effectively measured within small and micro enterprises.

Data will be collected using interviews / depth surveys.

The results of this study may be published. However, all information gathered during this research process will be treated in the strictest confidence. All information will be aggregated and no comments, feedback, etc. will be attributed to any individuals or organisations unless specifically requested by the contributor.

Thank you for your willingness to participate in this research.

I <u>consent</u> to participating in this research <input type="checkbox"/>		I <u>do not consent</u> to participating in this research <input type="checkbox"/>
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Interviewee signature: _____

Yours sincerely,

Ultan Faherty

Appendix 6: Profile of Companies Interviewed

Company	Employees	Turnover	Classification	Location	Interviewee
1	28	€1 Mil – €3 Mil	Small	SW Donegal	Managing Director
2	3	€0 – €0.5 Mil	Micro	SW Donegal	Owner / Manager
3	2 + 2	€0 – €0.5 Mil	Micro	SW Donegal	Owner / Manager
4	9	€0 – €0.5 Mil	Micro	East Donegal	Owner / Manager
5	5 + 3	€0.5 Mil - €1 Mil	Micro	East Donegal	Founder / CTO
6	18	€1 Mil – €3 Mil	Small	East Donegal	Managing Director
7	26	€1 Mil – €3 Mil	Small	East Donegal	Founder / MD
8	45	€5+ Mil	Small	NW Donegal	Founder / MD
9	4 + 1	€0 – €0.5 Mil	Micro	NW Donegal	Owner / Manager
10	32	€1 Mil – €3 Mil	Small	East Donegal	Owner / Manager
11	14	€0.5 Mil - €1 Mil	Small	NW Donegal	Founder / MD
12	22	€1 Mil – €3 Mil	Small	SW Donegal	Founder / MD
13	12	€3 Mil – €5 Mil.	Small	East Donegal	Managing Director

Appendix 7: Cover Letter

29th May 2013

A chara,

My name is Ultan Faherty and I am currently participating in an MSc in Marketing Practice at Letterkenny Institute of Technology and as part of this master's programme I am required to complete a dissertation. The title of my dissertation is ***Innovation in Small and Micro Enterprises in Donegal, Nice Idea or Commercial Reality?*** And my supervisor is Dr. Simon Stephens.

The three overall objectives of this research study are as follows:

- Investigate innovation practice(s) in small and micro enterprises in Donegal
- Identify what small and micro enterprises in Donegal understand by the term 'innovation'
- Identify how innovation can be effectively measured within small and micro enterprises.

Primary data will be collected using interviews / depth surveys and I would be most grateful if you would consent to participating in this research study. The research would take the form of an interview with both structured and unstructured questions.

The results of this study may be published. However, all information gathered during this research process will be treated in the strictest confidence. All information will be aggregated and no comments, feedback, etc. will be attributed to any individuals or organisations unless specifically requested by the contributor.

I sincerely hope that you would be willing to participate in this research phase. I will call you in a few days to confirm your availability. However, you can contact me in the meantime at 074 9186070 or at ultan.faherty@lyit.ie

Yours sincerely,

Ultan Faherty