Evaluating Business Networks:
The Case of Ireland

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Evaluating Business Networks: The Case of Ireland
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Abstract
Business networks are used by firms as a tool for organising interdependent business activities, where such networks are defined as a cooperative arrangement between independent business organisations that can vary from informal to formal exchanges of resources and information. Although the benefits and costs associated with business network membership have been highlighted in the literature, there is a distinct lack of discussion regarding appropriate evaluation frameworks to estimate the impact of business network membership on firm performance. This thesis addresses this specific issue through the development of an ex-post evaluation framework to estimate the impact of business network membership on firm performance. This research therefore makes a key methodological contribution through the development of an evaluation framework, while it also fills a gap in the international business network and evaluation literatures.

The Irish case is used as a laboratory where data is gathered from a telephone survey of 169 firms in formal business networks and 100 non-formal business network firms (a control group profiled on the business network respondents). The responses provided by the business network firms show that business network membership benefited the participants firms in a number of ways. Almost three-quarters of the business network firms attributed some part of their overall business success to network membership. In considering the potential ‘dark-side’ of business network membership, business network firms highlighted the lack of commitment by other members to the network and the possibility of entering non-reciprocal relationships as the main costs associated with membership.

Deeper analysis incorporates a control group of non-business network firms. This inclusion facilitates comparisons between the firm, managing director, and performance profiles of business network and non-business network firms. In isolation, without controlling for any other influential factors (e.g. if the firm is an exporter or innovator), business network firms appear to outperform their non-business network counterparts. A natural question which emanates from these results however, is whether it is business network membership itself that is positively influencing the performance of the business network firms or does it in fact relate to the characteristics of the business network firms themselves? Additionally, these findings implore the question of whether there is a selection effect also at play here. To control for firm and management specific characteristics, and selection effects, a Heckman two-step model was employed. When these factors were controlled for, no significant influence of being a member of a business network was evident on firm performance. This result indicates that it is not business network membership which influences firm performance but rather that firm performance is related to firm characteristics and selection effects. More specifically, faster growing firms tend to become members of these formal business networks.

The ex-post evaluation framework developed in this thesis not only makes a novel contribution vis-à-vis the academic literature of business networks and policy evaluation but also provides important insights to policymakers charged with evaluating the impact of their business network policy interventions. Although the model developed here is ‘tested’ in the Irish context, there are transferrable lessons that can be made regardless of country context.
Declaration of Originality

No portion of the work referred to in this thesis has been submitted in support of an application for another degree or qualification of this or any other university or institute of learning.

I declare that the thesis represents the results of my own work. Following normal academic conventions, I have made due acknowledgments of the work of others. The work has been completed within the specified word limit with 61,997 words, excluding references and appendices.

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Signed: __________________________

Julia Nicola Lynch
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<td>All-Island Software Network</td>
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<td>BLUE</td>
<td>Best Linear Unbiased Estimator</td>
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<td>CIP</td>
<td>Competitiveness and Innovation Framework Program</td>
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<td>CSET</td>
<td>Centres for Science, Engineering, and Technology</td>
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<td>CSO</td>
<td>Central Statistics Office</td>
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<td>DoETE</td>
<td>Department of Enterprise, Trade, and Employment</td>
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<td>DTI</td>
<td>Danish Technology Institute</td>
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<td>EEC</td>
<td>European Economic Community</td>
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<td>EI</td>
<td>Enterprise Ireland</td>
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<td>EIN</td>
<td>Enterprise Innovation Network</td>
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<td>ENF</td>
<td>Enterprise Network Fund</td>
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<td>ESRI</td>
<td>The Economic and Social Research Institute</td>
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<td>ESG</td>
<td>Enterprise Strategy Group</td>
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<td>EU</td>
<td>European Union</td>
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<td>FP7</td>
<td>The Seventh Framework Program</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>GGD</td>
<td>Gross Government Deficit</td>
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<td>GVA</td>
<td>Gross Value Added</td>
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<td>ICT</td>
<td>Information, Communication, and Technology</td>
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<td>IDA</td>
<td>Industrial Development Agency</td>
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<td>IRE</td>
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<td>ITT</td>
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<td>IMR</td>
<td>Inverse Mills Ratio</td>
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<td>KM</td>
<td>Kilometre</td>
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<td>LM</td>
<td>Lagrange Multiplier</td>
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<tr>
<td>MD</td>
<td>Managing Director</td>
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<td>MNC</td>
<td>Multinational Corporation</td>
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<td>NLP</td>
<td>National Linkage Program</td>
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<td>NESC</td>
<td>National Economic and Social Council</td>
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<td>NoD</td>
<td>Network of Direction</td>
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<td>NoMD</td>
<td>Network of Mutual Dependence</td>
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<td>OECD</td>
<td>Organisation for Economic Cooperation and Development</td>
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<tr>
<td>Acronym</td>
<td>Description</td>
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<td>OLS</td>
<td>Ordinary Least Squares</td>
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<td>PNP</td>
<td>Pilot Network Program</td>
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<td>QEC</td>
<td>Quarterly Economic Commentary</td>
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<td>RBV</td>
<td>Resource Based View</td>
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<td>R&amp;D</td>
<td>Research and Development</td>
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<tr>
<td>RSA</td>
<td>Regional Selective Assistance</td>
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<td>SFI</td>
<td>Science Foundation Ireland</td>
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<td>SFIE</td>
<td>Selective Finance for Investment England</td>
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<td>SME</td>
<td>Small to Medium-Sized Enterprise</td>
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<td>SNS</td>
<td>Supply Network Shannon</td>
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<td>STIAC</td>
<td>Science, Technology, and Innovation Advisory Council</td>
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<td>UNCTAD</td>
<td>United Nations Conference on Trade and Development</td>
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<td>VIF</td>
<td>Variance Inflation Factor</td>
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Chapter 1: Introduction
1.1 Introduction

Business networks are a tool that have been used by policymakers to promote growth at both micro and macro levels (Organisation for Economic Cooperation and Development (OECD) 2000; InterTradeIreland 2005). Although the benefits and costs associated with business network membership are acknowledged in the business network literature (Fuller-Love and Thomas 2004; Witt 2004), there is a distinct lack of appropriate evaluation frameworks to estimate the impact of business network initiatives on firm performance. The latter is true of both ex-ante and ex-post perspectives (Huggins 2001). The core focus of this thesis therefore, is to address this issue through the development of an ex-post evaluation framework which is used to estimate the impact of membership to formal business networks on firm performance.

The theoretical foundations of business network theory lie in the theory of the firm, where Marshall (1895) for example, recognised the advantages of interfirm cooperation, and Coase (1937) acknowledged that no single firm possesses every input it needs to undertake its activities. The term ‘network’ has various different meanings which is attributed to the interdisciplinary nature of the topic (Pickernell, Rowe, Christie, and Brooksbank 2007). The focus of this thesis however, is on business networks, which are defined as cooperative arrangements between independent business organisations that collaborate with one another on various issues, on an informal or formal basis (Besser, Miller, and Perkins 2006).

The purpose of this chapter is to outline the justification for this study, while also highlighting the key research objectives and contributions. The chapter is structured as follows: Section 1.2 outlines the rationale for this study. Section 1.3 specifies the research objectives and research questions addressed in the thesis, while the overall contributions of the thesis are outlined in Section 1.4. Finally, Section 1.5 provides details regarding the structure of the remaining chapters in the thesis.
1.2 Rationale for the Study

A considerable amount of research has been dedicated to exploring the various strands of business network literature. These strands include the definition of the term business network (Besser et al 2006), the various forms and structures of business networks that exist (Jones Hesterley, and Borgatti 1997), and the benefits and costs associated with business network membership (Baird, Lyles, and Orris 1993; Human and Provan 2000). Business networks are often characterised as independent actors coming together to collaborate and coordinate collective activities to achieve improved firm performance (Besser et al 2006). In conjunction with a lack of agreement in defining what a ‘business network’ is, confusion is also apparent in distinguishing between the numerous typologies that business network structures can take (OECD 2000). An accepted reason for the lack of a standard definition of a business network and for the existence of an array of business network structures is the interdisciplinary nature of network theory, which can for example be found in economic theory, sociology, and in the sciences (for example computer science and biology) (Tichy, Tushman, and Fombrun 1979; Pickernell et al 2007).

Policymakers have promoted the use of business networks as a tool to help growth at both micro and macro levels. For example, policymakers in Italy, Denmark, the US, and Ireland, have all used business networks as a means to help firms achieve improved firm performance (Rosenfeld 1996; National Economic and Social Council (NESC) 1996; and InterTradeIreland (ITT) 2005). Ireland’s most recent business network initiative introduced in 2010 for example, the Irish Software Innovation Network (ISIN) promoted by the national development agency Enterprise Ireland (EI), is aimed at developing the business network member firms’ research and development activities. From a macro perspective, business networks formed in the Emilia Romagna region of Northern Italy helped the region to grow from being one of Italy’s poorest regions in 1970 to being the second wealthiest in 1985 (Forfás 2004).

Evaluation plays an important role in policymaking circles because it provides accountability of where and how public funds are allocated, while it can also be used to evaluate the progress of initiatives and propose changes for future policy interventions. The various meanings of the term business network and the array of
typologies of business network structures that exist has led to the literature surrounding the evaluation of business networks to being somewhat unorganised and complex. This has subsequently resulted in a lacuna of literature centred on evaluations which estimate the impact of business network initiatives on firm performance (Huggins 2000). This lack of evaluation of the impact of business network initiatives highlights the need to develop evaluation frameworks aimed at evaluating such initiatives.

Given the above background, this thesis develops an evaluation framework to estimate the impact of business networks on firm performance, an ex-post evaluation framework. The framework developed is applied to firms who are members of formal business networks in Ireland, while a control group of non-business network firms (sampled on the business network firms) is also incorporated into the study. The rationale for including the control group of firms (who are not members of formal business networks) is to enable the behaviour and performance of firms who are members of formal business networks to be compared to those who are not members of formal business networks. Only then can we see the true impact of business network membership on firm growth. Business networks in Ireland are used as a laboratory to validate the framework developed, although the over-riding belief is that the evaluation framework developed here can be employed in varying contexts and thus has widespread applicability.

1.3 Research Objectives

The principal research question for this study can be specified as follows: Does business network membership impact on firm performance?

The key research objectives can be defined as follows:

(i) The development of an appropriate ex-post evaluation framework to estimate the impact of business network initiatives on firm performance;
(ii) The identification of issues relating to whether or not membership of a business network leads to, or determines, improved firm performance, and;

(iii) The proposal of ways in which public policy could enhance business network activity in the Irish case.

1.4 Contribution of the Study

In addressing the research question and key research objectives specified, this research makes original and timely contributions to an area that is much under-researched from both academic and policymaking perspectives. These key contributions are as follows:

Given the distinct lack of evaluation of business network initiatives, the current research makes a methodological contribution in terms of developing an ex-post evaluation framework. To the author’s knowledge, the framework developed is original in its application to evaluating the impact of business network membership on firm performance. The framework developed is academically robust, while also providing an evaluation tool with a policy relevant application. Secondly, this research fills a gap in the international business network and evaluation literatures. Thirdly, from an Irish perspective there is a distinct lack of research on business networks and their evaluation.

The fourth contribution of this research is to policy formation, implementation, and evaluation of business networks. The current study has the potential to inform policy in two key ways: Firstly, the results of the ex-post evaluation yield important policy recommendations in the implementation and evaluation of business networks in Ireland. Secondly, the results of this research should stimulate general debate on business networks and more specifically on policy evaluation.

The fifth contribution of this research is from a firm level perspective. More specifically, the results of the fieldwork provide evidence for firms (both current
business network and potential business network members) of the possible benefits and costs associated with being a member of a formal business network. Such empirical evidence would be of keen interest to any firm who is trying to improve its performance.

1.5 The Structure of the Thesis

The remainder of the thesis is structured as follows. Chapter 2 details the theoretical foundations of business network theory whose origins lie in the theory of the firm. The chapter traces the historical origins of the theory of the firm and highlights the various economic theories that have emanated from it. More specifically, the streams of the theory of the firm which have grown to incorporate network theory are discussed in Section 2.2. These streams include for example the transaction costs approach to the theory of the firm (Coase 1937, Richardson 1972; Williamson 1985), and the more recent resource-based view of the firm (Penrose 1959; Peteraf 1993). Although the transaction costs approach and the resource-based view of the firm address their own particular issues, they have converged to acknowledge that firms do collaborate (albeit for varying reasons), and thus these approaches are examined in terms of how they have grown to incorporate business network theory. As alluded to earlier a number of definitions of what a business network means exist, therefore, Section 2.3 clarifies the distinction between the terms network and networking, while also providing a definition as to what exactly the term business network means.

Chapter 3 concerns itself with addressing the various typologies of network structures that exist (Section 3.2). Business network structures vary in their levels of formality and in terms of their governance structures. The chapter therefore outlines the distinctions in the levels of formality of business network structures, that is, the key characteristics of formal and informal business network structures (OECD 2000; Breschi and Lissoni 2001), whilst also distinguishing between hard and soft business network structures (Ffowcs-Williams 2000; Sherer 2003). Chapter 3 also explores the governance structures of business networks, that is, networks of direction versus networks of mutual dependence. A critical review of business network structures based on these classifications of levels of formality and governance structures are thus
presented in Section 3.4. Distinction is also made between the terms *business network* and *cluster*, given that at times these terms have been used interchangeably by some researchers in the business network literature in Section 3.5 (NESC 1995; ITT 2005). Additionally, the motivations for firms to become a member of a business network are examined in Section 3.6, as are the possible costs associated with business network membership (Section 3.7).

Chapter 4 outlines the origins and development of business network policy from international and Irish perspectives. The chapter therefore traces the origins of such policy from the Emilia Romagna region of Northern Italy, Denmark, and other international cases, and highlights the key differences between the various initiatives promoted (Section 4.2). From an Irish perspective, business networks have also been promoted by policymakers. Irish business network initiatives have varied from top-down to more recent bottom-up approaches and Section 4.3 highlights the key milestones in Irish business network policy. In a similar vein, Section 4.4 specifies the current importance of business network promotion for Irish policymakers.

Chapter 5 explores the issues of policy evaluation. This entails *inter-alia*, a discussion of the reasons for, and potential barriers to, evaluation. Evaluation not only helps set targets for specific initiatives, but also tends to ensure accountability of public funds (Batterbury 2006). Aside from examining the general issue of policy evaluation and why it is warranted (Sections 5.2 and 5.3), the core focus of Chapter 5 is to critically analyse previous evaluations of business network initiatives (outlined in Section 5.4). Empirical studies of business network evaluations are examined in Section 5.5, while Section 5.6 outlines an ex-ante logic model evaluation framework developed by Lynch, Lenihan, and Hart (2009) to evaluate one of Ireland’s recent business network initiatives.

Chapter 6 is based on the development by the author of a database of business networks in Ireland. The discussion in this regard outlines the types and number of business networks that are in operation in Ireland, whilst also specifying the number of firms that occupy these networks. Formal business networks were chosen to be included in this study because membership to these networks is likely to provide more tangible outcomes given that they tend to be more goal focussed when compared to
informal business networks for example (Ffowcs-Williams 2000). Furthermore, two of Ireland’s most recently promoted business networks have been formal networks, hence highlighting their current importance in Irish network policy. The sampling methodology as well as the data collection process is outlined in Section 6.2. Univariate and bivariate analyses provide an indication of the types of firms that participate in these business networks, while their motivations for becoming a member of a business network, as well as their perceived benefits and costs of participation are also recorded in Sections 6.4, 6.5, and 6.6 respectively. Section 6.7 highlights the overall levels of additionality from business network membership, as perceived by the business network firms, while Section 6.8 addresses the timing of these effects. Section 6.9 provides further insights to the business networks in operation in Ireland by distinguishing between the different types of business networks, that is R&D, trade, and marketing business networks, and their associated benefits and costs. Section 6.10 introduces a control group of non-business network firms (i.e. those firms who are not members of formal business networks sampled on the business network firms). This control group of firms are included so as to facilitate comparisons between the firm, managing director, and performance profiles of business network and non-business network firms. Storey (2000) devised a six-steps approach to evaluation, where Steps one to three of Storey’s approach, involved recording the ‘recipients’ views of the initiative in question. In the case of this research, the ‘recipients’ are the firms who are members of formal business networks. Storey (2000) classed these initial steps as ‘monitoring’ of an initiative, and represents the least sophisticated steps of his six-steps approach to evaluation. According to Storey’s approach therefore, recording the business network firms’ views on how membership to a business network has impacted on their firm performance is classed as ‘monitoring’ the impact of business network membership. It is only with the inclusion of a control group that the ‘evaluation’ phase of estimating the impact of business networks on firm performance begins (i.e. Storey’s Step 4 in his evaluation process).

The results presented in Chapter 6 highlight that business network firms outperform their non-business network counterparts, however, these results are taken without controlling for firm-level or managing director characteristics or possible selection effects, which may influence firm performance. Thus, in order to obtain a true
estimate of the impact of business networks on firm performance, there is a need to develop an econometric model to control for such effects. Chapter 7 responds to this challenge by employing a sophisticated econometric technique, the Heckman two-step model, to control for any firm-level, managing director, or selection effects which may impact on firm performance, and thus isolates the impact of business network membership on firm performance. Chapter 7 directly addresses the lack of appropriate evaluation frameworks employed to evaluate the impact of business networks on firm performance and reaches the most sophisticated step taking account of selection bias in Storey’s (2000) six-steps to heaven approach to evaluation.

Finally, Chapter 8 concludes the thesis with a summary of the main findings, whilst highlighting the policy implications (Section 8.2). The chapter outlines the key contributions of the thesis (Section 8.3). Furthermore, the limitations of the study and the opportunities for future research are discussed in Sections 8.4 and 8.5 respectively.

1.6 Conclusion

In conclusion, through an extensive review of the business network and the evaluation of business network literatures, it is apparent that there is a dearth of evaluation relating to business network initiatives. The principal aim of this thesis therefore is to address this lacuna by developing an ex-post evaluation framework which estimates the impact business network initiatives have on their members firms’ performance. Even though the framework is applied in an Irish context, it is also internationally transferrable to the evaluation of different business networking policy initiatives in varying countries and contexts. Through the development of this evaluation framework and subsequent analysis of the results from the estimated econometric models, the identification of issues relating to whether or not business network membership leads to or determines improved firm performance are recognised. The thesis not only has academic merit in terms of its contribution to the business networking and policy evaluation literatures, but also potentially provides important policy insights.
Chapter 2: Foundations of Business Network Theory
2.1 Introduction

The purpose of this chapter is to trace the origins of business network theory and to clarify what exactly is meant by the term business network. The theory of the firm has developed throughout the years, and as such, it consists of a number of economic theories which describe the nature of the firm, that is, the firm’s existence, its behaviour, and its relationship with the market (Coase 1937; Richardson 1972; Penrose 1959; and Williamson 1975). These economic theories include for example the nexus of contracts, formal principal agent theory, incomplete contracts (coordination, asset specificity and property rights), and the knowledge based view of the firm (Foss 2000 p.xxx). Most importantly, from the perspective of this thesis, these economic theories that have emanated from the theory of the firm, have grown to incorporate business network theory. Section 2.2 therefore traces the history of the theory of the firm, which highlights the origins of business network theory.

Considerable attention has been given to the analysis of business networks and business network activity in recent years, where business networks have been described as cooperative relationships between firms, individuals, institutions, or agencies, which vary from formal to informal exchanges of information and resources (Huggins 2000; OECD 2000; Rosenfeld 2001; Kingsley and Malecki 2004). Despite its widespread use, there is no agreement as to the appropriate definition of a business network. Section 2.3 explores such definitions and also makes a clear distinction between the terms network and networking.

The core focus of this chapter is to outline the theoretical foundations of this thesis, while also clarifying what exactly is meant by the term business network.

2.2 The Theory of the Firm

The purpose of this section as previously stated is to trace the origins of business network theory. The theory of the firm has developed throughout the years owing much of this development to the different theories who view the firm from varying perspectives. One common element among these theories is that each highlights the
need for a firm to collaborate with others. This section therefore traces the history of the theory of the firm from, (i) the transaction cost approach, and (ii) the resource based view of the firm. The reason for focusing on these two approaches to the theory of the firm is because both have grown to incorporate business network theory.

For the purpose of this thesis, discussion of the theory of the firm begins with Alfred Marshall (1895) who explored technical progress, knowledge, and decision-taking as important themes of the firm, paying considerable attention to the form of organisation and the role of the entrepreneur (Casson 1996). Marshall also paid considerable attention to the competitive structure and size of the firm. Marshall’s analysis (1895) recognised the advantages of firm cooperation through the selling of complementary products, which includes firms cooperating in a vertical rather than a horizontal relationship. According to Foss (2000), however, when reviewing the history of the theory of the firm, it is Ronald Coase (1937) who made a significant contribution to the analysis of the theory of the firm, and so Coase’s approach (1937) to the theory of the firm is outlined first. The reason for beginning this analysis with the works of Marshall and Coase is due to the fact that both views highlight the motivations for and benefits that accrue to firms that engage in interfirm cooperation. These views in conjunction with the resource based view of the firm are used later in the research when constructing the questionnaire for the fieldwork part of the study (see Section 6.2.2).

(i) **The Transaction Cost Approach**

Coase (1937) in his classic paper, *The Nature of the Firm*, sought to present a definition of the firm that was both realistic and tractable to the fundamental economic principle developed by Marshall of “substitution at the margin”, which takes into consideration constraints faced by firms (Coase 1937 pp.386-387). Coase (1937) argued that the firm is one way of organising production, an alternative to the price mechanism. According to Coase (1937 p.390), “the main reason why it is profitable to establish a firm would seem to be that there is a cost of using the price mechanism”\(^1\). Coase (1937) claimed that a firm is a system of relationships that

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\(^1\) Coase himself identified several of these ‘transaction costs’, including the costs of discovering prices; and searching, negotiating and concluding contracts. Attempts, however, to identify the costs of using
comes about where the resources are dependent on the entrepreneur. The core question being asked is whether or not it makes economic sense to get involved in another transaction. In other words, the absence of firms should be due to the existence of production coordinated by a complete set of perfect markets. The reason why firms exist is because markets fail to reduce costs in organising transactions, that is, there is an incentive to evade imperfect markets. These incentives are mainly to save on the costs of transactions.

Coase (1937) advocated that as a firm grows so too does the cost of arranging extra transactions within the firm, which means that a point is reached whereby it may be more costly to organise transactions within the firm, thus these are organised in the market (Pitelis and Pseiridis 1999). Vertical and horizontal integration are therefore engaged in because it is deemed more efficient by the entrepreneur (Pitelis and Pseiridis 1999). Accordingly, vertical integration will take place when it is less costly to arrange transactions within the firm that had been arranged through the market before. Horizontal integration will then take place when it is seen that the benefits to organising production are mutual, that is, it is best to engage in horizontal integration in order to decrease the transaction costs of the firm. Pitelis and Pseiridis (1999 p.223), in reference to the work of Coase (1937), highlighted that the size of the firm and its boundaries then depends on the “relative costs of internal governance versus market allocation”. In effect, firms benefit through coordinating activities to reduce their costs of transactions.

Richardson (1972) who also added to the theory of the firm explained that production can be broken down into different stages or activities. Certain activities are complementary and can therefore be linked together in production (Foss 2000). Richardson (1972) recognised the need for firms to coordinate complementary activities and that this “co-ordination is achieved through co-operation when two or more independent organisations agree to match their related plans in advance” (Richardson 1972 p.890). Richardson (1972) highlighted that the key reason for the existence of networks of cooperation between firms is because there is a need to

the market have led to a number of developments, such as agency theory (Alchian & Demsetz 1972), transaction cost economics (Williamson 1975, 1985), and incomplete contracts theory (Hart 1995), property rights and measurement costs (Brazel 1989, Cheung 1983).
coordinate complementary, yet different, activities. Foss (2000) in reviewing the work of Richardson (1972) suggested that it is capabilities rather than transaction costs which are the determinants of the boundaries of the firm.

In reviewing the theory of the firm, Jensen and Meckling (1976) explored the importance of contractual relations and agency costs to the essence of the firm. Consequently, they proposed that contractual relations exist with employees, customers, and suppliers (amongst others), while these contractual relations give rise to the problem of agency costs (Yee-kwong and Wong 1999). This agency relationship as highlighted by Jensen and Meckling (1976) involves the principal who engages with the agent, to perform a service on their behalf, that is, one person appoints another to carry out a task for them. The cost (agency cost) incurred arises if both the principal and the agent wish to maximise their own utility. In certain cases the agent may not act in the best interests of the principal (Yee-kwong and Wong 1999). The threat, therefore, to this cooperative exchange is due to different incentives from the parties concerned. Thus, according to Jensen and Meckling (1976), a firm is the nexus of contract relationships between individuals.

Alchian and Demsetz (1972) adopted more of a behavioural approach to the theory of the firm and identified the firm as a specific form of organising cooperative productive activity, referred to as team production. The essential feature of team production, is that it involves cooperation between the team members who together produce a joint output. The contribution to joint output, however, made by each team member is not completely transparent. There may for example be an unbalanced distribution of information among the members of the team. This asymmetric information prevents members of the team from knowing the exact contribution that each member has made. This then may create shirking by members of the team. Alchian and Demsetz (1972) proposed that this information asymmetry creates an incentive by the members of a team to appoint a monitor. A reduction in shirking will lead to greater rewards for all team members (Yee-kwong and Wong 1999). Accordingly therefore, Alchian and Demsetz (1972) see the firm as a ‘policing’ device to be used when joint team production is present. The concept of team production introduced here highlights the need for team members to work together but also emphasises the potential problems encountered when they do work together.
Coase’s focus on the firm as an alternative to the market forms the basis for the transaction cost analysis presented by Williamson (1975). In a sequence of significant contributions, Williamson (1971; 1975; and 1985) has built a comprehensive theory that while based on Coasian foundations also incorporates ideas from psychology and contract law (Foss 2000). The behavioural starting point in Williamson’s theorising is Herbert Simon’s (1982) concept of bounded rationality. The concept of bounded rationality suggests that the rationality of individuals is restricted by the information they possess. Whilst, it is also restricted by the ability of individuals to process the information they receive in a rational manner (Foss 2000). Secondly, Williamson (1975) referred to the concept of opportunism, where opportunism is defined as individuals behaving to benefit their own self-interest. This behaviour results from the lack of complete or correct information at an individual’s disposal. Thirdly, Williamson (1975) also referred to the concept of asset-specificity, where assets (human and physical) that are used in a transaction are specifically for that task, and as such, cannot be used in other activities. In effect, asset specificity refers to the extent parties are engaged in a transaction.

Williamson (1975) stipulated that the conditions for contracts are therefore represented by governance structures, which involves the basic idea of allocating transaction properties (Foss 2000). Initially the main governance structures Williamson (1975) concentrated on were markets and hierarchies, however, Williamson changed this focus to include intermediate structures such as joint ventures and franchising for example, referred to as hybrids by Williamson (1991).

It is therefore Williamson’s concern with transaction costs that shapes his approach to the firm. The firm exists as the result of a number of organisational arrangements that have come about because of, and impact on, reducing the transaction costs in the firm. Transaction cost theory according to Williamson (1975; 1985) posits that firms while trying to minimise their transaction costs will try to find the most efficient governance structure according to the varying nature of connections between firms by which to arrange an activity. The presence of bounded rationality, opportunism, and asset specificity, calls for a governance structure such as the firm according to Williamson (1975, 1985). According to Pitelis and Pseiridis (1999) a firm allows for a smaller number of transactions, decreased bounded rationality, opportunism, and the effects of
asset specificity such as haggling. The result is a reduction in transaction costs incurred. Williamson (1985) asserts that vertical integration is warranted and is the most efficient way of dealing with repeated transaction costs (such as uncertainty and asset specificity).

Each of these approaches to the theory of the firm thus far have recognised that the firm does not exist in isolation. The firm engages in interfirm collaboration to achieve results it would be unable to achieve on its own. Discussion now turns to the most recent development in the theory of the firm, the resource based view of the firm, which, although views the firm from an alternative perspective, it also recognises the need for firms to collaborate with others.

(ii) The Resource Based View Approach

The resource-based view (RBV) of the firm has become popular in explaining why firms vary in their economic performance (Poppo and Weigelt 2000). By managing resources better, managers can achieve a lower cost position and/or they can produce a more distinctive product than their competitors. This allows them to achieve superior economic performance according to Poppo and Weigelt (2000) who examined the resource based view of the firm using the case of baseball free agents. The RBV owes its origins to the classical works of Selznick (1957) and Penrose (1959). This theory has come to the fore over the last number of years again, as it had been eclipsed by theories based on neoclassical economics and other strategic theories until the last decade² (Poppo and Weigelt 2000). Loasby (1999) highlighted that the key concept of Penrose’s theory is based on a combination of the work of Smith (1776)³ and Marshall (1895). More specifically, the division of labour within and between firms will lead to the development of the firm’s skills and the creation of

² For example Michael Porter’s (1985) five forces strategic model received considerable attention. The forces identified by Porter outlined the competitive intensity and attractiveness of a market. Porter (1985) in outlining his model highlighted that interrelationships between competing firms in related industries positively impacts on competitive advantage and that it is these relationships with others firms that helps a firm to create value, thus “the underpinnings of corporate strategy” (Porter 1985 p.3).
³ Specialisation through division of labour increases productivity according to Adam Smith. It suggests that allowing people to specialise in activities in which they have a comparative advantage increases the wealth of the society as a whole.
opportunities for the firm, while it also allows other firms to be proficient in other skills, hence the apparent advantages of cooperating with other firms.

According to Wernerfelt (1984), Penrose (1959) identified the firm as a set of productive resources organised under an administrative framework, where resources can be defined as inputs into the firm’s production process (products or services). The reason for collaboration between firms according to this approach is to combine sets of complementary, but different resources and capabilities, in a manner which will generate greater returns than will either a market transaction or complete internalisation (Loasby 1994; Madhok and Tallman 1998). The RBV is therefore concerned with firms’ creation, exploitation, and pursuit of resources and capabilities with sustainable rent-yielding potential. These resources and capabilities form the basis for a firm to achieve a competitive advantage⁴ (Peteraf 1993). Sustainable rents are derived from tacit, organisationally embedded, and socially complex resources and capabilities, which are not easily copied by other firms (Reed and DeFillippi 1990; Barney 1991). The decision for firms to collaborate therefore implies that firms do not possess all the resources and capabilities needed for sustained economic rents. Whilst it also implies that firms lack the capability to develop them competitively in-house, within an acceptable timeframe and cost, relative to more experienced and better positioned competitors (Madhok 1998).

In summation according to Madhok (1998), from the resource-based perspective, interfirm collaborations are vital when they provide firms with an opportunity for sustained earning of rents in situations where competitive advantage requires the synergistic combination of resources which a firm is unable to purchase through a market transaction, or to develop in-house, in a timely and cost-effective manner.

### 2.2.1 Origins of Business Network Theory

As highlighted in the previous section, both the transaction cost and resource based theories were initially developed to address very different questions relating to the firm, namely, governance and competitive advantage respectively. The transaction

⁴ Competitive advantage according to Porter (1985) is the search and favourable positioning of a firm in an industry.
cost perspective examines the firm in terms of its governance, while the resource-based view examines the firm primarily in terms of its productive attributes and the associated competitive advantage. Being mindful of their different orientations, the realm of both theories has begun to overlap. Resource-based arguments are now being applied to the issue of boundaries between firms and markets (Conner 1991; Kogut and Zander 1992; Madhok 1996), and transaction cost arguments are focussing on efficient governance, which results in competitive advantage (Williamson 1991). With respect to collaboration, both transaction costs and resource-based arguments, have been used as a basis to further understand interfirm collaborations.

In effect, the RBV is based on the view that managers choose activities which allow them to take advantage of their firm’s unique resources and capabilities, while transaction cost economics is based on managers organising their activities efficiently. Although both approaches are treated independently, given their different emphases, both incorporate the idea of interfirm cooperation where two or more organisations work together for mutual gain. From the RBV perspective a firm can overcome resource-based constraints through interfirm cooperation, specifically by exploiting a firm’s unique set of resources and capabilities. Whilst, according to transaction cost economics, firms cooperate to reduce the cost of organisational activities (Combs and Ketchen 1999). Combs and Ketchen (1999 p.880) while examining interfirm cooperation from the transaction cost and RBV perspectives, highlighted that both approaches to the theory of the firm are “valuable instruments for enhancing knowledge of interfirm cooperation, its antecedents, and its consequences”, hence it is through the development of the theory of the firm and the streams of economic theories which have emanated from it, that the theory of business networks has subsequently evolved.

Firms have been viewed as ‘solitary units confronted by faceless environments’ (Astley 1984 p.526). Given they are ‘solitary units’ as coined by Astley (1984), then the natural assumption is that firms need to engage with other actors in order to survive and compete in the market economy. According to the transaction costs approach this cooperation is necessary to minimise transaction costs, while according to the RBV perspective firms cooperate to overcome resource constraints. Firms
through membership of business networks and business networking activities have been able to engage with others to avail of these opportunities.

Despite widespread use, there is however, no agreement on the appropriate explanation of what exactly constitutes a business network or networking activity. The next section therefore aims to explore these concepts and to distinguish between the business network and networking concepts.

### 2.3 Definition of a Business Network

No standard definition of a business network exists. A number of varied and also quite similar explanations of business networks and networking activity (the distinction of which will be also outlined in this section) exist. According to Pickernell, Rowe, Christie and Brooksbank (2007) who developed a framework to review and monitor various features of networks, outlined that the concept of a network can have different meanings to various groups due to the cross-disciplinary nature of networks (for example network theory can be found in, sociology, science, and economics). This implies that the meaning of the term ‘network’ can vary depending on the theoretical approach taken. The approach taken in this research is from a business perspective and so the discussion progresses with this in mind.

Nooteboom (1999) defined a network as a pattern of linkages between firms and/or as linkages between divisions such as departments and subsidiaries within a firm. As such, networks exist between firms and/or within firms. Nooteboom (1999) identified three types of linkages. These included;

(i) **Vertical Linkages**
Vertical linkages are made up of goods and services which flow between suppliers and buyers in intra-firm value chains or interfirm value systems (Porter 1985).

(ii) **Horizontal Linkages**
Horizontal linkages occur where similar competitive products are combined to share common production and distribution resources.
(iii) Diagonal Linkages

Diagonal or diversified linkages are made up of dissimilar goods and services. Although not alike, they may be complementary in research, marketing, or in the distribution of the products and therefore benefit from sharing common resources.

Nooteboom (1999) amongst others such as Astley and Fombrum (1983), and Miles and Snow (1992), have highlighted that networks have been recorded as constituting sets of firms connected, and as sets of connected relationships between firms (Cook and Emerson 1978; Håkansson and Johanson 1993).

For the purpose of this thesis, a business network is defined as a group of firms coming together using combined resources to cooperate on joint projects (Akoorie 1998; Ffowcs-Williams 2000). More specifically, if one adopts Besser, Miller, and Perkins’ (2006 p.321) definition of a business network, business networks are described as, “co-operative arrangements between independent business organisations that vary from contractual joint ventures to informal exchange of information”. These business networks enable groups of firms to come together to combine their talents and resources to achieve results they would be unable to achieve if they operated in isolation.

At this stage, clarification also needs to be made between the terms network and networking. Chell and Baines (2004) in examining networking by owner-managers of small businesses in the UK highlighted the distinction between these two terms. They defined networking as the action of developing relationships with others, while the term network was defined as the network structure. In effect therefore, the verb to network and the participative networking relate to the actions of creating and maintaining relationships with others, while the noun network refers to the network structure. Clearly however, the terms network and networking are interlinked because while a firm may be part of a network structure, that is a business network as defined above, then by collaborating with others within that structure, they are to all intents and purposes networking.
2.4 Conclusion

The theory of the firm has been one of the leading fields of research in economics over the past 20 years (Casson 1996). The review in this chapter shows that the theory of the firm has grown through the development of various economic approaches. For the purpose of this research, both the transaction cost approach and the RBV approach of the firm were reviewed. While each stream of thought originated with varying emphases, they have converged to recognise the importance of interfirm cooperation, hence allowing the origins of business network theory to be traced.

As highlighted, the discussion of business network theory begins with Marshall’s analysis (1895) who recognised the advantages of firm cooperation, while the observation of Coase (1937) acknowledged that no single firm possesses every input it needs to undertake its activities, which implies that firms are forced to engage in exchange activities and that they naturally and gradually develop their own networks. Transaction cost theory proclaims that firms while reducing their costs of transactions will do so by finding the most efficient governance structures. In effect firms will work together in order to minimise the costs they incur. The reason for collaboration according to the resource-based view of the firm is because firms do not possess all the resources they need to do business, and so, by combining sets of complementary, yet different, resources and capabilities, firms can reap greater returns than they could achieve on their own.

Both the transaction cost and resource-based view of the firm were developed to address different questions, however, they both address the issue of interfirm collaboration. For both theories, albeit for different reasons, interfirm collaboration is seen as an efficient way for firms to do business. By working with others, firms can earn greater returns than they could achieve in isolation. The origins of business network theory can therefore be found in the theory of the firm and hence highlights the theoretical underpinnings of this thesis. The insights gained from these approaches also highlight key issues for the fieldwork part of this study. More specifically, the insights learned from these approaches are used when constructing the questionnaire (see Section 6.2.2).
Numerous definitions of the term ‘network’ exist due to the interdisciplinary nature of the topic. The conclusions reached in this chapter were that the term ‘networking’ is considered as the action of collaboration between individual actors, whilst ‘business networks’ are regarded as cooperative arrangements which vary from formal contracts to more informal exchanges between firms. Not alone has the interdisciplinary background of networks led to an array of definitions of what a network means, it has also contributed to a varied number of network structures being presented in the literature. This typology of network structures, in conjunction with the motivations for and potential drawbacks to business network membership, are examined in the next Chapter.
Chapter 3: Business Networks - Structures and Motivations
3.1 Introduction

A considerable amount of research has been dedicated to exploring the various strands of business network literature, none more so than the attempt at differentiating the different forms and structures of networks in existence today. Business networks can take numerous forms and objectives (OECD 2000). The objective of this chapter is to identify the different business network structures and to clarify them in terms of their levels of formality and the level of governance in the network structure. Section 3.2 therefore provides a brief overview of the various network structures present in the literature, while Section 3.3 introduces the various types of business network structures. The network structures are then classified in terms of their levels of formality and their governance levels in Section 3.4, while Section 3.5 draws a necessary distinction between business networks and clusters, which have been used somewhat interchangeably in the literature. The motivations for business network participation and the costs of membership are discussed in Sections 3.6 and 3.7 respectively. Given the prime focus of this thesis is on business networks, the key objective of this chapter is to identify how best to distinguish between business network structures, while also identifying the merits and drawbacks to network membership.

3.2 Network Structures

Many authors have embarked on the task of exploring and explaining the impact of business networks on their member firms performance and its impact on the local environment. In doing this not only have the way business networks been defined varied (as illustrated in Chapter 2), but so too has the way different types and structures of business networks been presented. In recounting the various types of ‘networks’, Chance and Vlosky (1995) in their paper examining the ability of flexible networks to improve rural firm competitiveness, highlighted various network structures defined in terms of the networks’ characteristics. Such network structures included ‘flexible networks’ (Chance and Vlosky 1995); ‘strategic alliances’ (Spekman and Sawhney 1995); and ‘logistic alliances’ (Bowersox 1990). Jones, Hesterley, and Borgatti (1997) also highlighted a number of network structures, and
put forward a table of a snapshot of these structures (see Table 1). Further work by Doyle (2000), building on the previous work of O’Doherty (1998)\textsuperscript{5}, identified five basic forms of network structures. These included a development circle, a loose cooperative circle, a project group, a joint venture, and a joint unit.

As Table 1 shows there are numerous terms used to describe various network structures. In essence, each structure describes the collaborative activities between the network actors. Evident from this however, is that the network literature presents an array of terms to describe the actions of firms cooperating with one another. The task of this chapter therefore is to present a way in which these terms can be disentangled, and put forward a classification, which can be used to distinguish between various business network structures.

\textsuperscript{5} O’Doherty (1998) identified four network structures, which included informal and unorganised networking, membership-based networks, customer-supplier networks and interdependent networks of firms
Table 1: Network structures in terms of types of exchanges and flow of resources

<table>
<thead>
<tr>
<th>Authors</th>
<th>Structure Name</th>
<th>Network Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alter and Hage 1993</td>
<td>Interorganisational networks</td>
<td>Unbounded or bounded clusters of organisations that by definition are non-hierarchical collectives of legally separate units.</td>
</tr>
<tr>
<td>Dubini and Aldrich 1991</td>
<td>Networks</td>
<td>Patterned relationships among individuals, groups, and organisations.</td>
</tr>
<tr>
<td>Gerlach and Lincoln 1992</td>
<td>Alliance capitalism</td>
<td>Strategic, long-term relationships across a broad spectrum of markets.</td>
</tr>
<tr>
<td>Granovetter 1994, 1995</td>
<td>Business groups</td>
<td>Collections of firms bound together in some formal and/or informal ways by an intermediate level of binding.</td>
</tr>
<tr>
<td>Kreiner and Schultz 1993</td>
<td>Networks</td>
<td>Informal interorganisational collaborations.</td>
</tr>
<tr>
<td>Larson 1992</td>
<td>Network organisational forms</td>
<td>Long-term recurrent exchanges that create interdependencies testing on the entangling of obligations, expectations, reputations, and mutual interests.</td>
</tr>
<tr>
<td>Liebeskind, Oliver, Zucker,</td>
<td>Social networks</td>
<td>Collectivity of individuals among whom exchanges take place that are supported only by shared norms of trustworthy behaviour.</td>
</tr>
<tr>
<td>and Brewer 1996</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miles and Snow 1986, 1992</td>
<td>Network organisations</td>
<td>Clusters of firms or specialised units coordinated by market mechanisms.</td>
</tr>
<tr>
<td>Powell 1990</td>
<td>Network form of organisation</td>
<td>Lateral or horizontal patterns of exchange, independent flows of resources, reciprocal lines of communication.</td>
</tr>
</tbody>
</table>

Source: Adapted from Jones et al (1997 p.914)
Prior to distinguishing between the various business network structures it is necessary to make reference to one of the network structures highlighted by Jones et al (1997) in Table 1, that is, social networks. Social networks are prevalent in the network literature and so it is worthwhile providing a brief overview of them here. Social networks have been viewed as a “specific set of linkages among a defined set of persons” (Mitchell 1969 p.2). Social network relations incorporate the relationships between individuals who provide the owner or manager of a firm with support. These include for example, friends, relatives, and acquaintances (both past and present), while it also incorporates social connections with universities, research institutes, and the like. Networks of such support impact on the formation of firms and on their development by providing resources that firms require as they develop (Fontes, Sousa, and Videira 2009).

The vast amount of literature on social networks distinguishes between the strength of social network ties, that is, strong ties and weak ties (Granovetter 1973; 1982). Strong tie networks include links with family, friends, relatives, and past acquaintances (Mackinnon, Chapman, and Cumbers 2004), where the network actors exhibit a low level of confidence and there is little reciprocity (Granovetter 1982). On the other hand, weak tie networks are used much less frequently and require much more effort by the network parties (Granovetter 1973; 1982). Relationships developed in these networks are with a range of individuals, groups, and organisations, such as research centres and universities for example (Mackinnon et al 2004).

According to the network literature benefits accrue to those who engage in both strong and weak tie networks. Strong tie networks facilitate the exchange of information and knowledge among the participants (Lundvall 1993; Gulati 1998), however an over-reliance on strong tie networks prevents the creation of fresh ideas, absorption of new information or the exploitation of business opportunities for growth and development (Chell and Baines 2000). On the other hand, weak tie networks, such as those developed with universities or research institutions for example, are composed of sources that are used less frequently and which allow the individual to draw on a large pool of contacts for information and advice (Granovetter 1973). They have been regarded as generating a number of benefits for those involved because
individuals are not rigidly tied to any one other actor, and they can build a number of open relationships and explore various different opportunities (Burt 1992; Julien, Andriambeloson, and Ramanglahy 2004).

Julien et al (2004) whilst examining the strength of ties of SMEs in the land-based transportation sector in Canada, found that weak tie networks need to be complemented by strong tie networks to reap any major benefits. They also found that strong tie networks are generally made up of the same type of people and as such the information provided in these strong tie networks can be repetitive. These strong tie networks are therefore not the ideal path for new ideas to be generated and shared. Weak tie networks, however, are composed of people who do not usually work together and so should spur the creation of fresh ideas and the flow of new information (Julien et al 2004).

It was deemed important to highlight the existence of social networks because, in effect, no firm operates in isolation. Network activity takes place with friends, family, acquaintances, customers, and suppliers for example on a daily basis for firms. The social network perspective outlined above offers a method of explaining this form of network behaviour. According to network theory these networks are important for the development of the firms in question, however, Doyle (2000) highlighted that when the needs of a firm become more intricate, firms will look beyond social networks towards different network structures to serve these needs. It is therefore with this point in mind that the discussion of this chapter now turns to business network structures in Section 3.3.

3.3 Business Networks

The term ‘business network’ is an all encompassing term that includes all forms of collaboration between firms, individuals, institutions, and agencies. Anderson, Håkansson, and Johanson (1994) regard business networks as groups of firms connected with each other, or as sets of relationships developed between firms, while Felzenstein (2003) used the term business network to describe the source of a firm’s linkages with others such as their suppliers, distributors, or transporters.
Relationships developed within a business network can be of a direct or indirect nature, an example of which is adopted from Anderson et al’s (1994) study which examined the relationships between firms within a business network (see Figure 1 below). Within this network there is one main supplier unit and one main customer unit. There is a central relationship between these units highlighted, while they are also connected through a common third party. Each unit then has its own separate connections with their own suppliers, customers, and other additional firms. An overriding conclusion drawn from the work of Anderson et al (1994) is that every relationship and connection that a firm has is viewed as being part of a network. To illustrate their point Anderson et al (1994) used two case studies, namely, The Wood Saw Network\(^6\) and Danprint.

Both case studies were used because they portray appropriate examples of how business networks can develop and subsist. As depicted in Figure 1A for example, the main relationship in this case study is shown to exist between the sawmill and the saw equipment producer, whilst other relationships also developed independent of each other, apart from one common relationship between both, with the saw blade producer. Cooperation in this case study was deemed necessary to develop a specific product, namely, band saw equipment (Anderson et al 1994). Through the development of a business network, which incorporated firms who collectively shared their expert knowledge and complemented other members’ activities, a successful product was finally developed (Anderson et al 1994).

In the case of Danprint, a small Danish printer that supplied labels to Sofidrink, a large Danish soft drink producer, a number of varied relationships also developed and in effect, Danprint created a business network (see Figure 1B). As illustrated in Figure 1B, interfirm collaboration exists between Danprint and Sofidrink, while Danprint also developed a relationship with a foreign paper maker and an ink supplier. The end result was that through these collaborations Danprint developed a business network consisting of a number of firms with complementary activities, who each benefited from collaboration within that business network.

\(^6\) The example of the Wood Saw Network as given by Anderson et al (1994) was adapted from a study by Håkansson (1987).
The brief overview of the case studies presented here shows that through the development of various relationships a firm can develop its own network of business relations. Within this network, all of the parties involved benefitted from sharing information and working with one another towards a common goal. Furthermore, the business networks developed in these case studies highlight that the collaborations in a network are not restricted geographically and they are not sectoral specific. In a similar vein to the case studies presented here, Belussi and Arcangeli (1998 p.416) whilst analysing the typology of network structures, highlighted that, “the new network firm is unlikely to be ‘anorexic’”. The reason they attributed to this is that firms need to make use of an increasing number of networks, which can help them to cooperate with others, “in the creation (or absorption), of new knowledge (R&D, design, engineering), and for the external introduction of new knowledge through innovation acquisition, adaptation, and implementation” (Belussi and Arcangeli 1998 p.416).
This section very simply described the most basic form of business network, where a firm grows and develops its own network of contacts. The term ‘business network’ encompasses the relationships developed between firms, individuals, and institutions that spans sectors and holds no restraints in terms of geographical proximity. Given the diverse nature of this one term it is imperative to break it down to analyse it further. Business networks have been classed and defined in various ways. This section provides a sample of some of these variations. More specifically, vertical and horizontal business networks are discussed, technological and knowledge networks, regional and strategic networks, and finally circuit, nodal circuit, branch, and hybrid business networks. The reason for including these variations of business networks is to outline the various forms that business networks can take. How these different structures can be distinguished is addressed in Section 3.4.

(i) **Vertical and Horizontal Business Networks**

Business networks have been divided into vertical and horizontal networks according to the value adding chain (Porter 1985). Nooteboom (1999) in his analysis of innovation and interfirm linkages advocated that vertical cooperation (or lateral cooperation as he also coined it) does not harm competition and may in fact have a positive impact on innovation and the distribution of innovations. Nooteboom (1999) did warn however that the relative exclusiveness that may be associated with long-term relationships could restrict the variety of contacts a firm has, which can be a source of innovation for firms. Vertical collaboration occurs along the production chain for particular products or services, while horizontal collaboration occurs between partners at the same level of the production process (Fischer 2003). Supplier networks (or vertical collaboration) represent a growing form of interfirm cooperation. According to Fischer (2003) the relationships developed between firms and their suppliers have become much more complicated. He suggested that leading firms tend to develop long-term subcontracting relationships with key suppliers and thus gives these subcontracted firms (suppliers) greater responsibility for quality control. Companies are now paying considerable more attention to the needs and views of their customers and so customer networks are very important to firms as they help them focus their innovative efforts (Fischer 2003).
(ii) **Technological and Knowledge Networks**

Lengrand and Chatrie (2000) proposed that two business network structures can be distinguished over the last 20 years, namely technological networks and knowledge networks. Technological networks were formed by large firms who began technological alliances so as to decrease the costs associated with research and development and also to allow firms to adapt to the pace of technological change. These forms of business networks as identified by Lengrand and Chatrie (2000) are also known as ‘local networks of innovators’, ‘regional innovation networks’, or ‘technological networks’. Knowledge networks are presented as a new form of cooperation network. Papailiou, Apostoulou, and Mentzas (2007) found that knowledge networks are the most common process by which knowledge is generated. Knowledge networks bring participants together to collaborate face-to-face, on the phone, or via email, to share ideas, and expertise. Knowledge can be used as one of the most important assets to improve the competitive position of a business and knowledge networks therefore can be used as the channel to achieve this objective.

(iii) **Regional networks and Strategic Business Networks**

Sydow (1996) referred to a regional network as an organisational arrangement of reciprocal, cooperative arrangements amongst firms (mainly SMEs). Membership of this form of business network allows small firms to behave like large firms. A strategic network is similar to a regional network but is not located in a particular region (and incorporates all sizes of firms) (Sydow 1996). The most important difference between the two business networks, according to Sydow (1996), is in terms of the strategic leadership of the networks. In a regional network, firms are mutually responsible, while strategic networks are led by core firm. Table 2 outlines the differences between these structures (Sydow 1996 p.26). As this table shows regional networks are occupied by firms that work together in a collaborative manner and allow smaller firms to achieve economies of scale. Strategic networks, on the other hand, are lead by a core firm and the actions of the other members of the network are directed by that firm.
### Table 2: Regional and strategic networks

<table>
<thead>
<tr>
<th></th>
<th>Regional Network</th>
<th>Strategic Network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic Leadership</td>
<td>None, perhaps collective leadership</td>
<td>Focal or hub firm</td>
</tr>
<tr>
<td>Size of network firms</td>
<td>Small and medium-sized firms only</td>
<td>Large, medium-sized, (small)</td>
</tr>
<tr>
<td>Organisation</td>
<td>Self-organisation, culture</td>
<td>Formalised interorganisational structure</td>
</tr>
<tr>
<td>Network boundaries</td>
<td>Relatively closed</td>
<td>Relatively open</td>
</tr>
<tr>
<td>Prototypical examples</td>
<td>Emilia Romagna, Italy</td>
<td>Japanese Keiretsu, franchising networks</td>
</tr>
</tbody>
</table>

Source: Sydow (1996 p.26)

(iv) **Circuit, Nodal Circuit, Branch and Hybrid Network Structures**

Suarez-Villa (1998) addressed the issue of network structures by outlining four different structures in terms of firm embeddedness, commitment, and trust within the network. Figure 2 depicts the network typologies of circuit, nodal circuit, and branch networks (Suarez-Villa 1998 p.11). The circuit (non-nodal) form of network structure is more likely to involve SMEs and there is a lack of hierarchy evident in the network. Interaction in this network structure is of a reciprocal nature where cooperation with others is undertaken as the need arises.
The nodal circuit structure also depicted in Figure 2 illustrates a slightly different situation to the circuit (non-nodal) network structure, in that a hierarchy is evident in this structure (i.e. certain firms can take up the role of gatekeepers). This nodal (core) firm can perform a ‘clearinghouse role’ (Suarez-Villa 1998), in terms of for example selecting the R&D knowledge and resources needed for a specific project. A branch network also exhibits a hierarchical structure however the SMEs in this network are dependent on a larger firm in the network. The core firm in this structure plays a much more central role, as is depicted in Figure 2. This form of hierarchy develops different levels for the member firms and so it may prove difficult for firms to exit the network because of the specialised roles that each firm develops within the network (Suarez-Villa 1998).

Figure 2: Circuit, nodal circuit, and branch networks

The hybrid structures as introduced by Suarez-Villa (1998 p.12) are divided into two, namely, hybrid circuit/barrier and hybrid circuit/branch networks (Figure 3). A form of hierarchy among members is evident in both of these structures. The circuit barrier
structure protects a certain part of the network for strategic reasons. This form of network brings about secrecy within the network as a whole because one part of the network is almost cut off from the other, with the core firm acting as the intermediary between the two. The circuit branch structure displays similar characteristics.

Figure 3: Hybrid network structures

The business network structures presented thus far highlight that there are varying typologies of structures, which all centre on the promotion of interfirm cooperation. The examples of the case studies presented by Anderson et al (1994) offered an example of a basic business network structure whereby a firm develops its own network relations, as it needs. Through the development of these relationships among the business network members benefits accrue to all in the network. Discussion of the various business network structures then progressed to introduce vertical and horizontal networks, technological and knowledge networks, regional and strategic networks, and finally circuit, nodal circuit, branch, and hybrid business networks. Each of these network structures highlighted interfirm collaboration, albeit to varying degrees and for different purposes.
These different network structures, while similar in their quest to describing business activity within a business network, provide some confusion as to what exactly constitutes a business network and how a business network structure can be defined. The next section aims to distinguish between these network structures.

3.4 Distinguishing Between Business Network Structures

Although the underlying concepts of the business networks described in the previous section are similar, in that, they each promote interfirm collaboration, there are distinguishing differences between each. The objective of this section is to highlight how one can distinguish between the different business network structures. This is done through highlighting the levels of formality in a network structure and also through recognising the governance structure of the networks.

3.4.1 Formality of Business Networks

Business networks have been referred to as formal and informal structures by many researchers throughout the business network literature (Maskell, Eskelinen, Hannibalsson, Malmberg, and Varne 1998; Feldman 1999; Breschi and Lissoni 2001; Madill et al 2004; amongst many others). A formal business network is a network structure in which the participating firms come together to share a common objective, which may require a coordination of resources and activities (Kingsley and Malecki 2004). This formal collaboration can take a number of different forms. One such form for example would be a joint venture, which is formed by at least two (or more) partners as a separate company on a shareholder basis, or it could also be a partnership that connects firms based on the premise of continued commitment to shared technology and business objectives (OECD 2000). Conversely, an informal business network is not restricted by an explicit agreement that connects all members. It is bound “entirely by mutually reinforcing self-interests” (Kingsley and Malecki 2004 p.72). Informal business networks are much more likely to share ‘small ideas’ (Breschi and Lissoni 2001), however they also play an important role in channelling knowledge flows (Feldman 1999; Dahl and Pederson 2003). Maskell et al (1998)
explained that the creation of informal business networks develops through a number of phases and can vary from connections (of a vertical or horizontal nature) between two individuals to connections between whole business networks.

Madill et al (2004) studied the business networks of technology and non-technology firms in an Ottawa cluster. The core focus of their research was to understand how and why certain patterns of networks develop and to empirically examine their value. Data gathered from the CEOs of the respondent technology based firms rated informal business networks as being more important than formal business networks to their firms (Madill et al p.365). Kingsley and Malecki (2004) also distinguished between formal and informal business networks. In their study of business networks (formal and informal) used by small manufacturers in the rural and urban counties of Northern Florida, they defined formal networks as purposefully formed groups of SMEs which are profit driven. The firms are located closely, they do not necessarily have to share inputs and outputs, and they collaborate with one another for specific business results. Conversely, informal networks were defined as a groups of organisations who collaborate with firms for knowledge and opinions, that the firms value and will entice them to enter into regular exchanges of information about issues relating to the firm’s competitiveness (Kingsley and Malecki 2004).

In conclusion, researchers are in agreement that formal business networks include firms who share a common objective and have a specific target to reach, while informal business networks’ primary role is to channel information among members who are not driven by a specific or common goal. More specifically, collaboration between firms in informal networks is mainly based on, sharing information, solving shared problems, and upskilling by interacting with others. Formal business networks, on the other hand, involve firms joining together to develop, market, or purchase products, while they also reap the benefits enjoyed by members of informal business networks (such as sharing information, solving shared problems, and additional generic benefits gained from collaborating with others) (Huggins 2001).

A further distinction in terms of the level of formality of business networks is made in the literature, by differentiating between hard and soft business networks. In effect, similar to the distinctions provided between formal and informal business networks,
hard business networks are generally more focussed and are driven by specific objectives, while soft business networks relate more to informal business networks, in that they incorporate groups of firms that are loosely connected and are not driven by a specific goal or common objective. Business networks which include co-marketing and co-production networks (including supply chain networks) are generally referred to as hard networks (Bosworth 1995). They are so called because they require high levels of interdependence. Hard business networks involve a significant amount of risk because they are built on the sharing of competitive knowledge and expertise which leads to greater opportunism and operations risk (Clemons, Reddi, and Row 1993). While trust is a vital component of any successful business network (an issue that will be dealt with in Section 3.7 of this Chapter), it is even more critical in hard business networks because members of these business networks are more vulnerable due to their greater interdependence and sharing of sensitive information (Mayer, Davis, and Schoorman 1995). Firms in hard business networks collaborate with one another towards common bottom line objectives (Rosenfeld 2001).

Conversely, soft business networks include business networks such as learning and resource networks that bring firms together to share resources and to learn about changes necessary to increase firm competitiveness (Bosworth 1995). These business network structures have a much lower level of interdependence than hard business networks (Sherer 2003). Business networks in general do not have to be geographically concentrated (Freel 2000), however, this is particularly applicable to the case of soft business networks, where interaction between the members does not have to be face-to-face and interaction can be achieved through electronic means once there is trust among members (Ffowcs-Williams 2000)\(^7\). Soft business networks are therefore a looser membership-based group formed to address generic issues, lower costs, and to provide a forum for learning or access to information (Rosenfeld 1996).

When drawing a comparison between hard and soft business networks, the OECD (2000) noted that soft business networks in general incorporate a much larger number of firms than hard business networks and that membership in these business networks is not restricted. Hard business networks are much more goal orientated,\(^7\) Cooke and Wills (1999) however noted that for firms who network for innovation purposes, geographical proximity may be important.

\(^7\) Cooke and Wills (1999) however noted that for firms who network for innovation purposes, geographical proximity may be important.
“commercially focussed” (Ffowcs-Williams 2000 p.2), and firms within these business networks are more formally and tightly linked together.

Sherer (2003) analysed the success factors of 71 manufacturing business networks in the United States in 1997. The business networks in this study were classified based on their specified objectives and levels of formality. In reference to the levels of formality, Sherer (2003) placed manufacturing business networks between the two extreme forms of business network formality, that is, very informal networks (which Sherer referred to as informal social networks) and formal joint ventures (Figure 4).

![Figure 4: Business networks’ level of formality](source: Sherer (2003 p.327))

In defining the various forms of business networks, Sherer (2003) classed hard business networks as business networks which had a specific objective, for example networks focussed on joint production or joint marketing. Soft business networks were more focussed on developing the workforce and sharing resources, because members did not have a combined objective. A very interesting point which emanated from Sherer’s (2003) study is that trust, defined in terms of honesty and reliability, among members of hard business networks is very important. Sherer (2003) highlighted that trust among members of a hard business network is more important than the capabilities that member firms bring to the network.

In examining the development of business networks in the US, Rosenfeld (2001) also distinguished between hard and soft business networks. More specifically, Rosenfeld (2001) found that business networks that were ruraly based were more likely to be soft business networks, while urban based business networks were more likely to be hard business networks. Furthermore, Rosenfeld (2001) in agreement with the
general literature on hard and soft business networks highlighted that hard networks are profit focussed.

In conclusion, distinction in this section has been made between business networks in terms of their levels of formality. Differences were highlighted between formal and informal business networks, and hard and soft business networks. In highlighting the differences between each, it is quite apparent that there is very little difference between formal and hard business networks, and little variation, if any, between informal and soft business networks. Formal (hard) business networks are objective-specific commercially focussed business networks, while members of informal (soft) business networks do not share common objectives and generally come together to reap the generic benefits of interfirm cooperation.

Aside from distinguishing in terms of their levels of formality, business networks can also be distinguished in terms of the governance of the network structures. This is discussed in the next section.

3.4.2 Governance of Business Networks

The distinction made between networks of direction (NoD) and networks of mutual dependence (NoMD) is based on issues related to power distribution within a business network. This type of network differentiation is known as the mutual dependence approach (Saachetti and Sugden 2003). The formal (hard) and informal (soft) business networks identified in the previous section were reviewed in terms of reciprocity and the relatively equal ‘give and take’ mentality between members in business networks. This section, however, introduces the idea that relationships in business networks are not always reciprocal or mutually supportive. This is reinforced by Richardson’s view who noted that, “the fact that work has been subcontracted does not by itself imply the existence of much cooperation between the parties to the arrangement” (Richardson 1972 p.885).

Networks of direction are made up of a lead member who exercises its power and control in the business network. In effect it is this firm or group of firms who leads
the business network and directs all activities within the business network (De Propris 2001). A network of direction is a hierarchical structure in which the creativity and activities of the satellite firms are controlled by the core firm(s). According to De Propris, Menghinello, and Sugden (2005) a major disadvantage to this business network structure is that many firms within this network are actually competing against one another. There is a lack of cooperation evident and very little sharing of information and knowledge which prevents any form of creativity and hence innovation within the network.

The origins of networks of mutual dependence can be found in what is called ‘mutual framing of decisions’ (Grabher 1993, Håkansson and Johanson 1993). Collaboration is strongly evident in this form of business network, where the relationships between the participants are of a reciprocal nature and the participants are mutually supportive of one another’s activities (Powell 1990). Saachetti and Sugden (2003) when examining these two forms of business networks distinguished their differences by a number of characteristics (see Table 3).

The two governance structures outlined in Table 3 are networks of direction and networks of mutual dependence. These are both distinguished by a number of characteristics which Sacchetti and Sugden (2003) deemed relevant to enable an understanding of the distribution of power within these networks. The first indicator they identified is the ‘locus of strategic decision making’. This highlights who exactly within the network makes the strategic decisions and coordinates activities, and thus indicates how the power is distributed in the business network, that is whether or not the power is held by a core firm (a NoD) or whether the power is distributed more evenly (a NoMD).
Table 3: Governance of business network's characteristics

<table>
<thead>
<tr>
<th>Governance Structure Indications</th>
<th>Networks of Direction</th>
<th>Networks of Mutual Dependence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exit</td>
<td>Voice</td>
</tr>
<tr>
<td><strong>Locus of strategic decision making</strong></td>
<td>- Core firm: decides and coordinates network activities.</td>
<td>- Core firm: decides and coordinates network activities.</td>
</tr>
<tr>
<td><strong>Problem solving</strong></td>
<td>- Exit</td>
<td>- Voice</td>
</tr>
<tr>
<td><strong>Basis for relations</strong></td>
<td>- Authority, command and control; - Uncertain time horizon.</td>
<td>- Authority, command and control; - Time; - Trust consolidation.</td>
</tr>
<tr>
<td><strong>Type of rationality</strong></td>
<td>- Instrumental</td>
<td>- Instrumental / Communicative</td>
</tr>
</tbody>
</table>

Source: Sacchetti and Sugden (2003 p.680)

Aside from identifying where the power within the business network rests, Sacchetti and Sugden (2003) looked at how those who possess the power solve problems with the other firms. According to Sacchetti and Sugden (2003), this ‘problem solving’ is a characteristic that can be traced back to Hirschman’s (1970) theory, which is based on the concept that when a firm (or organisation or any other group) faces a decrease in quality or reduced benefits, they are faced with two choices, they can exit (leave the relationship) or they can voice (try to improve the relationship). There are therefore two ways of dealing with conflicts in a business network; namely exit and voice. The exit strategy implies that a firm may not choose to work with another firm when (and if) a problem arises. The voice strategy, however, implies that when faced with a problem the firms will work together until the problem is rectified.

Given the power within a NoD is controlled by the core firm, the characteristics of the exit and voice options are more prominent in this network. Networks of mutual dependence are dominated by mutually dependent participants, which means that the
attitudes towards the problem solving strategy generally rely on the voice option. In effect, no one firm dictates the activities in a NoMD. The individual firm’s strategies in both of these business networks are obviously very different. In a NoD, the core firm controls the business network, and so individual firms can not decide their own strategy (other than to leave the network). Within a NoMD, however, firms’ decisions regarding their strategies are made within the network with the other members (Saachetti and Sugden 2003).

According to Sacchetti and Sugden (2003) the final characteristic, the rationality used by the member firms, is crucial in terms of shaping the intentions, strategies, cooperation, as well as the innovative potential of the business networks. In this respect, instrumental and communicative rationality are considered. The latter is based on Lundvall’s (1993) analysis of interactive learning and Habermas’ (1984) contribution on communicative action. Instrumental rationality represents transaction cost analysis of the business network members’ strategic behaviour. More specifically, Lundvall (1993) posits that if members of a network are solely concerned with working out the marginal cost of network activity, then the relationships developed within the network will be very weak. Communicative rationality (Habermas 1984), therefore needs to be seen in terms of the learning potential among the business network members.

As is clearly evident from Table 3, each of these four characteristics differs significantly between the two forms of structures. These two forms of networks provide an example of how business networks can be defined in terms of their governance structures. Networks of direction imply the achievement of the objective of one single firm, while the interests of all firms in networks of mutual dependence are balanced by their interdependence (Saachetti and Sugden 2004).

Business networks, in this section, have been distinguished in terms of their levels of formality and in terms of the governance structures of the networks. In recalling the business network structures presented in Section 3.3, more specifically (i) vertical and horizontal business networks, (ii) technological and knowledge networks, (iii) regional and strategic networks, and (iv) circuit, nodal circuit, branch, and hybrid business networks, one could distinguish these business networks in terms of their
levels of formality or in terms of the governance structures of the networks. In these cases, vertically and horizontal business networks, and technological and knowledge networks could be defined in terms of their levels of formality, while the remaining structures could be defined in terms of the governance of their network structures. For example, the horizontal networks as presented by Fischer (2003) were defined as networks which had a clear goal and members of the network work closely together towards that goal. This definition implies that the network structure in question is a formal (hard) business network. In reference to the strategic and regional networks introduced by Sydow (1996), regional networks are occupied by firms that work together in a collaborative manner, while strategic networks are lead by a core firm and the actions of the other members of the network are directed by that core firm. As per these definitions, regional networks can be classed as NoMD, while strategic networks as NoD.

Before a conclusion can be made to the clarification of business network structures and how they are classified, a clear distinction also needs to be made between business networks and clusters. This is necessary because both terms have, on occasion, been used interchangeably in the literature (Doyle 2000; Pickernell et al 2007; InterTradeIreland 2005).

3.5 Business Networks and Clusters

Business networks can also be differentiated by their geographical scope, between local, regional, national, and international business networks (OECD 2000). This classification in terms of geographical scope leads to confusion between the concepts of a business network and a cluster. Clusters share a common regional location, where “‘region’ is defined as a geographic area, labour market, or other functional economic unit” (InterTradeIreland 2005 p.5). According to Porter (1998) clusters are geographically concentrated interconnected firms and institutions in a particular field or in linked industries. It is thought that because of the closeness of firms in a cluster, both in terms of their geographical location and in their activities, that participants enjoy a number of economic benefits (Ketels 2003). As specified by Ketels (2003) such benefits include “access to specialized human resources and suppliers,
knowledge spillovers, pressure for higher performance in head-to-head competition, and learnings from close interaction with specialized customers and suppliers” (Ketels 2003 p.4). Although similar in some respects in their quest to promoting and reaping the benefits of interfirm cooperation, networks and clusters do differ in certain aspects. The key differences are highlighted below.

Rosenfeld (1996) argued that in general business networks consist of groups of interfirm collaborations, while clusters consist of geographically concentrated complementary firms, who share common opportunities and threats, and who have open opportunities to collaborate. It is important to distinguish between these terms given their considerable common attributes, yet also their quite apparent differences. NESC (1998) outlined five distinct differences between the two terms (see Table 4).

<table>
<thead>
<tr>
<th><strong>Table 4: Differences between business networks and clusters</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Business Networks</strong></td>
</tr>
<tr>
<td>Give access to specialised services at lower costs.</td>
</tr>
<tr>
<td>Have restricted membership.</td>
</tr>
<tr>
<td>Rely on informal and formal contractual agreements.</td>
</tr>
<tr>
<td>Facilitate more sophisticated business practices.</td>
</tr>
<tr>
<td>Have common business goals.</td>
</tr>
</tbody>
</table>

Source: NESC (1998 p.77)

The differences as highlighted in Table 4 centre on the fact that members of a business network share a common business objective, while this is not the case in clusters, where members share a vision. The key difference between a vision and a
goal being that a vision is regarded as an aspiration of how and where the members would like to see the cluster develop, while a goal is a much more focussed target that members of a network aim to achieve. Business networks provide members with access to resources they may not necessarily hold themselves, while clusters entice specialised services to a particular area. Clusters although geographically concentrated do not generally restrict their membership, although membership to a business network can on occasion be restricted (specifically for formal (hard) networks).

As Table 4 highlights there are key distinctions between business networks and clusters primarily based on the structures’ objectives, membership, and activities. As the preceding section on the business network structures highlighted however, there are also differences between different types of business networks; therefore a discussion between the types of business networks and clusters is also warranted. For this purpose the levels of formality of business networks structures is used, whereby formal (hard) business networks incorporate those business networks that are more goal focused and informal (soft) networks are loose informal structures that are not inclined to be focused on a specific goal. Table 5 portrays the key differences between hard and soft business networks and clusters.

The differences are made between each based on the characteristics of each structure. These characteristics include the (i) type of membership, (ii) relationships developed within the structure, (iii) the basis for agreement in each structure, (iv) what value added the structure provides for its members, (v) the impacts of involvement in each, (vi) the foundation for external economies in each structure, and (vii) their overriding objectives. As previously discussed the primary differences between hard and soft business networks is that hard business networks are relatively closed with a high degree of interfirm collaboration, while firms are loosely connected in an open soft business network. Hard business networks are goal focused and they allow firms to focus on their core competencies unlike soft business networks in which firms have a collective vision, and they can share resources with the hope of lowering their cost structures. Clusters in comparison (to both of these network structures) as Rosenfeld (2001) pointed out do not require membership, do not have shared goals, they do
provide access to suppliers, services, or the labour market, and the basis for their external economies is in terms of their location (or proximity).

Table 5: Characteristics of business networks (hard and soft) and clusters

<table>
<thead>
<tr>
<th></th>
<th>Hard networks</th>
<th>Soft networks</th>
<th>Clusters</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Membership</strong></td>
<td>Closed</td>
<td>Open, membership based</td>
<td>None required</td>
</tr>
<tr>
<td><strong>Relationships</strong></td>
<td>Collaborative</td>
<td>Cooperative</td>
<td>Cooperative and competitive</td>
</tr>
<tr>
<td><strong>Basis for agreement</strong></td>
<td>Contractual</td>
<td>Majority determination</td>
<td>Social norms and reciprocity</td>
</tr>
<tr>
<td><strong>Value added</strong></td>
<td>Allows firms to focus on core competencies</td>
<td>Aggregates and organises demand for services</td>
<td>External economies</td>
</tr>
<tr>
<td><strong>Major outcomes</strong></td>
<td>Increased profits and sales</td>
<td>Shared resources, lower costs, benchmarking</td>
<td>Access to suppliers, services, labour markets</td>
</tr>
<tr>
<td><strong>Basis for external economies</strong></td>
<td>Shared functions and resources</td>
<td>Membership</td>
<td>Location/proximity</td>
</tr>
<tr>
<td><strong>Shared goals</strong></td>
<td>Business outcomes</td>
<td>Collective vision</td>
<td>None</td>
</tr>
</tbody>
</table>

Source: Rosenfeld (2001 p.115)
Bailey (2003) in examining industrial policy in the East Midlands in the UK remarked that a “‘network paradigm-based strategy’ stressing the need for clusters to engage in the joint commitment of resources and joint innovative activity” had emerged (Bailey 2003 p.75). Policymakers targeted a number of sectors within this region with the intention of developing business networks with the hope that they would then develop into clusters (Bailey 2003). From this, it is clear that policymakers in the East Midlands region view the creation of networks of firms that are geographically close as a means to developing clusters. In other words, in some instances, business networks can be seen as a precursor to clusters.

In summary, although business networks and clusters hail from the same spectrum, there are key features which can be used to distinguish between them. More specifically, as outlined above, networks provide access for firms to specialised services and resources, and to ways in which they can lower costs. Clusters on the other hand attract specialised services to a region. In general, members of a network pay a membership fee while no fee is paid to become a member of a cluster. The key distinguishing feature between networks and clusters however is in terms of geographic location. In contrast to clusters (which are geographically concentrated), networks do not have to be geographically concentrated.

The interdisciplinary nature of network theory has led to different meanings of the term network and has also contributed to the wide array of network structures that occupy the literature. The aim of the discussion above was to clarify the distinctions made between the various business network structures. Highlighting the variations in these network structures implores the question of why firms get involved in a business network and what are the potential impacts associated with business network membership. The motivations for firms in these networks are explored in the next section (Section 3.6) and the costs associated with network membership are outlined in Section 3.7.

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8 Bailey (2003) also noted that there was a lack of a clear distinction evident between the terms ‘network’ and ‘cluster’.
Motivations for Business Network Membership

Significant empirical evidence points towards a strong relationship between business networks as a source of competitive advantage for firms (Birley 1985; Humphrey and Schmitz 1996). National and regional policymakers are increasingly promoting the business network concept as a strategy to increase growth for both local businesses and the local economy (full discussion of this is outlined in Chapter 4). Collaboration amongst firms is becoming a common and necessary practice, where firms can use business network relationships as a means to exposing themselves to new opportunities, to learn from others, to penetrate international markets, and to benefit from a pooled source of resources (Chetty and Holm 2000). Business networks are also acknowledged to be providers of practical and psychological support, and providers of access to opportunities and varied resources (Ostgaard and Birley 1994; Dodd and Patra 2000).

One of the most inclusive studies of business networks and their impacts was completed by Fuller-Love and Thomas (2004) on small, medium size enterprises (SMEs) in Mid Wales. This study provides some interesting insights for firms who are members of business networks. The results of the study showed that firms who were members of business networks found it a cost effective way for firms to improve their performance and achieve a competitive position that would be unattainable on their own. The key motivations for firms to become members of these networks was to collaborate with others in sharing information, to share ideas, make new personal contacts, and to improve the overall performance of the firm. The associated costs of membership, although few respondents in this study perceived any major costs, were the time associated with membership, sharing of information, while some networks were recorded as being too general in their objectives and fields. Small or less experienced firms also said that there was increased pressure for them when they joined the network.

As highlighted by Fuller-Love and Thomas’ (2004) study there are many advantages and also possible costs which accrue to business network firms. These advantages and possible drawbacks of business network membership as emphasised by Fuller-
Love and Thomas (2004) warrant further discussion and so the following sections outline an array of benefits and costs associated with business network involvement.

(i) Information Sharing

Interfirm cooperation has been compared to being similar to an ‘invisible college’ (Best 1998), where ideas and information are exchanged and developed. Information sharing is cited frequently in the literature as one of the most important benefits accruing to firms that engage in business network activities (Witt 2004). One of the main reasons why information sharing has proved so important is because as well as increasing the firm’s intelligence, it also accelerates the distribution and implementation of new technology among firms (Malecki and Tootle 1996; Perry 1999). A study by Baird, Lyles, and Orris (1993) of 188 small firms in the US state of Indiana compared firms engaged in business network activity to those not involved in such activities. The findings revealed that the firms engaged in network activities reported that their network relations aided them to secure new technology, marketing skills, and capital. Mackinnon et al’s (2004) study of SMEs in the Aberdeen oil complex concluded that the importance of being connected to industry business networks was certainly recognised by the majority of respondents. Such membership was particularly important in terms of communication, that is, providing information and knowledge about forthcoming contracts and projects.

(ii) Innovation

Business network literature also affirms positive relations between innovativeness and those firms who are involved in business networks (Arndt and Sternberg 2000). Julien et al (2004) reporting on the results of surveys from 147 SMEs in the land-based transportation equipment sector in Canada, examined the strength of networks the firms possessed and how they impacted on the firms’ development. The results showed that the more innovative firms made greater use of their network sources than less innovative firms. Furthermore, Julien et al (2004) highlighted that business’ networks help them to keep up to date with current issues, while also enabling “them to take advantage of opportunities to innovate, thus remaining ahead of their competitors” (Julien et al 2004 p.251).
Powell, Koput, Smith-Doerr (1996) found that in the US biotechnology industry, innovation is instigated at the business network level, rather than at the individual firm level. They found that patents were more likely to be filed by a group of firms (and research organisations) working together rather than individual firms themselves. They also argued that firms who were members of these networks were able to achieve a competitive advantage that they would not have been able to achieve on their own.

(iii) Increased Profits

Rosenfeld (1996) in examining US business networks highlighted that networks provide their member firms with tangible benefits, which include for example, economies of scale in the form of reduced production costs and marketing costs, improved access to resources, and improved product and/or service quality. Research has also shown that firms involved in business networks have the potential to increase their profits through either (or a combination of) increased sales or the achievement of economies of scale (Rosenfeld 1996). Participation in a business network for example helps firms achieve scale economies (average cost per unit of production decreases as output is increased) with the help of complementary relationships. Business network members achieve greater returns when the marginal benefits they reap are greater than the marginal cost they incur for participation (Arndt and Sternberg 2000; Lechner and Dowling 2000). Fuller-Love and Thomas (2004) in reference to the work of Jarillo (1998) remarked that firms in business networks can profit from decreased marketing costs. Literature has also supported the concept that membership to Keiretsu networks promotes and results in increased profitability to the member firms (Nakatani 1984). A Keiretsu “is an intricate web of relationships among banks, suppliers and companies in related fields” (Porter, Takeuchi, and Sakakibara 2000 p.74). Nakatani (1984) said that a ‘shock’ experienced by a member firm is not only borne by that firm but by other members and banks (to varying levels) of the Keiretsu. The situation of the Japanese Keiretsu is a unique situation, where this group of interrelated firms and banks behave in an exceptionally close manner. Japanese companies for example typically financed 80-90 percent of their assets with loans from their Keiretsu partner, and they create a tightly-knit network of suppliers and customers (Porter et al 2000).
Chetty and Holm (2000) through the use of a longitudinal case study examining how firms use business networks when they internationalise, found that business network activities allow the member firms to form relationships with others that provided them with access to resources and new markets. Research findings have also shown that firms engaged in business network activity record higher export sales (Perry 1999).

Aside from the tangible benefits associated with business network membership, Doyle (2000) in reviewing business networks (from a training and human resource development perspective), highlighted that there are psychological and developmental benefits that can also be attributed to business network participation. Doyle (2000) suggested that firms can reduce their isolation by sharing their problems with others, while network involvement can also help the participant firm to learn and to grow so that it can adapt to the changing environment that it operates in.

(iv) Local Economic Benefits

As illustrated above, the positive impact of business networks on firms’ performance are widespread across a range of issues. Local economic benefits also emanate from business network activity. Besser et al (2006) in reference to Besser’s previous work (2002) recorded how business leaders in towns and cities in one US state work tirelessly to get new business owners and managers involved in their formal business networks. They highlighted that firms in business networks have increased backward linkages in the local economy. Accordingly, “it makes sense that business operators embedded in a dense network of local businesses would be more likely to use local suppliers than operators with fewer ties” (Besser et al 2006 p.325). They explained that networked firms have an increased likelihood of purchasing from local suppliers and service providers, than non-business networked firms, and also suggested that “networked businesses are more successful than non-business networked businesses” (Besser et al 2006 p.333).

The benefits to business network membership have been highlighted throughout the business network literature. The potential costs associated with business network membership have also been noted, although to a much lesser extent. An account of these potential costs is outlined in the next section.
3.7 Costs Associated with Business Networks

While the majority of business network literature proclaims the advantages of business networks, some researchers have cautioned that business networks do not always lead to improved firm performance and that there may actually be a potential ‘dark side’ to network participation (Gulati et al 2000). The following section aims to explore the possible costs associated with business network activity.

Chell and Baines (2000) used quantifiable data from 104 owner-managers and qualitative data of 35 interviews of micro-firms to examine the type and extent of business network activity in the UK. In reviewing the network literature they referred to the work of Curran et al (1993), who showed that owners of small firms in the UK did not actively engage in network activities with other business owners or organisations. The reason for lack of such activity included time pressures, deficiency in growth aspirations, as well as an unwillingness to network, arising from the entrepreneur’s need for independence (Chell and Baines 2000). In a study of three Indian business networks in Chicago and the UK, Frederking (2004) reported that the local culture and the network ties behind neighbourhood businesses stifled innovation and discouraged risk taking in one community while encouraged them in another. Unequal power in business networks can also prove costly for firms. The unequal power between firms in supply chain networks has led critics to warn of the potential for damaging results for SMEs involved in the networks (Mackinnon et al 2004). One of the largest obstacles in maintaining and establishing business networks is the concern held by business owners about the risks of sharing information and resources with other businesses (Curran et al 1993; Gulati and Gargiulo 1999).

Dean, Holmes, and Smith (1997) analysed the attitudes of SMEs (manufacturing and services) in Australia with respect to their involvement in formal (hard) business networks. Aside from identifying the potential benefits of formal network participation (such as increasing firm profits, exchange of information and ideas, staying in business, expansion of sales (volume and location), sustaining firm growth and to avail of advertising and marketing opportunities), factors which may inhibit formal network participation were also highlighted. When asked what they believed to be the inhibiting factors to formal business networks, the firms responded that the
most significant factors, irrespective of whether it was a manufacturing or services firm, were related to the sharing of information with other firms and the firm’s desire to remain independent. Other cited concerns included the issue of trust among members of the business network, the lack of suitable partners in the business network, the geographic distance to the business network, and the lack of suitable information/guidance in the network. Firms were concerned about the increased risk to the firm when in the business network and were also apprehensive about specific firm characteristics such as the size of their firm, and the lack of personal contacts and financial resources they possessed (Dean et al 1997).

Business networks are generally based on collaboration among members, therefore non-reciprocal relationships pose as a threat and a concern for any business network member. A free-rider situation is not condoned in a network and so firms are expected to contribute equally when networking with others. No account is taken of each exchange made among network members. There is, however, a general perception that exchanges between members should be relatively equal⁹ (Witt 2004).

Human and Provan (2000) after examining two SME based business networks in the U.S. wood-products manufacturing industry reported that the network organisers acknowledged they did have problems with encouraging interaction among their members at first. Human and Provan (2000) highlighted that this finding was not unusual given the US business culture is based on “independence, competitiveness, and a belief that ‘sharing is bad’…the competitive ethos…makes cooperation across…organization boundaries very difficult” (Human and Provan 2000 p.340). This culture of independence gave rise to a conflict of interest in the networks where there was a struggle with firms trying to maintain their autonomy, even though it was acknowledged that business network success and subsequent firm success was dependent on the firms interacting with one another (Human and Provan 2000).

An additional potential cost of business network involvement is referred to as the ‘lock-in-effect’. When firms are over embedded with existing partners in a business network, the firm is unable to avail of new collaborative opportunities with other

⁹ Although this is unlikely to be the case in the NoDs previously discussed.
firms (Gulati et al 2000). Business networks may also become rigid which could result in limiting the strategic options of firms because firms may be unaware of strategic options available to them outside of the business network (Sullivan-Mort and Weerawardena 2006).

While the benefits to network membership are plentiful, the discussion above, highlights potential costs that may also be incurred by the network members.

3.8 Conclusion

The focus of this chapter was to outline the key distinctions between business network structures, while also highlighting the motivations, and possible barriers, associated with network membership. Network theory has developed in a number of disciplines resulting in a number of varied typologies of network structures existing in the literature. The work presented by Jones et al (1997) gives a brief snapshot of these different structures, which subsequently leads to the discussion of social networks. The inclusion of a discussion on social networks was warranted because this structure outlines network activity that all firms engage in. Social network theory has developed to distinguish between the strength of ties in social networks. Although the benefits of social network activity are many, Doyle (2000) highlighted, that when firms’ needs become more complex, they look to other network structures to serve these needs. Discussion therefore progressed to examine the various business network structures as a means to meeting these needs.

A range of taxonomies of business network structures exist, therefore, the structures in this chapter were differentiated in terms of their levels of formality and their levels of governance. Subsequently, the various motivations that entice firms to become members of networks were examined, as were the potential costs associated with business network involvement. In general the overriding assumption is that as long as the marginal benefit of business network participation is greater that the marginal cost of being involved in the business network, then firms benefit from network membership. The general consensus highlighted in this chapter is that business networks do benefit the participant firms.
The numerous typologies of business network structures that exist highlighted the need to differentiate between them. In light of the discussion in this chapter, the distinction of a business network structure that will be adopted for the fieldwork part of this study, is the most ‘basic classification’ as it was coined by Rosenfeld (1996). More specifically, business network structures are defined in terms of their levels of formality. Where the formal (hard) business networks refer to business networks where members are relatively interdependent and join together to work together towards a common goal, such as co-production, co-marketing, or cooperating with other members in terms of R&D activities. In contrast informal (soft) business networks refer to situations where firms are more loosely connected and cooperate in terms of sharing information, acquiring new skills, or solving common problems.

As alluded to above, business networks in Ireland are distinguished in terms of their levels of formality in the fieldwork part of this study. Formal business networks are chosen for the evaluation phase of this research. The reason for focussing on formal business networks is because formal networks are more goal focused and so the impacts of this type of business network on the member firms growth is likely to be more tangible. A second reason for focussing on formal networks is because recent network initiatives introduced by the Irish government have been formal business networks. Further discussion relating to the rationale for this choice is provided in Chapter 6.
Chapter 4: Business Network Policy
4.1 Introduction

Researchers have highlighted the merits of business network participation and therefore business network policy has found its way into policymaking circles at regional, national, and European levels (Cabus and Vanhaverbeke 2006). The objective of this chapter is to provide an overview of how network policy has developed from a national and international perspective. This will provide some interesting insights into the importance policymakers have placed on business network promotion. Section 4.2 explains where network policy originated, while Section 4.3 outlines the current situation relating to European network support. Section 4.4 examines the history of Irish network policy tracing from the first national linkage program in 1985 to the current situation of Irish networks (Section 4.5). It is important to get an insight into the history and current state of Irish business network policy because it is the case of Irish business networks that are used as a laboratory to test the evaluation framework developed in the latter part of this thesis.

4.2 Government Support for Business Network Initiatives

This section traces the history of business network support by policymakers and outlines the key distinctions between the various initiatives introduced. Discussion first begins with the case of Italy because many believe that the benefits of networking that accrued to firms in Italy sparked the interest of international policymakers.

4.2.1 Italy

According to Rosenfeld (1996) the ‘catalyst’ for business networking was northern Italy, specifically the Emilia Romagna region during the 1970s and 1980s. In this region it was common for groups of small artisan firms to hold a remarkably strong market position. A large part of this success was due to the tight-knit, interdependent, and shared objectives of trade and business associations and membership service centres (Rosenfeld 1996 in reference to the works of Pyke, Becattini, and
Sengenberger 1990, and Putnam 1993). Government policies during the 1970s and 1980s further encouraged cooperation, however, the underlying conditions of such collaboration already existed, conditions synonymous with business networks in Italy. The network firms had a strong artisan tradition and were clustered geographically which led to the natural formation of the business networks (Rosenfeld 1996). Business networking allowed these firms to gain access to outside capabilities and resources which enabled them to supply to the larger firms, something they would not have been capable of achieving on their own (Rosenfeld 1996). Firms were able to benefit from sharing information and knowledge when cooperating with others (Becattini 1990). According to Pyke and Sengenberger (1992) the local networks developed in conjunction with the trust and flexibility embedded in them formed the basic principles believed to stimulate local development in the region.

Research by Lorenzoni (1982) found that network formation in northern Italy was a “process of devolution from a group of 700 very large firms in 1951 to 9,500 firms by 1976” (Lorenzoni (1982) cited in Chance and Vlosky 1995 p.10). In most cases according to Chance and Vlosky (1995), the formation of business networks in Italy was based on the hub-and-spoke network structure, where a large ‘hub’ firm subcontracted production to smaller (specialised) firms. The result of these business networks formed in the Emilia-Romagna region was that the region went from being one of Italy’s poorest regions in 1970 to being the second wealthiest (of 21 regions) in 1985 (Forfás 2004).

### 4.2.2 Denmark

The success of business networks in the Emilia Romagna region sparked an interest in business networking from Danish policymakers. Key differences that were clearly evident between the two countries were that Denmark lacked the high concentrations of ‘like’ firms, which dominated the Italian regions, and it also lacked the strong family ties that the Italian firms possessed (Rosenfeld 1996). In 1989 the Danish

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10 This hub-and-spoke network structure is similar in terms of its levels of governance, to the networks of direction that were discussed in the preceding chapter.
Technology Institute (DTI) designed a program which was immediately adopted by their Ministry of Trade and Industry. The key components of this program were:

a) “A publicity campaign;

b) Training programs for people, called ‘brokers’ to facilitate cooperative ventures and other people called ‘scouts’, to identify opportunities; and

c) A competitive grants program for groups of three or more firms to encourage them to design, develop and implement activities jointly.”

(Rosenfeld 1996 p.248)

Danish industry associations were very sceptical of this strategy as they felt that Danish firms were too independent and competitive to work together like the Italian firms. In effect, the Danish firms lacked the tradition of interfirm collaboration that the Italians possessed. Despite this scepticism, the Danish government maintained their commitment (3 years) to the strategy. The two key features of the program were network brokers and financial subsidies. The network brokers identified opportunities and brought firms together; they initiated discussions and advised on aspects of cooperation. Financial support was deemed necessary to help Danish firms to see the benefits of business networking and a graduated level of support was provided at different phases of the program (NESC 1996). According to Ffowcs-Williams (2000), by 1993 (4 years after its inception) approximately 150 business networks involving 650 firms were formed as a result of the DTI program. A key finding following evaluation of the program in 1991 was that 40 percent of firms that had reached Phase 3 of the program ascribed at least four percentage points of their increase in sales to their participation in the program, while 75 percent of the respondents thought that the network cooperation had strengthened their international competitive position (NESC 1996 p.5-7). Therefore, although Northern Italy is commonly regarded as the inspiration of interfirm collaboration, Denmark proved that similar positive results could be achieved under very different conditions and as such has provided its’ own inspiration for other countries to follow suit. According to Rosenfeld (1996), other countries that adopted the Danish program were for example, Portugal, UK, Spain, US, and Ireland.
The US while wishing to emulate European business network policies faced a dilemma in choosing between the Northern Italian and Danish models according to Rosenfeld (1996). Basically, the choice faced by US policymakers was whether or not they should attempt to foster a culture which supports interfirm cooperation (the Italian approach), or use public policy to incentivise business networking in the hope that the value of business networks would become apparent overtime, thus leading to a creation of a culture of interfirm cooperation (the Danish model). The end result was that both approaches were adopted in the US but by different States (Rosenfeld 1996). According to Ffowcs-Williams (2000) business network initiatives have also been introduced in many other countries, for example, Norway, Australia, Canada, and New Zealand. A brief overview of these country cases are outlined below (adapted from Ffowcs-Williams 2000 pp.5-6).

(i) Norway

From 1990 to 1998 support was given to 100 business network projects, which incorporated approximately 2,700 firms (predominantly SMEs). A significant amount of public support was provided and a pool of consultants was made available to act as brokers. No significant improvements in the business network firms’ performance were recorded following a review of the ‘bottom-line’ results. The network firms did, however, perceive that they had benefited from membership to these networks. Softer outcomes were recorded as being achieved, such as for example, improved business processes, the ability to cooperate with others, and capability development.

(ii) Australia

AusIndustry sponsored the Australia Business Network Program, which ran for four years from 1994 to 1998. In this time period, 400 business networks were formed, which involved approximately 1,200 firms. Most of the networks formed involved local firms coming together. In the case of more export orientated business networks, however, firms were from a much wider geographic location. The prime focus of this initiative was to encourage interfirm cooperation among the member firms.
(iii) Canada

For a three-year period, 1995 to 1998, the Canadian Chamber of Commerce and an alliance of business associations ran the Canadian business networks program. This initiative, which followed the Norwegian structure, created 30 business networks. A number of networks had already been established in Canada prior to this program, however, other networks were created as a direct result of the program. For example, The British Columbia Trade Development Cooperation developed 18 business networks that were export focussed; also developed were a number of business networks in manufacturing, resources, and environmental sectors; the Quebec Government in conjunction with Laval University, developed a business networks program with a focus on value-added processes and supplier chains; amongst other provincial and sectoral network initiatives.

(iv) New Zealand

New Zealand Trade Development Board established New Zealand’s first business networks initiative in the late 1980s, specifically, export focussed groups of firms. These were predominantly soft networks however, in 1994 a hard networks initiative was piloted. The soft networks developed in the first initiative established trust and links between firms, which to some extent, is believed to have aided in the development of hard networks in New Zealand’s second initiative.

One common theme evident in each of these country cases is that public policy was used to promote a behavioural change in how firms operated. More specifically, networks were seen by policymakers as a way for firms to work together to achieve greater results than they would accomplish on their own.

4.3 Current Support for Business Network Initiatives

While the Emilia-Romagna region of Northern Italy and the Danish business network models have been adopted by many countries in the hope of fostering a business networking culture, policymakers’ promotion of such activity still remains a strong
Policy making at the European level has also promoted business networks as a tool to encourage growth at micro and macro levels. European innovation policy has evolved over time, and has moved from being R&D focussed during the 1970s to being based on knowledge transfer during the 1980s, while during the 1990s it was realised that innovation “is not a linear process” (EU 2009 p.6). Instead, innovation is seen to involve a network of players, such as for example, firms, researchers, and universities. Innovation is a major focus of the 2007-2013 European Cohesion Policy programs, and the Cohesion policy will contribute a quarter of its funds (€86 billion, three times more than the previous programming period (2000-2006)), to R&D and innovation. According to the European Union (EU) (2009) a significant proportion of this money is spent on developing networks, cooperation, and clusters. The EU also endorses the use of networks as a means to exchange ‘best practice’ between regions, such as for example, the Innovating Regions in Europe network (IRE) and the RAPIDE network (EU 2010). Overall, the above highlights the significance the EU places on the ability of networks to foster development in research activities to impact at both a micro and macro level.

The EU, in February 2008, launched one of its newest business network initiatives, the Enterprise European Network, a European network to support firms, which is financed by the European Commission, through the Competitiveness and Innovation Framework Program (CIP). The primary aims of this network are to assist firms in going international (that is, avail of the large European market), in terms of their innovation and developing new products, in accessing EU projects and funding, and providing feedback to the Commission to ensure that the policies and initiatives introduced by the Commission are actually helpful to SMEs (EU 2008)11. In all, the network has 572 members, which include Chambers of Commerce, universities, and development agencies, located across the EU and further afield12. A number of successful collaborations have emerged from this network. One such example

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includes Owlstone, a British nanotechnology specialist firm, which through the Enterprise Europe Network located a supplier with which it now collaborates with and sells its chemical detection system to in Luxembourg\textsuperscript{13}. Limited resources can hinder firms from entering new markets and so the Enterprise European Network also assists firms to source funding, as was the case with an Italian hydraulics company who sourced finance to help them prepare a feasibility study for entering potential new markets\textsuperscript{14}. The EU also actively provides financial support for collaborative activity. The Seventh Framework Program (FP7) for example, allocated €32,413 million to the Cooperation program to support all types of research collaborations between universities, research institutions, and industry\textsuperscript{15}.

In conclusion, the Emilia-Romagna region is referred to as the birthplace of business networks. The experience here generated interest in the possible benefits of business networking, and policymakers began to embrace the notion of promoting such activity within their own economies. The DTI implemented their business network program in 1989 and international policymakers subsequently attempted to adopt this Danish model. Italian policymakers were faced with a relatively easy task of promoting business networks given the natural presence of networks among Italian firms. This natural culture between firms allowed for cooperation without hampering competition for the Italian firms (Rosenfeld 1996). Denmark, on the other hand, lacked any form of business networking culture and so used public policy to promote such practice in the hope that the firms “would become absorbed into the culture” of interfirm cooperation (Rosenfeld 1996 p.249). Today, European policy recognises the advantages of business networking activities, and thus promotes such activity through a number of network initiatives and provides funding to entice collaboration between various actors.

Irish policymakers do not differ to the countries outlined above and have also recognised the benefits to be gained from promoting business networks. This has resulted in a number of Irish network programs being introduced. The promotion of networks in Ireland provides an interesting case to study because business network

\textsuperscript{13} http://www.enterprise-europe-network.ec.europa.eu/success-stories/chemical-firm-sniffs-out-new-opportunities
\textsuperscript{14} http://www.enterprise-europe-network.ec.europa.eu/success-stories/eu-funds-give-lift-new-markets
\textsuperscript{15} http://cordis.europa.eu/fp7/cooperation/home_en.html
policy in Ireland has changed from that of a top-down promotion of networks to a bottom-up approach in the promotion of recent network initiatives. The next section outlines the history of Irish business network policy. The current situation of networks in Ireland is then outlined.

### 4.4 Business Networks in Ireland

Business networking has a long history in Ireland, according to Doyle (2000), the *Ouzel* was the earliest recorded exercise of Irish firms cooperating in the pursuit of a common goal. The *Ouzel* was an organisation that was made up of Dublin merchants who formed a society so that the profits from the sale of goods on the galley that had run aground in Dublin Bay would be managed and distributed in a fair and equitable manner. The society remained in existence and eventually developed into the Dublin Chamber of Commerce (1757).

The structure of the Irish economy has changed dramatically in the last number of decades, as has the focus of industrial/enterprise policy. Ireland, prior to the 1950s was a closed economy, however, as an economy trying to recover from the financial crisis later in that decade, Ireland relaxed its protectionist stance and policymakers began to promote Ireland as an attractive low-cost location on the periphery of Europe for multinational corporations (MNC) to operate as a base from. Ireland joined the European Economic Community (EEC) in 1973, which further necessitated reducing protectionist laws. Ireland now, a small open economy, reaped the rewards which came with an influx of foreign direct investment, however possible side-effects (some negative) for indigenous firms were also experienced, which are further explained below.

The Telesis report (1982) warned of the lack of technical competence within the indigenous sector and also highlighted the foreign MNCs’ lack of confidence in the Irish companies as potential suppliers. This prompted Ireland’s first ever initiative aimed at promoting interfirm collaboration, the National Linkage Program (NLP) (1985). This was a top-down approach in which indigenous firms were targeted by the state agency as potential suppliers to the MNCs. Its aim was to “focus on
upgrading local suppliers by improving their technical know-how and ability”, thus increasing “the ability of Irish suppliers to serve the MNC market in Ireland” (Ruane 2001 p.3). Between 1985 and 1992, foreign MNCs increased their local purchases of raw materials by half (from £IR438 million to £IR811 million), while in the electronics industry, local sourcing increased from nine to nineteen percent during that period (World Bank 2005). Suppliers experienced an 83 percent rise in sales, and their productivity and employment increased by 36 and 33 percent respectively (United Nations Conference on Trade and Development (UNCTAD) 2001).

Ireland’s National Economic and Social Council (NESC) (1996) outlined details of a successful business network which was stimulated by the NLP. Three independent companies, namely, Top Tech, Rennicks and Ballymount Precision Engineering, were contracted by Apple, the computer company, to produce components for keyboards and frames for their computers. Through the NLP, Apple requested that the three companies produce integrated systems instead of the disconnected components they had been supplying, hence the formation of the Orbitech group (assisted by the electronic linkages team, which is now Enterprise Ireland, one of Ireland’s national development agencies). Orbitech, following its formation was an alliance of complementary companies, who “were able to innovate collectively in the face of a demand change from a key customer”; the customer being, Apple (NESC 1996 p.26). It is believed that this network structure allowed Orbitech to win contracts worth up to £25 million. Eventhough, the NLP was heralded somewhat of a success, warnings about the lagging indigenous sector continued to be expressed (NESC 1996).

The Culliton Report (1992) further emphasised the need for Irish policy to focus more on the indigenous sector and build on local strengths, citing the Danish business network program (as previously discussed), as a possible example for Ireland to follow. Shortly after this, the Science, Technology, and Innovation Advisory Council’s report (STIAC) (1995) was in agreement that, “the basic structural problem of Irish industry … must be tackled through a program to bring enterprises together in co-operating groups” (Forfás 2004 p.34). Their suggested aim was to bring independent companies with complementary activities together to collaborate in various common areas, such as R&D, technology acquisition, process change, and market development. The STIAC, like Culliton, also highlighted the Danish network
program as a suitable benchmark program for the Irish policymakers to follow. Thus, the key recommendation of the STIAC report was the establishment of an Irish business program modelled on the Danish one.

The Science, Technology and Innovation White Paper followed in 1996 with the declaration that Forbairt\textsuperscript{16}, an Irish development agency, would introduce a Pilot Network Program (PNP) aimed at fostering networking activities among firms. The PNP was introduced in 1997 and ran for a six-month period. By the end of the pilot seventeen new business networks had formed, which led to the recommendation by the Steering Group of the PNP, that a full network initiative be implemented at a national level, while it was also suggested that the initiative should be based along the lines of the Danish model.


“The role of enterprise-led networks will become progressively more important as a mechanism to drive the development agenda and provide services to companies. Over time, a higher proportion of state support is likely to be delivered to networks focusing on developing sectoral expertise and enabling Ireland to become a global centre of excellence in niche areas”.

(ESG 2004 p.30)

Following the publication of the ESG report and its convincing promotion of business networks, Enterprise Ireland launched one of its more recent networking initiatives. The initiative was launched in February 2006 and significantly was a bottom-up approach, and was known as \textit{The Pilot initiative for Collaborative Projects from Industry-Led Networks}. The aim of the pilot was to support up to ten business networks (of 24 months duration) that wanted to work on a collaborative project, which may have the potential to result in benefits to the companies involved and the wider economy (Lenihan and Sugden 2008). Early in 2006 facilitation funding from

\textsuperscript{16}Forbairt is now known as Enterprise Ireland, which is the government agency responsible for the development and promotion of the indigenous business sector. (http://www.enterprise-ireland.com/)
the Irish Government was approved to sixteen industry-led networks from a range of sectors across all regions in Ireland to stimulate and assist the business networks in the development of potential collaborative projects. €1.5 million was approved in January 2007 to support five industry business networks who were undertaking collaborative projects under the enterprise industry-led networks pilot initiative.

Given its relatively recent inception, the success or otherwise, of this initiative has not as of yet been evaluated. However, research by Lynch, Lenihan, and Hart (2009) proposed an ex-ante evaluation framework which they suggest can be usefully employed to evaluate the pilot program and also suggest that the framework can be used should the Irish government decide to have a full roll-out of the program (details of which are discussed in Chapter 5, Section 5.6).

In addition to the network initiatives already highlighted, Lenihan and Sugden (2008) pointed out that there are three main focal points in policies involving business networking in Ireland, one of which have been discussed already, namely the NLP. The second focal point was on training, where the National Economic and Social Council (NESC) (1996) and Forfás (2004) identified the Plato Program as another early networking initiative. According to NESC (1996), Plato initiatives are a locally-based focus on training networks, whereby local owner managers are encouraged to share information and learn from each other in addition to learning from large local enterprises who act as facilitators of small working groups. The Skillnets Initiative, another distinct training program involving a relatively wide set of economic actors, was introduced in 1999. According to the DoETE (2003 p.138), the objective of this initiative is “to improve workforce training at enterprise level, particularly among SMEs”. The initiative is administered by Skillnets (an independent company whose board comprises employers, union and state representatives).

Third, there were network initiatives in the area of Research and Development (R&D). Examples of these network initiatives include for example, Science Foundation Ireland’s (SFI) program for Centres in Science, Engineering, and Technology (CSET). The aim of this initiative is to create networks of internationally recognised researchers from third level educational establishments and industry. Enterprise Ireland (EI) through its Innovation Partnership, its Programs for Advanced
Technology and its Technology Transfer Initiatives, supports cooperation between industry and academia (Lenihan and Sugden 2008).

All-island business networks and regional business networking have also been promoted under the auspices of InterTradeIreland\(^{17}\) and individual regional development agencies respectively. The DoETE (2003) see the all-island business networks promoted by InterTradeIreland as networks designed to help businesses, in the North and South of Ireland, to build strategic relationships, in addition to, exchanging market information. The All-Island Software Network (AISN) for example is a strategic partnership between InterTradeIreland, the Irish Software Association, and Momentum, the Northern Ireland Information Communication and Technology (ICT) Federation. The core aim of the network is to help firms to increase trade by establishing collaborative business networks across the North and South of Ireland. It also aims to help firms grow and achieve economies of scale, while also assisting them to identify and develop business driven networks\(^{18}\).

One network which was promoted at a regional level by Shannon Development (an Irish regional development agency) was Supply Network Shannon (SNS), a network of engineering and electronics sub-supply companies. Formed in 1999, SNS is “an industry led initiative aimed at; representing, promoting, developing and connecting together sub-supply companies in the Shannon Region of Ireland”\(^{19}\). SNS run a number of programs, such as for example, the Tsunami Network, a cluster of manufacturing firms working together on a project, specifically to develop a joint quotation model. They also partner with Skillnets to develop and deliver training to their member firms, while they self confess to hope to promote themselves as a national reference model for business networks in Ireland.

In light of the comprehensive overview provided of the history of network policy in Ireland, the next section focuses on the current situation relating to business networks in Ireland today. It presents details of Ireland’s most recent business network

\(^{17}\) InterTradeIreland is a development organisation given responsibility by both North and South of Ireland governments to encourage trade and growth across the island of Ireland. (www.intertradeireland.com)

\(^{18}\) www.intertradeireland.com/index.cfm/area/information/page/all%20island%20software%20network

\(^{19}\) http://www.snshannon.com/about-supply-network-shannon.html
initiatives introduced and draws a distinction between the various Irish network initiatives introduced over the years.

4.5 The Current Situation of Irish Business Networks

InterTradeIreland (ITT) completed Ireland’s most comprehensive study of business networks in operation in Ireland to date, in the report, *Business Networks on the Island of Ireland* (2005). The content of this report was based on questionnaires that were completed by business networks across the island. They identified 110 networks and clusters, with a total of 9,860 firms involved in these networks, 93% of which were SMEs. They categorised the networks into four distinct groups, namely, business networks, development networks, regional business clusters, and business organisations. Details are outlined in Table 6. Similar to the discussion entered to in Chapter 3, there are numerous typologies of business networks structures. The distinctions made by ITT further contribute to these. The table presented however is just for illustrative purposes to outline the types of business networks in Ireland, rather than entering another discussion as to the types of business network structures in Ireland.

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20 It is believed that the updated version of the report is due to be published in 2010.
21 ITT recognised that there is a difference between the two concepts. They made reference to the work of Ffowcs-Williams (2000), who highlighted that the two terms hail from a common spectrum, with “a blur between them rather than a sharp divide” (ITT p.13). Hence, ITT use both terms interchangeably.
22 This figure may be reflected by the dominance of SMEs in Ireland. For example 81 percent of industrial enterprises and 98 percent of firms in the services sector are classed as small firms (CSO 2008).
Table 6: Business networks on the island of Ireland

<table>
<thead>
<tr>
<th>Type of Network</th>
<th>Definition</th>
<th>Number of Networks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Networks</td>
<td>This involves firms collaborating for specific purposes where the results of the activity will have some identifiable and measurable impact on their business. Specifically a business network is (a) a group of firms (b) with restricted membership (c) who have agreed to cooperate in some way (d) to achieve specific business objectives that are likely to result in enhanced competitive advantage and/or mutual financial gain.</td>
<td>74</td>
</tr>
<tr>
<td>Development Networks</td>
<td>This is the most basic form of network consisting simply of firms, associating with other firms where the activity may often be confined to networking, the exchange of information, or shared services. These networks will usually be informal and unstructured and may meet the first three of the four key elements of the Business Networks category but typically will not have a purpose linked directly to financial gain or competitive advantage for the members.</td>
<td>18</td>
</tr>
<tr>
<td>Regional Business Clusters</td>
<td>These are geographically concentrated groups of interconnected companies, educational institutions, local authorities, local economic development agencies, and related institutions that arise out of linkages or externalities across sectors. Clusters share a common regional location. Though they often result in gain for companies, clusters are not always established solely with that end in mind and are often motivated by broader goals that have to do with regional and national economic development for the greater public good.</td>
<td>18</td>
</tr>
<tr>
<td>Business Support Networks</td>
<td>This category refers to inter-organisational networks of business or trade associations with state agencies, universities or other institutions undertaking collaborative initiatives or inter-organisational responses for the ultimate, though not direct, benefit of businesses. They may also include some individual firms but their objectives are not directly related to the business results of those firms.</td>
<td>17</td>
</tr>
<tr>
<td>Business Organisations</td>
<td>This includes either recently or long established industry associations, chambers of commerce, business-associations and professional bodies where members pay dues and commit themselves to a certain level of joint problem-solving, but where their business success does not depend significantly on the actions of other members. The primary aim of most of these bodies is to represent the business members to external parties.</td>
<td>No number given</td>
</tr>
</tbody>
</table>

Source: Adapted from InterTradeIreland (2005 pp.15-17)
Business networks are geographically dispersed throughout Ireland, with 81 percent of the networks established between 2001 and 2005 (ITT 2005)\textsuperscript{23}. The firms involved were from a broad spectrum of industries. The study showed that the key success factors of a network (as perceived by the network itself, not the network members) depend on (in order of most importance), the commitment of member firms; access to funding for the network; full-time facilitation; good information flow/communication between members; support of state agency; strong leadership by members; listening to the needs of members/constant feedback; increase in membership base year on year; and sharing of knowledge in the network (ITT 2005).

The report outlined that the business networks claim their member firms benefit in many ways, such as for example, the free flow of information among members and the provision of a supportive environment. This statement they believe is strengthened by the fact that 74 percent of the partnerships are driven by the firms themselves, thus, are bottom-up industry-led initiatives. The report also highlighted the important role to be played by government agencies in supporting network initiatives, with 65 percent of the networks and clusters on average being part funded by the government agencies. One of the final points highlighted in this report was the belief that networks “need a critical mass of companies as well as other actors to grow and prosper” (ITT 2005 p.55). Seven key recommendations emerged from this report, as follows:

1. Increase the number of networks and clusters in the island of Ireland;
2. Improve the range and scope of network and cluster facilitations;
3. Improve the flow of information between networks and clusters;
4. Develop credible data on network and cluster performance;
5. Increase the role of public agencies in supporting networks and clusters;
6. Support collaboration between networks and clusters; and
7. Improve international collaboration for Irish networks and clusters.

(ITT 2005 pp.55-59)

\textsuperscript{23} According to InterTradeIreland (2005), 40 percent of the networks and clusters identified (categories 1-3) are supported by Skillnets. Skillnets is an enterprise-led support body whose mission is to enhance the skills of people in employment in Irish industry to support competitiveness and employability. (http://www.skillnets.com/)
These recommendations highlight the future path needed to develop business networks in Ireland. As evident from these recommendations, ITT stressed the need for additional support of business networks, which further emphasises the importance business networks provide in supporting the growth and development of firms and the environments they operate in. It is also important to note at this juncture, that the continued support of Irish policymakers to network initiatives also highlights the need to develop appropriate evaluation methodologies to estimate the impact of membership to these network initiatives on firm performance.

Subsequent to the publication of this overview, a number of Government policy documents dealing with the growth of the economy referred to the need for and development of business networks. The Department of Enterprise, Trade and Employment (DoETE) published the report, “Knowledge and Enterprise Clusters in Ireland”, in 2008, which acknowledged the important role the DoETE plays in creating enterprise development policies, such as business networks and clusters (again, these terms were used interchangeably). The report highlighted the understanding by Irish policymakers of firms’ needs to avail of external resources. This is echoed in the business network literature where it is also acknowledged that no firm operates in complete isolation (Håkansson and Snehota 2006), and thus need to collaborate with others to avail of these external resources that the DoETE (2008a) refer to. On the whole, DoETE’s (2008a) report provided an overview of the importance that business networks (and clusters) play in the Irish economy. More importantly, it also highlighted that this importance is recognised by the DoETE. In highlighting the importance of business networks and clusters in Ireland, DoETE (2008a) referred to a number of current network programs outlined below (adapted from DoETE 2008a pp.10-11). While these programs were not directly involved with creating individual business networks (apart from the industry led network program), each program promotes the concept of business networking and the creation of collaborative relationships with experts such as those in academia, who can help the firm to achieve returns they would be unable to reach on their own. Hence, a brief overview of each is provided here.
(i) **Strategic Research Clusters**

This initiative funded by Science Foundation Ireland (SFI) provides support for linking researchers in academia and industry currently within twelve Strategic Research Clusters.

(ii) **Centres for Science, Engineering, and Technology**

SFI has funded the establishment of nine Centres for Science, Engineering and Technology with the aim of advancing knowledge and exploiting opportunities for discovery and innovation. These Centres involve research partnerships between Irish universities and leading multinational companies.

(iii) **Competence Centres**

This initiative jointly promoted by IDA Ireland (Industrial Development Agency) and Enterprise Ireland involves the establishment of collaborative entities led by industry and resourced by highly qualified researchers associated with research institutions. They are empowered to undertake market focused strategic research for the benefit of industry. The objective of the Competence Centre initiative is to achieve competitive advantage for industry in Ireland by accessing the innovative capacity of the research community. In August 09 2010, the Irish Government announced increased funding, €37 million, for investment in these competence centres. The Minister for Enterprise stated that these competence centres enable firms who may normally be competitors, to come together and collaborate with one another to overcome common research issues.24

(iv) **Technology Transfer Offices**

The Government is committed to significantly increasing the support for Technology Transfer Offices in third-level institutes to ensure better economic returns from R&D investment. These offices work with the researchers to identify commercial

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opportunities, negotiate with enterprises, and protect and manage intellectual property.

(v) Industry-Led Networks Pilot Program

Enterprise Ireland has provided funding for the creation of business networks through its Industry-Led Networks Pilot program. The program was designed to support industry-led networks undertaking collaborative projects that contribute to the development of the member firms, while also contributing in some way to national economic objectives.

(vi) Innovation Partnerships

This initiative supports joint R&D projects involving companies and universities, where a lot of the R&D is carried out within a third level institute or a public research organisation, however benefits to the firm accrue in terms of the expert knowledge they are receiving. Funding is provided to the research performing body, which also receives support from the collaborating company.

(vii) Applied Research Enhancement

This program provides funding for the establishment of applied research centres in Institutes of Technology, aimed at building sufficient scale to allow them to make an impact on industry in their locality through collaboration with others in the area. Support is provided to Institutes of Technology to cover the capital, personnel, materials, and other directly associated costs.

(viii) Skillnets

Skillnets is an enterprise-led support body dedicated to the promotion and facilitation of learning, as a key element in sustaining Ireland’s national competitiveness. Skillnets supports over 150 networks of enterprises in learning networks, which are led and managed by the enterprises themselves.
(ix) Fusion

Fusion is an ongoing all-island business network initiative managed by InterTradeIreland that supports business innovation and increased capability, by developing and facilitating partnerships and projects, between businesses, higher education institutions, and graduates.

These programs highlighted by DoETE (2008a) involve collaboration between industry and academia (aside from the industry-led networks pilot program and Skillnets, which are both bottom-up approaches and are predominantly firm based). The intention behind fostering these network programs is to advance knowledge and exploit any research opportunities to develop innovative activity (an approach also adopted by the EU as previously highlighted).

Additionally in 2008, the DoETE published, the “Innovation in Ireland” report. Highlighted in this report was Ireland’s aspiration to become a leader in innovation and to developing an “innovation-driven economy”. Once again this report reiterated the importance of collaboration and recognised the advantages that accrue to businesses that do collaborate (DoETE 2008b). Business networks (and clusters) were pointed out as one of the ten key policy areas that underline the Irish Government’s approach to innovation (DoETE 2008b). The reason why such initiatives are being promoted is because businesses that network can achieve more collectively than they could do on their own (DoETE 2008b).

In response to the economic challenges that Ireland are facing, the DoETE (2008c) proclaimed that there are also opportunities that can be availed of to help the Irish economy progress through the downturn. ‘Building Ireland’s Smart Economy’, a policy document produced by the DoETE (2008c) proposed a number of actions to try and restructure the Irish economy. The five actions identified were based on harnessing the strengths already present in the economy. More specifically, the actions included:
(i) Securing the Enterprise Economy;
(ii) Building the Ideas Economy – Creating ‘The Innovation Island’
(iii) Enhancing the Environment and Securing Energy Suppliers;
(iv) Investing in Critical Infrastructure; and
(v) Efficient and Effective Public Services and Smart Regulation.

(DoETE 2008c)

The heart of the second action, creating ‘The Innovation Island’, is centred on the premise of building on the success of Ireland’s indigenous sector. Innovation was highlighted as the “key building block” to develop the indigenous sector (DoETE 2008c p.60). To move Ireland towards this ‘Innovation Island’, medium-term objectives were specified. One of the specific objectives outlined was to ‘increase significantly the availability of capital and business networks for start-up research-intensive enterprises’ (DoETE 2008c p.61). Increasing the availability of both capital and business networks were highlighted because both were recognised as catalysts for converting “research and innovation into valuable commercialised products and services” (DoETE 2008c p.62).

Enterprise Ireland has recently funded two new enterprise networks, aimed at fostering collaborations between industry and sector groups. The aim of these networks is to entice firms to collaborate with one another and to work with experts in R&D (Enterprise Ireland 2009). Enterprise Ireland has provided €600,000 to fund the networks, which include the Enterprise Innovation Network (EIN) (launched in July 2009) 25, and the most recent network launched in February 2010, which is the Irish Software Innovation Network (ISIN) 26. The introduction of EIN was the last recommendation to date by the Irish Government’s Strategy for Science, Technology, and Innovation 2006-2013 to be put into action and focuses on promoting R&D to SMEs in the Irish construction sector, while the ISIN aims to increase collaborative activity between firms in the software sector with research experts. The launch of these new network initiatives further emphasises the importance of the role business networks play in Irish policymakers’ strategy.

As the evidence above shows business network promotion has remained an important tool for Irish policymakers. One change evident in Irish business network policy has been the move from a top-down to a bottom-up approach of business network promotion. The NLP (1985) and the Pilot network initiative (1997), two of Ireland’s first network initiatives, were both top-down approaches. The NLP for example, involved the national development agency creating links with MNCs for Irish sub-supply companies, while the PNP (1997), which was modelled on the Danish network program, involved bringing independent companies with complementary activities together to collaborate in various common areas, such as R&D, technology acquisition, process change, and market development. At the heart of both of these initiatives were government agencies creating the network connections between the firms.

More recently, network promotion is based on bottom-up approaches, where business networks are now being led by the member firms. In response to ESG’s (2004) report, the pilot initiative for collaborative projects from industry-led networks was launched by Enterprise Ireland in 2006. Significantly, this was the first bottom-up network initiative promoted by Irish policymakers.

Aside from this change in strategy in network promotion, the promotion of Irish business networks has also moved in line with that of the EU business network policy, where innovation has been highlighted as a key driver of economic success. To drive this success in innovation, business networks have been recommended as tools to harness this activity. In Europe, the Enterprise European Network was launched in 2008 and the European Commission provide funding to support collaboration between industry and academia, while in Ireland, the newest network initiatives introduced are aimed at promoting research activities amongst SMEs in Ireland.

4.6 Conclusion

In light of the evidence provided above, it was the Emilia Romagna region in Northern Italy that first sparked the interest of international policymakers with respect to the promotion of business network initiatives. Due to the geographically
concentrated family-based element of the interfirm networks in the Emilia Romagna region, a culture of interfirm networking existed that is synonymous with Italy. Policymakers in Denmark, recognising the benefits of interfirm cooperation in Italy, introduced their first business network program in 1989. Danish firms did not possess any previous culture of networking activity while the firms were also not necessarily geographically concentrated. These issues therefore posed a different challenge for the Danish policymakers to those experienced in the Italian case. Following its introduction the Danish network program was heralded somewhat of a success and it has subsequently received considerable attention from international policymakers. Recognising the benefits achieved in the Danish case, many international policymakers emulated the Danish program; Ireland being one of those countries. Ireland’s PNP, based on the Danish network model, was used by Irish policymakers to promote collaborative activity among firms. Irish policymakers faced similar challenges to those experienced in Denmark in that no established history of interfirm cooperation existed. The pilot programme was however reported as being a success and Irish policymakers have maintained their support for business network initiatives.

Irish policymakers have subsequently implemented a number of business networking initiatives, which have varied from initial top-down approaches to more recent bottom-up initiatives. The aim of each initiative has been to increase interfirm networking, with the expected result being that the participant firms would experience increased rates of growth. In line with global trends, Ireland’s economy has experienced significant change in recent times therefore the Irish government is faced with tight budgets. The recent quarterly economic commentary (QEC) (2010) outlined that gross national product (GNP) decreased 3.5 percent in 2008 and decreased by up to 10.7 percent in 2009, with growth expected to fall by 0.5 percent by the end of 2010 (positive growth for gross domestic product (GDP) of .025 percent is estimated for 2010). The current economic downturn has also contributed to a significant decrease in employment, where expected employment for the end of 2010 will be 72,000 lower than in 2009 (on an annual average basis) and has decreased by 266,000 since 2007, while the general government deficit (GGD) is expected to be 11.5 percent of GDP by the end of 2010 (The Economic and Social Research Institute (ESRI) 2010).
Although Irish growth rates have decreased and unemployment rates have increased considerably, putting a strain on public finances, the Irish government has remained focused on the promotion of business networks. Although, funding to informal networks, such as Skillnets, has decreased. In 2009, the Irish government cut Skillnets funding by €9.8 million\textsuperscript{27}, however, the new EIN and ISIN network initiatives have both received the government’s financial backing over the last twelve months. These new initiatives in conjunction with recent government publications highlights the continued focus on business networks as a means for Irish firms to become more competitive.

ITT (2005) highlighted a number of key recommendations to help grow business networks in Ireland. Emphasised in these was that one aspect of business network analysis which still remains deficient in Ireland is the development of credible data on business network performance (recommendation number 4). ITT relied on the views of the business networks regarding the motivations for, and impacts of, business network membership. Undoubtedly, information provided in this way does not provide a clear reflection as to the effects of business network membership, as perceived by the network members. If credible data were available then the impact of business network membership on participant firms’ growth could be evaluated. This research addresses this issue highlighted by ITT (2005) and gathers data from firms who are members of formal business networks. A detailed account of this information is provided in Chapter 6. Prior to this, the issues relating to why and how best to evaluate the impact of business network initiatives is addressed in Chapter 5.

\textsuperscript{27} http://www.irishtimes.com/newspaper/ireland/2009/0317/1224242946973.html
Chapter 5: Business Network Evaluation
5.1 Introduction

Evaluation has been the subject of increasing debate in industrial/enterprise literature and has become a ‘buzzword’ among policymakers (Lenihan, Hart, and Roper 2007). Existing literature has focused on examining the benefits and barriers associated with evaluation (see for example Skinner 2004; Batterbury 2006; Potter and Storey 2007) and on developing appropriate evaluation methodologies (see for example Storey 2000; Diez 2001; Lenihan et al 2007; Potter and Storey 2007). The aim of this chapter is to outline the various methodologies that have been used to evaluate the impact of business networks on firm performance. Prior to this however, the questions of what is evaluation and why is evaluation needed are addressed in Sections 5.2 and 5.3 respectively. Section 5.4 progresses to explore the various techniques available to evaluate the impact of business networks, while Section 5.5 examines previous empirical evaluations of business networks. The penultimate section outlines an ex-ante evaluation framework developed by the current author (in collaboration with Lenihan and Hart 2009) to aid in the evaluation of business network initiatives. On the whole, this chapter will highlight the lack of appropriate evaluation methodologies to estimate the impact of business networks on firm performance, thus outlining the need for the development of such a framework in the ensuing chapters.

5.2 What is Evaluation?

This section examines what ‘evaluation’ means, not specifically in terms of evaluating business networks, but rather in the general industrial/enterprise policy field. The OECD’s (2007) most recent report on the evaluation of SMEs and entrepreneurship policies and programs adopted Papaconstantinou and Polt’s (1997) definition of evaluation as it highlights the key concepts that are important in determining an appropriate definition of evaluation. Papaconstantinou and Polt (1997 p.10) referred to evaluation as a “process” which aims to “systematically and objectively” determine

29 The reason for taking this general view is because, regardless of context, the underlying principles of what is, and why there is a need for, evaluation remain the same.
the “efficiency and effectiveness” of an initiative. A “process” implies that evaluation should not occur just once, but is an ongoing phenomenon to aid and improve the delivery of a specific initiative (Potter and Storey 2007). An evaluation should be methodical and impartial. Papaconstantinou and Polt’s (1997) definition also implies that the initiative in question requires lucid objectives against which the objectives of the initiative can be measured (Potter and Storey 2007).

Evaluation is also defined as the “systematic and objective assessment of an ongoing or completed project, program or policy, its design, implementation and results” (DAC 2002 p.22). This definition adds to that of Papaconstantinou and Polt (1997) by incorporating the design and implementation phases of a program or policy into the evaluation, referred to as an ex-ante evaluation. Furthermore, Lenihan, Hart, and Roper (2005 p.29) defined evaluation as the level of “additionality” of a particular policy, in terms of economic activity in excess of what would have happened in the absence of intervention”. The important issue addressed by Lenihan et al (2005) is the counterfactual situation, that is, whether or not the outcome would have been achieved regardless of whether or not the program or policy was implemented. In the specific case of this thesis for example, the counterfactual situation considered would be, whether or not a firm who is a member of a formal business network would have achieved the same business outcomes if it was not a member of the network.

Evaluation can thus be defined as, a methodical and impartial assessment of an existing or completed initiative, where the evaluation incorporates the design, implementation (ex-ante), and impact (ex-post) issues of that initiative. The subsequent issues therefore to be examined are why there is a need for evaluation and what are the barriers that prevent evaluations being undertaken.

5.3 Why Evaluate?

Whilst acknowledging that evaluation is a growing field of study, it is useful also to examine why there is a need for evaluation. This section addresses this question by outlining the reasons to undertake an evaluation, while the barriers to evaluation are also identified. Although, not directly focussed on the evaluation of business
networks, the underlying principles presented in this section, of why an evaluation should be undertaken and the barriers faced when one does, are generally the same, irrespective of the context.

Evaluation not only helps set targets for programs or policies, but Batterbury (2006) also suggested it ensures “value for money” and accountability of public funds. In further developing the evaluation debate Lenihan et al (2005) highlighted that an evaluation should also take account of the counterfactual situation. This provides valuable insights of what would have happened in the absence of the intervention. Batterbury (2006) in critically assessing the evaluation of European Union Cohesion policy adapted existing branches of evaluation theory to produce seven core purposes of evaluation which are outlined in Table 7 below.

30 With respect to the current research project, an attempt was made to ascertain the total amount of government funding allocated to business networks in Ireland. A total figure for such financial support was unavailable. As outlined in the previous chapter however, funding towards recent network initiatives has been specified (see Section 4.3 and 4.4 with specific reference to Enterprise Ireland’s pilot initiative for collaborative projects from industry-led networks, and the two most recent network initiatives, EIN and ISIN).
<table>
<thead>
<tr>
<th>Purpose</th>
<th>Evaluation Questions</th>
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| (i) Accountability                           | ▪ Have the desired outcomes been achieved?  
  and legitimacy                               | ▪ What impact has the program had?  
                                                    ▪ Did the program make a difference?  
                                                    ▪ Was the program cost effective?                                                                                          |
| (ii) Improved quality and performance        | ▪ Did the program meet its performance targets?  
                                                    ▪ Has the program improved as a result of the officials/participants involvement with its evaluation?                                                                 |
| (iii) Better planning and program design      | ▪ What is the program logic/goals?  
                                                    ▪ Are these workable?                                                                                                          |
| (iv) Enhanced capacity                       | ▪ What criteria would the program officials use to assess success?  
                                                    ▪ What things do the officials feel need changing to achieve better results?  
                                                    ▪ Have the program officials gained a better understanding of how to achieve success in the future?                                                                 |
| (v) Policy and organisational learning       | ▪ Why did the program have the observed effects?  
                                                    ▪ What lessons can be learned from other programs and policies?  
                                                    ▪ Were there any unintended effects? Why did they occur?                                                                 |
| (vi) Increased ownership of the program       | ▪ What criteria would the participants use to assess success?  
                                                    ▪ What things do the participants feel need changing to achieve better results?  
                                                    ▪ By implementing these changes, do the participants feel greater ownership and control of the program?                                                                             |
| (vii) Empowerment of stakeholders             | ▪ What were the goals of the participants?  
                                                    ▪ Did their goals change during the lifetime of the project?  
                                                    ▪ What criteria would the participants use to assess success?                                                                                                                     |

Source: Adapted from Batterbury (2006 pp.181-182)
When Batterbury (2006) outlined these reasons for evaluation, she also specified evaluation questions to accompany each reason and thereby highlighted what outcome is to be expected from each reason. The following section outlines the key reasons for carrying out an evaluation, based on those highlighted by Batterbury (2006).

Accountability and legitimacy have been emphasised as principal reasons for evaluation. Accountability refers to the assessment of a program’s efficiency and effectiveness, that is, whether or not it provides value for money (Potter and Storey 2007). Demonstrating accountability of public funds could lead to increased support (financial or otherwise) for that program, or it could also be used as a guide when implementing future programs. Legitimacy refers to a policymaker’s willingness to evaluate a program that they have implemented and thus allows for these policymakers to be held accountable for the success or otherwise of the initiative put in place (Batterbury 2006).

Evaluation can improve the quality and performance of a program. It can also be used to involve participants and aid in the better planning and design of a program (Batterbury 2006; Potter and Storey 2007). When discussing methodological issues relating to the evaluation of regional policies, the overriding purpose of an evaluation, according to Diez (2008), is to measure the net effects of a program against its initial stated objectives. These objectives then become the point of reference for the evaluation and are against which the success (or otherwise) of the program can be assessed. The underlying assumption made here by Diez (2008) is that pre-specified objectives of the program exist. If however, the objectives of a program are not clearly specified, then it is not possible to identify the success (or otherwise) of the program. Storey (2000) for example specified that clear detailed targets should be set at the beginning of a program because, for example, “increasing employment” is less clear than providing a specific target “such as increasing employment by 5 per cent over a 5 year period” (Storey 2000 p.177).

Learning is also a central objective of evaluation. Being able to reflect on past experiences is an important element of change and learning (Balthasar and Rieder 2000; Skinner 2004). In essence, lessons can be learned from an evaluation that allow for the consideration of why a program achieved the results it did. Additionally,
lessons can also be learned from ex-ante evaluations undertaken, that is those evaluations prior to implementation, and those undertaken while the program is developing. Information gathered in this form of evaluation can help improve the program at the time of the evaluation and can provide insights for similar programs implemented in the future.

Diez (2001) when exploring the evaluation of regional policies made reference to the concept of ‘participatory evaluation’. This form of evaluation involves a collective group, consisting of evaluators, managers, and social groups, working together and exchanging information openly. As a result of involving each of these actors in the evaluation process, the focus of the evaluation moves from understanding the impact of the program to also focussing on how the information gathered can be used in making decisions on the progress of the program in question (Diez 2001). Through the inclusion of the various interested parties in the evaluation process, there is an increased ownership of the program in question and it increases the participants’ desire to work together in achieving their desired outcomes (Batterbury 2006). While inclusion of participants in an evaluation would reap additional benefits such as identifying the goals of the participants (as opposed to those solely identified by the policymakers), Batterbury (2006) stated that she could not foresee it becoming a core purpose of EU policy evaluation. This she maintained is primarily because it moves away from the traditional focus on the goals set by policymakers and evaluators. That is, it would represent a move away from the “accountability-driven ‘summative’ approach” (Batterbury 2006 p.184).

The reasons as indicated above, from the general industrial/enterprise policy perspective, provide valuable insights as to why there is a need to evaluate business network initiatives. In summary, there is a need to evaluate an initiative to determine if the desired objectives of the program are achieved (assuming these objectives were clearly specified in the first place), and to also monitor the progress of the program in question. In terms of an ex-ante or on-going evaluation, then the progress of the program can be assessed and necessary changes made if needed. Not alone is evaluation important to establish accountability of how and where public funds are allocated, but it also plays an important role in establishing the net benefit of the program. Evaluation plays a valuable role in stimulating debate about a program,
while it also ensures continued improvements in its design and delivery, and provides lessons for future programs implemented (Potter and Storey 2007).

Each of the reasons outlined above provoke a number of questions that an evaluator needs to address. The overall questions being, has the program achieved its initial objectives? Can improvements be made to the program? What is the opportunity cost of public funds invested in this program? Is there enough evidence to support the continuation of the program? Where and how should future funds be invested? Individually, each question is important in its own right. Collectively, they form the basis for a rigorous evaluation of a program. Barriers to evaluation do however exist. It is important to be cognisant of these barriers when evaluating a program. Firstly, as alluded to already in this chapter, a lack of clearly stated objectives at the beginning of an initiative can hinder an evaluation and so the success (or otherwise) of the program cannot be determined (Storey 2000). Aside from this, Potter and Storey (2007 pp.19-21) highlighted a number of additional reasons which may hinder the evaluation of a program. These are now discussed.

Evaluation can be both expensive and bureaucratic. An evaluation is not always carried out internally and so it can result in paying an evaluator. There is an opportunity cost associated with collecting the data. Whilst, there is also an opportunity cost for the program administrators, who may need to work with the evaluator in informing them about the program. The choice of evaluator can pose problems. An external evaluator, for example, may be seen by those internally as not being able to understand the internal workings of the organisation itself. Additionally, Skinner (2004) advocated that there is also the fear that external evaluators may provide results they feel the organisation want, so they can secure future work for the organisation. Management can also be eager to get a new initiative underway, and so, the opportunity cost associated with carrying out an evaluation increases managements’ desire to move forward at the implementation phase of a scheme, without any formal evaluation. Furthermore, when implementing an initiative, management may perceive that the initiative will achieve its desired objectives. This belief that their program will succeed leads to an informal evaluation of the program, which the management deems acceptable because they trust the choices and decisions
they make, thus rendering the need for any formal evaluation worthless (Skinner 2004).

There can also be *cultural differences* between the evaluators and program managers. Evaluators are often from an academic background, while program managers generally come from a practical background. The program managers can also find it hard to accept that an outsider, or third party, is the best to assess their program’s effectiveness. This may lead to resentment by managers or policymakers when asked to complete forms or aid in the collection of data for the evaluation.

An evaluation *may not lead to a change* in the program. If evaluators are external to the program, they may misinterpret certain details regarding the program and may also fail to articulate their results in a manner that can be easily interpreted by the policymakers and program managers. Certain policymakers and/or managers may not be in favour of the evaluation, hence making them unreceptive to helping the evaluators. The policymakers and/or managers may also find it hard to distance themselves from the program, and therefore, may be prone to giving a biased view of the program.

Evaluation of programs is predominantly associated with *developed economies*. This is due to a number of factors, such as, the availability of individuals with the skills necessary to conduct a good evaluation. Whilst, the lack of history of such activity in a country can also lead to scepticism about, and the need for, the process. This is a very real problem which inhibited evaluation practices in Ireland for some time.\(^{31}\)

Although each of the potential barriers highlighted above are valid in their own right, Potter and Storey (2007) distinctly argued that they do not supersede the benefits of evaluation, and thus, should not result in the lack of evaluation of a program. This implies that the benefits associated with evaluating a program outweigh the costs associated with it.

\(^{31}\) An interesting point highlighted by Potter and Storey (2007) however, was that they specified Ireland as being one of three countries (the others being the Netherlands and Slovakia), who have evaluated all state aided schemes. In contrast Boyle (2005) noted that evaluation in Ireland still lags considerably behind other nations. This leads to the proposition of the question as to the type of evaluations that have been done in the Irish context. Are they mere monitoring of an initiative?
A common problem for any evaluation is the identification of suitable methodology to evaluate a program (Hart 2007). Hart (2007) in reference to the evaluation of EU regional policy highlighted that existing evaluation methodologies may be inappropriate because they do not provide policymakers with a clear indication of the underlying means that lead from intervention to economic impact. The next section explores the available methodologies for evaluating a program and deals with the question of ‘how’ best to evaluate.

5.4 Evaluation of Business Networks

In explaining the lack of a standard network evaluation methodology, Huggins (2000), when examining the success (or otherwise) of business networks in the UK, made reference to the work of Monsted (1991), who argued that this deficiency in the literature can be attributed to the ‘heterogeneity’ of business networks, which embraces an array of disciplines. This issue was also highlighted when interpreting what a network is and the diverse typologies of network structures that exist. The primary focus of this thesis is to developing an evaluation framework to estimate the impact of business networks on firm performance, however, prior to being able to embark on this task, it is necessary to explore the choice of methods available to use in an evaluation. More specifically, this section takes a general view to examining the merits of using quantitative, qualitative, or a mixed methods approach to evaluation.

5.4.1 Choice of Evaluation Method

Regardless of the program in question, there is no single evaluation method that will suit all initiatives (Diez 2001). In reviewing the evaluation of regional innovation and cluster policies, Diez (2001) highlighted that each individual situation warrants its own specific evaluation design. She referred to the work of Patton (1990) who pointed out that some evaluators regard evaluation as a form of art rather than a science. In this respect “the art of evaluation involves creating a design that is appropriate for a specific situation and particular action or policy-making context” (Patton 1990 p.249). In light of this, it is practical to explore the evaluation of other
initiatives, aside from network policy, so as to devise the most appropriate evaluation method for the research in question.

Piric and Reeve (1997) in evaluating public investment in R&D highlighted that according to the stages that an evaluation is implemented, there are three types of evaluation. These are, “prospective ex-ante evaluation, monitoring interim evaluation, and ex-post evaluation” (Piric and Reeve 1997 p.50). Each type of evaluation can involve qualitative, quantitative, or a mixed methods approach to evaluation (Piric and Reeve 1997; and Leeuw and Vaessen 2009). The following section outlines the advantages and disadvantages inherent to both qualitative and quantitative evaluation techniques. This does not ignore the fact that many evaluations incorporate both techniques together, a mixed methods approach (Leeuw and Vaessen 2009). Mixed methods allow for the triangulation of the data, which involves looking at the initiative from different points of view, thus avoiding any problems associated with adopting a single method (Leeuw and Vaessen 2009). The choice of technique, including the mixing of techniques, is dependent on a number of factors, including the availability of data, the characteristics of the industry in the study, and the expertise of the evaluator (Piric and Reeve 1997).

The advantages and disadvantages of both qualitative and quantitative techniques are outlined in Table 8 below. Qualitative methods have in the past focussed on discussions with those directly involved in a program. Such an approach allows for the collection of information, which may not be possible to gather through quantitative methods. This includes for example, gathering information that goes beyond assessing an initiative’s impact from those directly involved in the specific program. More specifically, the level of satisfaction of those involved in the initiative can be gauged, the suitability of the program can be assessed, and it can also be determined if the program in question clashes with other programs in action (Potter and Storey 2007). Qualitative evaluation is regarded as being easy to interpret and it also allows for the possibility of exposing unintended effects of the program (Spencer, Ritchie, Lewis, and Dillon 2003).

Although relatively easy in its use and valuable in the extra information that it can ascertain, qualitative methods may not always provide reliable estimates on the
impact of a program. Such a method can be descriptive in nature, may contain interviewer bias, the sample may be unrepresentative of the population, and independent corroboration is not possible (Potter and Storey 2007). Potter and Storey (2007 p.23) also highlighted that a question such as, “What impact do you think this program had on your business?” may be impossible for a respondent to answer, as they are unable to hold other influences on their business constant to ascertain a true reflection of the impact of the program.
### Table 8: The advantages and disadvantages of quantitative and qualitative methodologies

<table>
<thead>
<tr>
<th>Qualitative Evaluation Methodologies</th>
<th>Quantitative Evaluation Methodologies</th>
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<tbody>
<tr>
<td><strong>Advantages</strong></td>
<td><strong>Disadvantages</strong></td>
</tr>
<tr>
<td>Engages participants in policy learning.</td>
<td>Respondents and interviewers may be biased or poorly informed.</td>
</tr>
<tr>
<td>Can vary the scale and subsequently the cost.</td>
<td>Rarely provides a clear answer.</td>
</tr>
<tr>
<td>Greater awareness of the processes that lead to impacts.</td>
<td>Tends to ‘describe’ rather than ‘evaluate’.</td>
</tr>
<tr>
<td>Is relatively easy to interpret.</td>
<td>Risks including ‘unrepresentative’ groups.</td>
</tr>
<tr>
<td>Can assess against a wide range of evaluation criteria.</td>
<td>No opportunity for independent verification.</td>
</tr>
<tr>
<td>Picks up unintended consequences.</td>
<td>Hard to judge efficiency and effectiveness.</td>
</tr>
<tr>
<td>Better insight of policy options and alternatives.</td>
<td>Hard to establish cause and effect.</td>
</tr>
</tbody>
</table>

Source: Adapted from Potter and Storey (2007 p.23)
Quantitative methods can provide clear and relatively accurate measures of the impact of a program (Potter and Storey 2007). The results of a quantitative analysis can be verified independently, however, quantitative methods are not without their drawbacks. Quantitative methods can, on occasion, be overly technical and restricted in the results they provide. The collection of data can be costly and where they are used in a study, it can be difficult to source appropriate control groups. The main limitation of quantitative methods is the ‘black box’ that it produces in its results. This ‘black box’ includes, the lack of information on the policy problem, how the problem is being tackled, how improvements can be made to achieve the desired objectives, and the overall impact of the program (Potter and Storey 2007). Despite the drawbacks, the main advantage of quantitative evaluation is that it provides actual estimates of the impact of the initiative being evaluated.

Mixed methods, incorporating both quantitative and qualitative approaches, are regarded as the most favourable approach to evaluation (Meyer-Krahmer 1984; Johnson and Onwuegbuzie 2004). By complementing quantitative and qualitative techniques, the associated problems with a quantitative method can be overcome, as suggested by Meyer-Krahmer (1984) when analysing the concepts, methods, and lessons of evaluation of industrial innovation policy. Potter and Storey (2007) also advocated the use of a mixed method approach to evaluation and made particular reference to the ‘Six Steps to Heaven’ approach introduced by Storey (2000, 2006).

The ‘Six Steps’ approach, while initially devised to evaluate the impact of public policies that support small businesses (Storey 2000), can also be used as a guide to develop ‘robust’ evaluations (Potter and Storey 2007). This approach is set up in a hierarchical manner so that Step 1 represents the least sophisticated evaluation approach and Steps 1-3 are generally associated with qualitative approaches. Steps 4-6 are of a more quantitative nature, while Step 6 is the most sophisticated approach to evaluation. These steps according to Storey (2000) include:
Step 1: Take up of schemes;
Step 2: Recipients’ opinions;
Step 3: Recipients’ views of the difference made by the assistance;
Step 4: Comparisons of the performance of the assisted typical firms;
Step 5: Comparison with match firms;
Step 6: Taking account of selection bias.

(Storey 2000 p.180)

These steps are considered a ‘building block’ for evaluation where, Step 1 monitors the characteristics and take up of the initiative, and the second step provides the opinions of the participants portraying insights into the value of the initiative. This latter step does not, however, provide the necessary information to establish whether the objectives of an initiative were achieved or not. Step 3 progresses by examining whether the initiative made a difference to the performance of the participating firms, that is, exploring the level of additionality provided by the initiative in terms of, for example, additional jobs, profits, or sales of the firms (Storey 2000, 2006). In essence, Steps 1 to 3 are concerned with ‘monitoring’ the program. The prime difference between the ‘monitoring’ and ‘evaluation’ of a program being that ‘monitoring’ relies on the participants’ views, while ‘evaluation’ compares the participant firms to non-participants firms (Storey 2000).

The first step of the ‘evaluation’ process begins with Step 4. Here the impact of the initiative is measured by establishing the difference between what actually happened with what would have happened in the absence of the initiative. This is achieved by comparing the performance of firms involved in the initiative with those that are not. Step 5 involves the matching phase, whereby, a control group that comprises of non-assisted firms is identified to match the assisted firms’ profiles. This matching is based on firm characteristics such as, age, sector, ownership, and location (Storey 2000). While the final step (Step 6), the most sophisticated step of Storey’s six-steps, corrects for any selection bias that may be present. This selection bias may occur because firms who are more motivated may be more inclined to get involved in the program in the first place (self selection bias), or, because the program managers may choose the firms for the program (administrative selection bias) (Storey 2000).
In terms of the evaluation techniques employed at each stage, survey data is generally gathered to ascertain the views of the assisted firms and also to gather information regarding the characteristics of the firms (e.g. the firm’s business profile). This information is analysed through qualitative techniques, therefore, Steps 1 to 3 are analysed through qualitative means. When the control group is incorporated into the study, Step 4, quantitative techniques are employed to compare the assisted firms with the non-assisted control group of firms.

It is worthwhile to note at this stage that Storey’s six-steps approach to evaluation is adopted in this thesis. Most notably, this research reaches Storey’s (2000) most sophisticated level of evaluation, Step 6, where selection bias is controlled for when evaluating the impact business network membership has on firm performance. Further discussion on this is presented in Chapters 6 and 7 when the fieldwork part of this study is introduced and the evaluation framework is developed.

In conclusion, the choice of evaluation method adopted is dependent on a number of factors. These include, the size and characteristics of the program, whether an ex-ante or ex-post evaluation is needed, and the alternative methods available to the evaluator. It is important to note as well, that an evaluation framework developed, should not be so sophisticated or complicated, that it cannot be put into practical use (Lenihan et al 2007). Following from the above discussion, Section 5.5 examines empirical evaluation studies centred specifically on the ‘network’ concept.

5.5 Empirical Studies of Business Network Evaluation

The various interpretations of what a network is and the different typologies of networks structures have lead to the lack of a standard network evaluation methodology. From an intensive review of business network literature, this section aims to disentangle the empirical studies relating to business network evaluation. The approach adopted divides evaluation studies centred on the network concept into three categories, namely, (i) the evaluation of business networking activity, (ii) the
The primary concern of this thesis is to developing an evaluation framework to estimate the impact of business networks on firm performance and is hence directly related to category (iii) specified above. The methodologies adopted in evaluating network activity in the other two categories provide some interesting insights as to how business networks and business networking activity has been evaluated and so are included in the ensuing sections 5.5.1 and 5.5.2 respectively. The evaluation methodologies adopted in these three categories are outlined in the next section. The methodologies adopted generally incorporate either qualitative or qualitative techniques, while mixed method techniques are also used in a limited number of the evaluations. Discussion begins first on the evaluation of business networking activity.

### 5.5.1 Evaluation of Business Networking Activity

The majority of business network literature focuses on the impact interfirm networking has on the participant firms. It is important to note here that a firm does not necessarily have to be part of a network structure to engage in networking activity. Håkansson and Snehota (2006) suggested that ‘no firm is an island’, thus implying that all firms are part of a network in one way or another. Firms engage in networking activity with their suppliers, with customers, with firms from various industries, and on occasion with their competitors (Fuller-Love and Thomas 2004).

Evaluators have employed both qualitative and quantitative techniques to evaluate interfirm networking activity. Through the use of a quantitative technique, more specifically, a log-linear regression, Donckels and Lambrecht (1995) evaluated the impact of business networking on small business growth. A telephone survey of 900 randomly selected entrepreneurs was conducted in three Flemish regions of Belgium. The results showed that networking positively influenced the growth of small businesses, particularly in the case of firms who had developed contacts with other

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32 Note the distinction made in Chapter 2 between a ‘business network’ and the action of ‘networking’ itself. This distinction also applies here.
firms at a national or international level, rather than those firms who had made contacts with others at a regional level. Freel (2000) used frequencies and tests of association to illustrate the impact a firms’ external linkages have on the product innovation of small manufacturing firms in the West Midlands in the UK. Freel (2000) remarked that little empirical studies had gone further than simple frequency statistics when reporting on interfirm collaboration. Freel himself, therefore, sought to delve deeper by studying the source, role, proximity, and strength of innovation related to interfirm cooperation in a sample of 228 small firms. Rogers (2004) employed a more technical approach to investigating the relationship between networking activity and the innovative behaviour of Australian firms. The regression technique used by Rogers (2004) was a probit model, the dependent variable was whether a firm undertook innovative activity or not. The independent variables included firm, industry, and management variables, as well as a variable to account for a firm engaged in networking activity. A positive relationship was found between those firms that are engaged in networking activity. More specifically, firms who network with others are more likely to be innovative firms. Julien et al (2004) also employed quantitative techniques, that is, partial least squares and analysis of variance tests (ANOVA), to estimate the relationship between a firm’s relationships with other firms and organisations and its impact on the technological innovation of the firms. In each of the cases outlined above, data was gathered from the firms via a telephone questionnaire.

Researchers in analysing the impact of interfirm networking on firm performance have also employed qualitative techniques, the main method of choice being the case study approach. De Toni and Nassimbeni (1995) used the case-study approach to evaluate the behaviour of firms (buyers and suppliers) in the Italian clothing and glass districts. The study involved semi-structured interviews with four buyer (2 per district) and ten supplier (4 in glass and 6 in textile districts) firms. The results showed that interfirm networking was an effective and efficient strategy for the participating firms.

33 They defined the term district as an ‘industrial settlement’ that consisted of a number of firms connected with one another at the production level (De Toni and Nassimbeni 1995).
Dyer and Nobeoka (2000) also adopted the case-study approach to recognise the advantages of interfirm networking in the automobile industry, specifically in relation to Toyota’s production network. Toyota developed a network of firms who were encouraged to share knowledge openly, prevent free riders, and to create methods to reduce the costs of sourcing and accessing knowledge were reduced.

Mixed methods have also been used to evaluate interfirm networking. Chell and Baines (2000) gathered quantifiable data from 104 owner-managers and qualitative data from 34 interviews with firms in two urban areas (Newcastle upon Tyne and Milton Keynes) in the UK. Face-to-face questionnaires were carried out with the 104 firms to ascertain generic firm information, while in-depth interviews were then carried out at a later stage with 34 firms to provide a deeper understanding to the networking behaviour of the firms. Frequencies and tests of association were used to analyse the data, while the information from the in-depth interviews provided a deeper insight into the networking behaviour of the firms.

As the empirical examples provided here show, qualitative, quantitative, and mixed methods techniques have been used to evaluate business networking activity. In general, data is gathered via face-to-face and telephone interviews. As shown, however, how this is analysed varies. The next section examines evaluations centred on business networks, that is, the network structures themselves.

### 5.5.2 Evaluation of Business Network Structures

In this section, the techniques used to evaluate business network structures are examined, that is, the evaluations centred on examining the factors that influence the success of the network structure itself. The dominant approach in evaluating business network structures has been qualitative techniques, predominantly a case study approach. Huggins (2000) through the use of four case studies showed that there are a number of variables that impact on the success or failure of business network initiatives. These included for example, the number of participants in the networks and the degree of spatial proximity between members of the networks. Sydow (2004) also adopted the case study approach in a longitudinal study that spanned a ten-year
period to analyse a network of industrial insurance brokers (The Insurance Brokers Network (InBroNet)). Throughout Sydow’s study, the development of the network was observed with respect to when and how it was evaluated and subsequently whether or not this evaluation impacted on the evolution of the network itself. In this respect, according to Sydow (2004 p.201), his study ‘…is one of the very few studies to have investigated evaluation practices in interorganisational networks’. The evaluation of business network structures is primarily based on qualitative techniques, mainly the case study approach, which allows a complete evaluation of the network over an extended period of time.

The dominant method used to evaluate the success of the network structure has been the case study approach, while evaluations of business networking have been of both a quantitative and qualitative nature. Whilst, the studies outlined provide interesting insights into evaluations centred on the business network concept, they do not highlight an appropriate or consistent methodology which can be applied to evaluating the impact of business networks on firm performance. The next section therefore outlines previous evaluations centred on estimating the impact of business networks on the performance of member firms.

5.5.3 Evaluating the Impact of Business Networks

Chetty and Holm (2000) highlighted that there was a gap in the literature in evaluating the impact of business network structures on firm performance. In addressing this gap, they adopted a qualitative longitudinal case study approach. Structured interviews were carried out with four firms, each a member of a business network, in 1992 and 1995. The same questions were asked in the interviews in both years to the firms’ managing directors (and marketing managers for two of the firms). The results relating to how membership to the business networks impacted on the firms were presented in descriptive form. Torres (2002), also adopting a case study approach, through exploratory qualitative research, analysed the impact a marketing network had on firms in the Irish craft sector. Six in-depth face-to-face interviews were carried out with the manager of the network (over a three-year period), to find out about the motivations and rationale behind setting up the network. The findings from
these interviews where then used as the basis for semi-structured face-to-face interviews with all the members (16 potters) of the network. The results of the manager and firm-level interviews were collated in the form of descriptive results, which outlined the reasons for joining the network and the impacts of such membership. Mackinnon et al (2004) also adopted a qualitative approach to analysing the impact of business networks on the network member firms. A telephone survey of 192 firms was first completed, and 34 firms were subsequently identified for face-to-face semi-structured interviews. The results from the telephone survey and face-to-face interviews were analysed using descriptive frequencies and a discussion of the findings emanated from this.

Dredge (2006) in examining local business networks in New South Wales, Australia, advocated that qualitative methods (more specifically the case study approach) are the most suitable for examining the function and influence of business networks. He advocated that quantitative methods are not as suitable because they are geared towards taking account of one specific period of time and do not allow for an analysis of the network’s development over time. Dredge (2006) using a qualitative approach, more specifically the case study approach, interviewed 24 network members and sourced additional information from newspapers and other local archives about the network in question. The core focus of this study was on examining the less tangible impacts, social and cultural characteristics, of networks on their members, hence the suitability of the case study approach rather than a quantitative technique.

Rosenfeld (1996), who adopted a more quantitative approach to evaluating the impact of business networks on firm performance, highlighted that even though there was an increased focus on the use of business network initiatives by policymakers, there still remained a distinct lack of research on their impact. The primary objective for the evaluations carried out by Rosenfeld (1996) of two US business networks, was to examine the design of the initiative, its implementation, and the impact on the business outcomes of the participating firms. The methodologies employed in both studies were based on data from surveys of the participants’ perceived attitudes towards cooperation, any problems they may have encountered in the network, and the overall impact of the initiative on the firm’s performance. The differences between both evaluations was in their timing and duration; one evaluation was cross-
sectional and was carried out before any networks were formed and matured (an ex-ante evaluation), while the other was a longitudinal assessment and examined the initiative over a three-year period (an ex-post evaluation). Given the lack of time for the networks to form and/or develop, the first evaluation primarily focussed on the implementation of the initiative and its expected impact as perceived by the network managers and the member firms. The longitudinal study provided enough time and scope to include pre and post membership data of the member firms. This evaluation examined the process of implementation of the initiative, its impact both at a micro and macro level, and it assessed the sustainability of the initiative without any financial support.

Dean, Holmes, and Smith (1997) conducted a telephone survey of 912 SME manufacturing and services firms involved in formal business networks in Australia. The aim of the survey was to gather information on the benefits and costs associated with membership to the business networks. Their findings, analysed through univariate and bivariate analysis, suggested that there are differences between the two sectors (manufacturing and services) with respect to business network involvement. Although all firms, regardless of their sector, experienced the same generic benefits of sales and profits, the two sectors differed on more specific benefits, for example business recognition and expansion of sales were important for service firms compared to manufacturing firms.

In response to Bessant’s (1995) recommendation to further explore the strengths and weaknesses of networks as a public policy instrument, Huggins (2001) evaluated UK network initiatives. Through a postal questionnaire, the study recorded data on 531 companies that had participated in one of twelve UK business network initiatives (both formal and informal). The results produced in this study were of a descriptive nature and the benefit of the network initiatives were assessed in terms of the (i) learning capabilities (improvement in skills, expertise, training, and ability to achieve best practice standards), (ii) commercial capabilities (improved or consolidated sales, 

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34. The impact of the initiative on the local economy was estimated by others in the community (Rosenfeld 1996).
35. The network initiatives were organised by Training and Enterprise Councils and other support agencies, e.g. Business Links, Enterprise Agencies, Chambers of Commerce, and other private support agencies (Huggins 2001).
Fuller-Love and Thomas (2004) examined whether business networking contributes to the success of SMEs in the Mid-Wales manufacturing network. A questionnaire was sent to members of the manufacturing network to examine the effect of network membership on the participating firms. Fifty companies completed the questionnaire (out of 150 companies in the network). Descriptive statistics were used to outline the reasons for firms joining the network and was also used to specify the views of the respondents in relation to the advantages and disadvantages associated with network involvement. The results portrayed the benefits and drawbacks as perceived by the network members of their involvement in a business network. Fuller-Love and Thomas (2004) concluded their paper by highlighting the need for further research which could involve other networks, (from manufacturing and other sectors), so as to compare activities and “to develop a model of best practice” (Fuller-Love and Thomas 2004 p.253).

Another case study approach was adopted by The Ministry of Economic Development in New Zealand (2006) when evaluating their Enterprise Network Fund (ENF), a fund that was used for networks of firms who needed assistance with business or management capability of the network. The focus of their evaluation was to examine program implementation, program delivery, and program outcomes, and to conclude whether the program should continue, continue unchanged, or with changes. The evaluation involved surveying 311 ENF assisted firms, firms in business networks, and it was aimed at determining whether an ENF event had any impact on the participant firms. This involved examining for example if the firms’ had improved their turnover, their exports, their client base, or the firms’ knowledge (for example, the firm’s knowledge of customer preferences in offshore markets) (ENF 2006). The
study also examined the counterfactual scenario, whether the firms felt they would have achieved similar outcomes if they did not receive assistance.

As is evident from the empirical work outlined above, evaluating the impact of business networks on the participant firms was based on the perceptions and views of the network firms themselves. The views of firms as to why they became members of their network and the perceived impact of that network membership were gathered through the use of questionnaires (predominantly telephone and postal questionnaires). The dominant way of analysing the questionnaire results has been through univariate and bivariate analyses. While establishing the views of network firms is obviously important, the majority of evaluations do not appear to have progressed beyond what Storey (2000) would have classed as ‘monitoring’. An exception is the ENF (2006) evaluation, which examined the counterfactual scenario, to establish whether the firms would have achieved similar business outcomes if they were not a member of the business network. These ‘evaluations’, however, do not reach the levels of ‘evaluation’ that Storey (2000) advocated, which involves incorporating a control group into the study to draw comparisons between the participant and non-participant groups, nor do they take account of selection bias, both steps which are deemed necessary to reach the top of Storey’s hierarchical approach to evaluation.

In conclusion, various techniques have been employed to evaluate business networks as highlighted in the empirical work above. While their merits have been promoted, both qualitative and quantitative techniques are not without their drawbacks. The case study approach, while able to provide a comprehensive overview of a situation, can be complex to interpret and difficult to base generalisations upon (Meyer-Krahmer 1984; Kitchenham, Pickard, and Ffleeger 1995). A longitudinal study can incur the problem of the inability to contact the specified sample for each time period in the study. Quantitative techniques have the potential to provide an estimate of the impact of an initiative, however, they lack detail on the background of the program (Potter and Storey 2007). Furthermore, if adopting Storey’s (2000) Six-Steps approach, which incorporates a control group into the study, there can be difficulty associated with constructing a suitable control group.
The aim of this section was to investigate previous evaluations which estimated the impact of business networks on firm performance. The lessons learned from these ‘evaluations’ highlight the need for the development of a more sophisticated, yet practical, evaluation framework, to estimate the impact of business networks on firm performance. Prior to introducing the fieldwork part of this study, an analysis is presented of an ex-ante evaluation framework, developed to evaluate a business network initiative. This framework was developed with the aim of evaluating one of Ireland’s more recent business network initiatives.

5.6 Development of a Logic Model

In an attempt to evaluate one of Ireland’s most recent business network initiatives, (Enterprise Ireland’s pilot initiative for collaborative projects from industry-led networks previously discussed in Chapter 4 Section 4.4), Lynch, Lenihan, and Hart (2009) developed an evaluation framework to facilitate effective program planning, implementation, and evaluation of this network initiative. The framework developed was a logic model, which depicts how a chain of cause-and-effect at both a micro and macro level can be established for business network interventions. Logic models have been widely developed as evaluation tools in varying fields such as health, education, and management practices, and are primarily an ex-ante evaluation framework (see for example research by Mulroy and Lauber 2004; Stinson and Wilkinson 2004; and Kaplan and Garrett 2005). Although widely used in other business situations, they have never been applied to the evaluation of business network activity up until the Lynch et al (2009) study. As this is a unique contribution of the framework to business network and evaluation literatures, the framework warrants an examination here.36

Logic models can help one to understand what is likely to happen and what actually happened in a specific program. Lynch et al (2009) highlighted that logic models can be used to examine program reliability and program effectiveness, while they can also

be used to compare how a program should operate to its actual operation. Figure 5 below outlines the key steps in developing a logic model as identified by Lynch et al (2009). Initially, an evaluation should establish whether there are net economic benefits with the introduction of the network initiative (Output 1). The benefits of the network initiative are then connected to more tangible metrics (firm performance, Outputs 2-4). Subsequent to any micro effects, there will be wider market or economy long run effects (Output 5 in Figure 5). Most importantly, according to Lynch et al (2009), is the way in which these effects link to the firm level analysis so that an assessment of how firm performance might be affected in the long-run. The impacts on the firm, be they positive or negative (Output 6), will impact the long-run macro effects on sales, profits, and employment (Output 7). By combining the short and long run effects the net additionality of a network initiative can be assessed (bottom right hand corner of Figure 5).

In developing the initial steps of their evaluation framework (Figure 5), Lynch et al (2009) identified a number of evaluation challenges which subsequently needed to be addressed. Firstly, both the short and long run effects of the network intervention have to be identified and subsequently quantified. Furthermore, the multiplier effects, and the net additionality of the intervention, at the micro and macro level, also have to be identified. In order to address these issues, Lynch et al (2009) developed a more detailed logic model, Figure 6 below.

Figure 6 shows a chain of cause-and-effect for a business network intervention. The chain of cause-and effect runs from the input (the intervention) to output, to outcome and to impact (Lynch et al 2009). A program has a number of sequential outcomes across its life-cycle, that is short, medium, and long-term outcomes. In reference to evaluating a business network intervention, Lynch et al (2009) identified three inputs, namely time, personnel, and money, which can be complemented by partners, experience, and the availability of technology and resources. Connected to these inputs are the network activities undertaken by participants, which includes for example, network events, meetings, and collaboration with others.
Figure 5: Logic model for evaluation: Analytical model of the total short and long run impacts of the industry-led networks program.

Seven interrelated outputs relating to performance of the initiative

1. Impact of Industry-led networks funding on firm performance (Additionality)
2. Indirect impact of Industry-led Networks Initiative
4. Short run (direct) impact of Industry-led networks on sales, profits, and employment (+) or (-)
5. Long run effects on Supply of networking opportunities: (+) or (-)
6. Long run impact on the firm: (+) or (-)
7. Long run impact on sales, profits, employment: (+) or (-)

Displacement (-)/ Multiplier Effects (+) on: Supply/ Take-up of Industry-led Networks initiative

Lynch et al (2009) highlighted that the initial short-term outcome expected to occur following network involvement is a change in mindset of the participant firms (a type of behavioural additionality)\(^{37}\). That is, they may become more open to collaboration with others, more motivated about network activity, more committed to the network, which subsequently leads to increased collaborative activities. Following the initial increased collaborative activities, it is expected that the firm and subsequently the local economy will benefit. These outcomes are identified in Figure 6, where for example, the firm may achieve economies of scale and/or scope, avail of lower barriers to trade, and increase their collaborative activities, which may consequently have spillover effects for the local economy. Lynch et al (2009) also highlighted the potential downside of network activity and showed that possible drawbacks such as non-reciprocal or unproductive relationships are also associated with network participation. Furthermore, it is the long-term outcomes that are of most interest in shaping whether or not an intervention was a success (McLaughlin and Jordan 1999). This is highlighted as the long-term outcomes in Figure 6 below.

In conclusion, Lynch et al (2009) identified a number of benefits to the logic model they developed. Firstly, it can be used as an ex-ante evaluation tool to identify the underlying rationale for a new, or updating a current intervention, and secondly, it can be used as an ex-post tool to evaluate the impact of a business network initiative. In effect, the logic model provides an opportunity to reflect on the strength of the causal mechanisms at work between the network intervention, the firms’ operating environments, and the net economic benefit. Theoretically, the development of the logic model allows for the multi-layered ways in which business networks affect business performance and the subsequent macro impacts (if there are some) to be assessed.

Figure 6: Logic model (chain of cause-and-effect)

**Inputs**
- Time
- Personnel
- Money
- Partners
- Resources
- Technology
- Experience

**Activities**
- Events & Workshops
- Meetings: Face-to-Face; Emails; Telephone.
- Co-operation: Interfirm; Academic; Agencies; Social;

**Short-Term & Medium-Term Outcomes**
- Change in Mindset:
  - Awareness;
  - Attitude;
  - Behaviour;
  - Motivation;
  - Opinion;
  - Commitment.
- Increased Collaboration:
  - Ideas;
  - Learning;
  - Skills.
- Increased knowledge;
- Innovation;
- Skilled Employees;
- Firm Profitability;
- Economies of Scale & Scope;
- Increased Network Participation;
- Lower Barriers to Trade;
- Other Collaborations;
- Firm Survival.
- Increased Attractiveness of the Local Economy;
- Increase in the Number of Available Jobs;
- Increase in Firm/Local Economy Competitiveness.
- Risk associated with sharing information & resources;
- Opportunity cost of networking activity (Time, money & personnel).
- Unproductive relationships;
- Preclude partnering with other potential networks;
- Non-reciprocal relationships.

**Long-Term**
- Increased Network Activity;
- Increased Economic Activity;
- Improved Knowledge Transfer & Application;
- Positive Impact on Industrial Policy;
- Multiplier Effects [Local, Regional, & National].
- Unproductive network;
- Avoid future collaborations;
- Displacement Effects.

5.7 Conclusion

Evaluation can play a pivotal role in policymaking circles because it provides accountability of public funds, it can be used to improve on current or future programs, and it can be used to take account of the overall impact of the initiative. The evaluation of business networks is somewhat of a chaotic issue due to the various meanings of the term ‘network’ and to the different typologies of network structures. Sydow (2004 p.202) emphasised the lacuna of ‘both in research and in practice…the evaluation of interorganisational networks’. Echoing the words of Sydow (2004), Horelli (2009 p.206) also emphasised the lack of research on the evaluation of networks and noted that ‘network evaluation is a genre of assessment that is still under construction’. The overriding objective of this chapter, therefore, was to examine previous empirical evaluations centred on the network concept, with the primary focus on, establishing how best to evaluate the impact of business networks on firm performance.

To understand evaluations that centre on the network concept, empirical studies of the evaluation of (i) networking activity, (ii) business network structures, and (iii) the impact of business networks on member firms’ performance were examined; the prime focus of this thesis being on the latter. Following the evidence provided, it is notable that the qualitative case study approach is used frequently to evaluating the impact of business networks on their members’ growth, whilst quantitative approaches taken never reach the sophisticated levels Storey (2000) deem necessary to be regarded as an ‘evaluation’.

The conclusion which emanates from this chapter is that there is a need to develop an appropriate evaluation framework to estimate the impact business network membership has on its participant firms’ performance. This research adopts Storey’s six-steps approach to evaluation. By adopting this approach, the counterfactual situation, that is, what would have happened in the absence of becoming a member of a business network will be explored through the inclusion of a control group of firms who are not members of formal business networks. Additionally, this research reaches Storey’s most sophisticated step of evaluation, Step 6, which controls for any
possible selection effects. In reaching this step, the true impact of business network membership on firm performance can be estimated.

The next chapters, Chapters 6 and 7, address these issues through the development of an ex-post evaluation framework, to estimate the impact business networks have on their member firms’ performance.
Chapter 6: Business Network Firms - Characteristics, Business Effects, and Additionality
6.1 Introduction

The aim of this chapter, by gathering data from firms who are members of formal business networks, is to provide a detailed analysis of the motivations of such firms for becoming a member of a business network. Additionally, the chapter highlights the perceived impacts (as judged by the network firms) of such membership. Subsequently, through the inclusion of a control group of firms who are not members of formal business networks, a deeper analysis of these business network firms is accomplished, by comparing the firm, MD, and performance characteristics, of business network and non-business network firms.

This chapter is based on a unique dataset which allows for a comprehensive analysis on the operation of the range of formal business networks in Ireland. The aim of the chapter is to present the results from a series of self-assessment questions in a telephone survey which asked the members of formal business networks to indicate the effects of membership on their firm. The emphasis in the discussion is on examining the motivations for membership to a business network, the impacts of such membership (positive and negative), and the levels of additionality attributed to business network membership. Section 6.2 provides details of the sample and sampling methodology adopted in the study. Univariate and bivariate analysis provide an indication of the types of firms participating in the business networks (Section 6.3), their motivations for doing so and their perceptions of their achieved benefits and costs (Sections 6.4, 6.5, and 6.6 respectively). The additionality and timing effects of business network membership are outlined in Sections 6.7 and 6.8 respectively. Section 6.9 seeks to distinguish if there are any perceived differences to membership between the different types of formal business networks, that is, does being a member of an R&D network have different perceived benefits and costs compared to trade and marketing networks.

The results presented thus far rely solely on the business network members’ views. Such an approach according to Storey’s (2000) six-steps framework falls into the ‘monitoring’ of an initiative rather than an actual ‘evaluation’. Section 6.10 progresses this analysis beyond ‘monitoring’ to the ‘evaluation’ phase through the inclusion of a control group of firms who are not members of formal business
networks. Comparisons are made between both business network firms and non-business network firms in terms of the firm, MD, and performance profiles in Section 6.10, while Section 6.11 concludes the chapter.

This chapter addresses the lack of detailed information on business networks in Ireland, while it also provides some interesting insights regarding business networks, and provides a detailed comparison between key characteristics of business network and non-business network firms.

6.2 The Sample

This section outlines the rationale and methodology adopted in compiling data on business networks in Ireland. The key objective of the fieldwork was to collect data that would provide a representative picture of the impact formal business networks have on their member firms. The steps to be taken therefore were to firstly identify the total number of business networks in Ireland, then identify the business networks to be included in the fieldwork, and to subsequently contact a random sample of firms in these business networks to participate in the questionnaire. Evaluating the impact of business network membership on firm performance must be understood in the wider conceptual framework of the determinants of firm performance. The questionnaire to formal business network firms therefore sought to collect data on firm level factors which may influence firm performance, while it also sought the business network respondents’ views as to the perceived impacts of business network membership. A questionnaire to the non-business network firms also gathered information relating to the firm level factors that may influence firm performance (the analysis of which is discussed in Section 6.10).

6.2.1 Sampling Methodology

As discussed in Chapter 4, ITT (2005) produced Ireland’s most comprehensive overview of business networks to date, where it specified that there are 110 business networks and clusters in Ireland incorporating almost 10,000 firms. For the purpose
of this research, a database of business networks in Ireland was compiled, an updated and complete overview of that produced by ITT in 2005. In order to ascertain information regarding business networks in Ireland, all county and city enterprise boards, chambers of commerce, and relevant development agencies were contacted (via email and telephone). A subsequent web search was also undertaken to ensure all business networks were included in the database. The prime purpose of this compilation was to identify the number of business networks in Ireland, the type of business networks in question, the number of members in the business networks, and the overriding objective of the business networks.

The business networks were divided into formal and informal business network structures, where formal business networks were recorded as networks whose members come together to work towards a common objective such as joint production, marketing, and R&D for example (Rosenfeld 2001). The second classification was informal business networks, which included business networks that were less focussed on joint projects and more concerned with workforce development and where firms can share ideas (Breschi and Lissoni 2001). As per these definitions 18 formal business networks and 175 informal business networks were identified. One possible explanation for the majority of business networks in Ireland being informal in their structure is because the business network literature suggests that within these business networks firms have a loose informal connection with other members of the business network and members are independent of others’ actions (Sherer 2003). So in effect they may be easier to form because firms do not have to commit to the network. Business networks incorporate in excess of 18,000 firms with the vast majority, almost 16,000 of these, being members of informal business networks. The networks are geographically dispersed throughout Ireland, are a mix of industry-specific and mixed sector business networks, which are both regionally and nationally based.

For the purpose of this fieldwork, informal business networks were discarded from the population. As business network literature has highlighted there are a number of

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38 It is important to note that specific members’ details were not available for every business network in Ireland and so no cross comparison of firms in more than one network could be made. The implications of this are that the figure presented for the total number of firms in business networks in Ireland may be over-estimated.
benefits to membership of informal business networks, however, membership in these business networks is not generally driven by any specific or common goal by the member firms (Madill et al 2004). This is in stark contrast to formal business networks which form the basis of this research. More specifically this research focuses on the examination of R&D, trade, and marketing business networks, all of which are classified as formal business networks. Literature suggests that the formation and membership of these types of business networks are for specific business results and members collaborate with one another towards common bottom line objectives (Kingsley and Malecki 2004). The likely impact of formal business networks is much more tangible than that of informal networks. Tangible effects of business network membership make the impact of business network membership on firm performance more quantifiable. A further rationale for focusing on formal business networks is because two of Ireland’s most recently promoted business network initiatives are formal network structures, hence highlighting their relevance (increasing) in an Irish business network policy context. The section that follows describes the data collection approach adopted.

### 6.2.2 Data Collection

With respect to data collection, a small number of exploratory interviews were initially carried out with key informants in Enterprise Ireland and InterTradeIreland. The aim of these semi-structured interviews was to enquire about the current policy situation relating to business network initiatives and also the evaluation of such schemes. The prevailing conclusion taken from these interviews was that business networks are seen as an important policy instrument to aid firm growth, while the development of evaluation frameworks to estimate the impact of these initiatives on firm performance are very much in their infancy, an issue that has also been highlighted in the business network literature (Sydow 2004).

A telephone survey was the choice of survey method. This method was chosen (as opposed to face-to-face, mail, or internet surveys) for a number of reasons. It is generally the most effective survey method in achieving high response rates, it is comparably cheaper and can be completed quicker (Dillman 1999), while a greater
number of firms dispersed throughout Ireland could also be contacted. The length of a questionnaire can greatly influence the response to the questionnaire, and thus the questionnaire for this survey was constructed with this in mind. More specifically, de Leeuw, Hox, and Dillman (2008) highlighted that the most successful telephone surveys are those that have an average length of approximately twenty to thirty minutes (the average length of time for this questionnaire, attached in Appendix A was 20-25 minutes). Most importantly however, this method ensures that the correct respondent completes the survey, that is, the person that is involved in the business network. A telephone survey also allows the interviewer to probe further into questions and to explain any questions they may find difficult to understand (without biasing the respondent).

The questionnaire was designed with two broad objectives in mind. Firstly, it was designed to provide a set of control variables that would allow the performance of network firms to be modelled more effectively. According to Hart et al (2008) the in-firm information is necessary because it is not possible to isolate the effects of ‘selection’ and ‘assistance’ on the business network firms that had grown faster than non-business network firms without such information. Secondly, the telephone survey provides a set of variables relating to the perceived impact of network membership (self-assessed) which can be analysed to provide evidence on the impact of business network membership, according to the network firms.

The questions included in the questionnaire derive from an extensive review of the business network literature, which highlighted key issues that warranted investigation. Whilst the economic theories embedded in the theory of the firm (see Chapter 2) also provided the rationale for examining the motivations, benefits, and costs associated with network membership. In reviewing the various aspects of the theory of the firm, a number of questions emerged. Such as, why do firms become involved in business networks, that is, the motivations for membership, what are the potential benefits of collaborating with others, and what are the potential barriers of collaboration? For example, according to Coase (1937), Richardson (1972), and Williamson (1975) firms benefit by collaborating with orders to reduce their transaction costs. More specifically, when firms try to minimise their transaction costs they will try to find the most efficient governance structure. According to the RBV of the firm, firms
collaborate so that they can combine sets of complementary resources and capabilities and achieve returns that they would be unable to achieve on their own (Penrose 1959). Jensen and Meckling (1976) highlighted the potential problems associated with collaborating with others, more specifically, the problem of agency costs that arise, while Alchian and Demsetz (1972) also highlighted that the contribution of members of a team is not always transparent and there may be shirking by some of the members. These insights relating to the motivations, benefits, and potential costs associated with collaborating with others justified the inclusion of a number of questions in the questionnaire (see for example Sections C and E in the questionnaire, Appendix A).

Of the total population of firms in formal business networks, firms’ contact details for 542 business network firms were available\(^39\). A random sample of firms were contacted by telephone and were invited to participate in the study. From the total sample, details of 146 firms were unusable due to incorrect contact details or the firms were no longer in business\(^40\). Of the 396 usable sample a further 117 firms refused to partake in the study\(^41\). Structured interviews therefore, were based on a questionnaire conducted with managing directors or owners of 169 companies within the first six months of 2010. The questionnaire (attached in Appendix A) was focussed on gathering information on the business profile of the firms, the markets that they service, local linkages they may have, and any research and development activity that they may engage in. With respect to business network involvement, firms were asked to identify the motivations and impacts of business network membership on various aspects of firm performance, while also identifying the level of additionality (if any) from business network membership. Information regarding the business performance of the firms was also gathered, while specifics relating to the managing director’s profile were also ascertained. In refining the questionnaire, a pilot study was also undertaken with a sample of business network firms. The aim of this pilot study was

\(^39\) The contact details for the remaining firms in formal business networks are not available on the public domain. The business networks generally claim that this type of information is confidential.

\(^40\) Figures released by the Insolvency Journal show that three companies a day were declared insolvent in Ireland in June 2010, while insolvencies for the first six months of the year increased by 27 percent compared to last year. (http://www.insolvencyjournal.ie/news/10-07-02/Insolvencies_increase_by_27_in_the_first_half_of_2010.aspx.)

\(^41\) Reasons for not taking part included; lack of time, some firms had no interest in taking part in the study, and for the remainder of the firms it was company policy not to partake in questionnaires in general.
to eliminate any confusion respondents may have had with certain questions and to
generally get a feel for how well the questionnaire flowed. At pilot stage, the
questionnaire was well received and the end result was that a few questions needed to
be made more ‘snappy’ to reduce any confusion, both on the part of the interviewer
and interviewee.

Response rates can be calculated in a number of ways. A frequent method used is to
express the number of completed surveys as a percentage of the number of completed
surveys plus refusals. This can over-state the level of response in a survey. The
response rate is therefore calculated on the basis of the ‘usable’ sample, that is, the
number of completed surveys as a percentage of the total number of ‘usable’ sample.
This resulted in a relatively high response rate of 42.7 percent. The final sample
coverage resembles relatively closely the underlying population of firms in business
networks, based on firm size, location, and sector. For example, from the available
contact details of firms in formal business networks, the firms are predominantly
SMEs, are geographically dispersed throughout Ireland, and represent an array of
industries. Furthermore, according to the report by ITT (2005) of business networks
in Ireland, networks were occupied by SMEs (98% of the firms), the firms represented
a wide range of sectors, and were geographically dispersed throughout Ireland. The
fact that the final sample coverage resembles relatively closely that of the underlying
population suggests that the sample is likely to provide results which are largely
representative of the whole population of firms in formal business networks. The
subsequent sections outline the key characteristics of these respondent firms.

6.3 Respondent Firms

Throughout this section the respondent firms’ characteristics and their sectoral and
geographical distribution are examined. Subsequently, the market orientation of the
business network firms is investigated. More specifically, where (and how much)
they sell their services and/or products to, and where (and how much) they purchase
resources from. Respondents were also asked to provide details on any R&D activity
that they engage in.
6.3.1 Firm Characteristics

Of the 169 firms who completed the questionnaire, 63 percent of the business networks firms are regarded as micro firms, 22 percent as small firms, 10 percent as medium-sized firms and 5 percent as large firms\(^\text{42}\). While the sample is dominated by micro to small-sized firms, this is not all that unusual or unexpected, given that the business network literature suggests that it is predominantly firms in this size category that occupy business networks. Specifically in the case of Ireland, ITT’s (2005) report of business networks in Ireland found that 93 percent of business networks were dominated by smaller firms. The firms were predominantly well-established firms, with 40 percent of the respondents reporting they were set up over 20 years ago, 25 percent were set up between ten to 20 years ago, while 18 percent and 17 percent of the firms were set up more recently, between six to ten years ago, and in the last five years, respectively.

The respondent firms are geographically well dispersed throughout Ireland, 37 percent are classed as being in rural locations, while the remaining 63 percent of firms are urban based\(^\text{43}\). The respondents also represent an array of industries as shown in Table 9 below. Eighty-six percent of the respondent firms are Irish-owned. Of those that are foreign-owned (14% of the respondents), 50 percent of the parent companies are located in the US, 21 percent in the UK, 17 percent in Germany and the remaining 12 percent are from other countries. Just over half of the respondent firms are limited firms (51%), five percent are partnerships, four percent are public limited companies, and 36 percent are sole traders (the remaining four percent were unsure of the legal status of their firm).

\(^{42}\) A micro firm is defined as a firm who has less than 10 employees or €2 million, a small firm has less than 50 employees or less than €10 million, while a medium firm has less than 250 employees and €50 million (http://ec.europa.eu/enterprise/policies/sme/files/sme_definition/sme_user_guide_en.pdf).

\(^{43}\) Urban areas are classed as towns with a population of 1,500 or more (Central Statistics Office (CSO) 2006 p.13)
Table 9: Sectoral distribution of business network member firms

<table>
<thead>
<tr>
<th>Industrial Sector</th>
<th>Number of firms</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food products, beverages and tobacco</td>
<td>31</td>
<td>18</td>
</tr>
<tr>
<td>Textiles and textile products</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Leather and leather products</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Wood and wood products</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Pulp, paper and paper products publishing</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Chemicals and man-made fibres</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Rubber and plastic products</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>Other non-metallic mineral products</td>
<td>13</td>
<td>8</td>
</tr>
<tr>
<td>Basic metals and fabricated metal product</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Ad hoc machinery and equipment</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Electrical and optical equipment</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Transport equipment</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Ad hoc manufacturing not elsewhere specified</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Non-manufacturing</td>
<td>82</td>
<td>49</td>
</tr>
<tr>
<td>All firms</td>
<td>169</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Own estimation from survey data collected

In summary the database collated is occupied by business network firms of varying sizes who represent an array of sectors and are geographically dispersed throughout the country. In addition to the core characteristics of the business network firms being identified, the business network firms were also asked about their market activities, that is, their sales, purchases, and R&D activities. This information provides an indication as to the type of firms’ business orientation in the sample (e.g. whether or not the firms export or innovate). Details of these firm characteristics are provided in the next section.

6.3.2 Markets and Local Linkages

When asked to outline the location(s) to which they sell their products/services, the responses received show that the business network firms sell at a local (that is, to customers within a 30 kilometre (km) radius), regional, national, and international level. Seventy-nine percent of respondent firms sell to local customers, 75 percent of the business network firms sell to customers within the region (excluding local), 81
percent sell nationally (excluding local and regional), 53 percent sell to Northern Ireland, while 65 percent of the business network firms sell to customers based overseas. While the locations of sales do not vary greatly, the percentage of the business network firms’ total sales that they sell to each location does differ. Figure 7 below outlines the percentage of sales sold to customers at each of these locations.

**Figure 7: Percentage of sales sold to customers at a local, regional, national and international level**

![Chart showing percentage of sales](chart.png)

Source: Own estimation from survey data collected

As shown in Figure 7, just over 80 percent of business network firms sell between one and ten percent of their sales to Northern Ireland, while 40 percent of the respondent firms sell between one and ten percent to international markets. For ten percent of the respondent firms, these two markets account for more than 90 percent of their firms’ sales. The remaining three markets are somewhat evenly matched with the majority of business network firms who sell at a local, regional, or national level selling slightly less than 50 percent of their sales to these markets.
With respect to purchasing of inputs, the majority of the business network firms (108 firms, 64% of the respondents) reported that they purchase their inputs from local suppliers (within a 30km radius). Forty-six percent of the business network firms purchase supplies from elsewhere in the region, 59 percent from elsewhere in Ireland, 24 percent from Northern Ireland, while 58 percent purchase inputs from international suppliers. Figure 8 outlines the percentage of inputs purchased from suppliers at each of these locations. Similar to the proportion of sales to each location, purchases of inputs varies by location. Over 15 percent of business network firms purchase in excess of 80 percent of their inputs locally. For those business network firms that purchase their inputs from abroad or from Northern Ireland, the vast majority purchase between one and ten percent of their supplies in these locations. As for purchasing from others in Ireland but outside their respective regions, business network firms purchase less than 50 percent of their supplies from suppliers in these locations.

Source: Own estimation from survey data collected
6.3.3 R&D Activity and Innovation

Aside from enquiring about the markets the business network firms sell to and buy from, they were also asked about their research activities. In responding to this, 77 percent of the business network firms (114 firms) said that they conduct in-house research and development, while 28 percent of the respondents (48 firms) have outsourced R&D activity in the last year. Of those that conduct in-house research activity, the respondents were asked about the number of people they employ to conduct R&D activity. Given the majority of respondents are micro and small-sized firms, it was unsurprising that 38 business network firms employ just one person, 46 business network firms employ between two-four people, 17 business network firms employ five to ten people, six business network firms employ 11-24 people, five business network firms employ 25-49 people, one US manufacturing business network firm employs 50-99 people, and another US business network firm in the services sector employs over 100 people in R&D activity.

Over three quarters of the respondents (77%) of the sample remarked that they have introduced new product(s) or service(s) in the last four years. Of these business network firms, 57 percent remarked that the products/services they introduced were new to their business, 10 percent said some of their products/services were new to the business while others were completely new, 20 percent said the their products/services were new to their industry/sector, while 13 percent said the products/services they introduced were completely new to the world. The diversity in these responses show that the respondent firms vary in their R&D activities, in terms of whether or not they conduct in-house or contract external assistance for research, the number of people employed in research activities, and the levels of innovative activities that are carried out within the respective business network firms.

6.4 Network Involvement

As frequently referred to in the business network literature, ‘no firm is an island’ (Håkansson and Snehota 2006), and thus firms are often involved in a number of collaborations and can frequently become members of more than one business
network. Respondents were probed regarding such issues. The formal business networks of which respondents were members were dispersed throughout Ireland, with 117 of the business network firms being recorded as members of a regional business network and the remaining 52 as members of national business networks. Over half of the firms have been members of their respective networks for five years or longer, while eighty-six percent of the firms pay membership to their business network. The amount of membership varies across the networks and respondents; the average membership was recorded as approximately €263 per annum. These formal business networks are generally run based on membership payments and government funding (ITT 2005).

With respect to the geographical location of business network membership, the results confirm the findings in the business network literature which suggests that geographical proximity does not influence network firms’ and the business networks they are members of (Anderson et al 1994; Heanue and Jacobson 2002). Fifty-seven percent of the business network firms reported that the networks consisted of firms from the same region, however, 52 percent of the respondents also said that business network members hailed from different regions in Ireland, and 15 percent from outside of Ireland. Membership within the business networks was diverse, with a blend of business network firms who produce similar products/services as the respondent firms and of those who produce different products/services (58% and 69% of the respondents remarked on this respectively).

### 6.4.1 Why Get Involved in Business Networks?

The reasons for getting involved in these business networks spanned a variety of motivations for the business network firms. The main reasons included to increase business profit and/or to lower their costs, to sustain and/or create employment, to collaborate with others to increase sales, and to collaborate with others in terms of marketing/branding of their business’ products/services. Figure 9 outlines the

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44 Regional business network in this case is defined as a business network whose membership is restricted to firms within that region, while there are no geographic limitations to membership of a national business network.
reasons, as specified by the respondent business network firms, for getting involved in a business network. Bearing in mind that the majority of respondents were members of either a trade, or marketing business network, with a smaller number of respondents (16%) in R&D business networks, it is not surprising that the main reasons highlighted for getting involved in the business network were to increase the business network firms’ sales and for marketing and branding reasons (for over 65% of the respondents), while just under 35 percent of the business network firms became members to collaborate on research activities. Aside from these reasons, business network firms also remarked that membership was desirable so as to improve relations with suppliers and customers and also to impact on the employment of the business network firm, both in terms of safeguarding current jobs and in creating new employment. The network firms also sought to increase business profit, increase their research activities, and to embark on possible joint ventures.

Just over ten percent of the respondents also remarked that one of the reasons for getting involved in the business network was to avail of training opportunities. Training as part of a business network is immersed in the business network culture in Ireland recently. As Chapter 5 illustrated, Skillnets has received government business network funding in recent years and so many Irish business networks avail of this financial support to run various training programs and events for their members. In support of business network literature (Bengtsson and Kock 1999; Brüderl and Preisendorfer 2000; Witt 2004), the respondents also highlighted that other reasons for getting involved in these business networks included the opportunity to meet other people, to be around and interact with ‘like-minded’ people, while also sharing ideas and information, and it provides firms with a local support network, and can also act as a lobby group for some firms. Less than ten percent of the business network firms also remarked that one of the reasons for becoming a member was to avail of funding opportunities.
Figure 9: Reasons for getting involved in a business network

Source: Own estimation from survey data collected

As this section has shown the reason for business network firms to get involved in these networks varies from tangible and measurable benefits such as cutting costs or increasing sales to less tangible benefits such as interacting with other members to share information and ideas or to reduce their isolation by meeting others. In conjunction with outlining the reasons for becoming a member of the business network, respondents were also asked about the type of collaboration they engage in. This is discussed in the next section.

6.4.2 Collaboration in the Network

Collaboration, in terms of who the network firms collaborate with (within the business network), where these firms are located, and the type and frequency of this collaboration, differs among network members. This section therefore aims to deal with each of these issues.

Thirty-five percent of the business network respondents collaborate with other members in the network who produce similar products/services as they do, while a slightly higher percentage (39%) collaborate with other members of the network who
produce different products/services, and only four percent of the respondents collaborate with research organisations and universities. A reasonable assumption for this low rate of collaboration with research organisations is due to the small number of research organisations that are members of these business networks, rather than any direct lack of interest by the firms in collaborating with any research organisation.

Figure 10 shows the type of information that business network firms collaborate on. From this, it is evident that all of the respondent business network firms engage in discussing generic business issues with other network members. More explicitly though, for those network firms who collaborate with other members that produce similar products as their firm, they are more likely to discuss industry specific issues and marketing issues. When business network firms who produce different products collaborate with one another, they are more likely to collaborate on R&D issues and issues relating to the sales and profits of the firm. Unsurprisingly R&D issues involve collaboration with research institutions. Respondents highlighted that they would also discuss industry specific issues with business network firms who produce different products to them. The benefits of this may at first seem unclear, however, according to business network literature, firms can be wary in divulging too much information (Curran et al 1993), and so a firm who is not a direct competitor may be the less risky option for them to discuss such issues with.
Aside from the types of issues that the business network firms collaborate on, the geographic dispersion of such collaboration is also of interest. Anderson et al (1994) suggested that interaction between network firms is not restricted geographically, a finding which is further reflected in the results presented here. Evident from Figure 11 is that network firms predominantly collaborate with research organisations outside of their own region. A reasonable explanation for this may be due to the lack of research organisations in some rural areas of Ireland, while the business network firms do not commonly collaborate with overseas research organisations either. This may be directly linked to a lack of international links by Irish business networks, an issue ITT (2005) highlighted in their 2005 report on business networks in Ireland.

Source: Own estimation from survey data collected
When asked about the frequency and formality of these collaborations, the majority of respondents remarked that they collaborated with these business network firms and/or organisations on more than one occasion, and that the collaborations they were engaged in were a mixture of both formal and informal collaborations. Business network literature regarding formal and informal collaborations suggests that informal collaborations are just as useful as formal collaborations, where as well as sharing ideas with others; they also play an important role in channelling knowledge flows among its members (Feldman 1999; Dahl and Pederson 2003).

Business network membership also led almost half (46%) of the network firms to collaborate with others outside of the network. These others included businesses who produce similar products/services (25%), businesses that produce different products/services (22%), and research organisations (12%). Issues they collaborated on included, sharing of general business information (76%), industry specific issues (71%), R&D projects (46%), marketing projects (54%), and they also collaborated in an attempt to increase their firms’ sales and profits (74%).
In summary, it is evident that business network membership enabled these network firms to engage with others in the business network to collaborate on both generic business and more industry specific issues. Respondents remarked that these collaborations were not restricted geographically and were also of both a formal and informal nature. Business network membership also provided network firms with the opportunity to collaborate with others outside of the network on various issues, industry specific or otherwise. Thus far, the reasons for getting involved in the respective business networks and the various collaborations that business network members become involved in have been explored. In the discussion that follows, the governance of the business networks is examined and the question of whether business network firms are members of other business networks is addressed. Both of these questions warrant investigation because the governance of the business network is likely to influence the impact of network membership on the participant firms’ performance, while membership of other business networks will also provide interesting insights into the networking activities of those firms.

6.4.3 Governance of the Network

The governance of the business networks in this study was sought to be established because as Saachetti and Sugden (2003) suggested the governance of the network structure indicates the distribution of power within a network, that is, whether the business network in question is a network of direction or a network of mutual dependence, both of which have been discussed in Chapter 3. The business network firms were therefore asked about the amount of control they have in terms of the decision making within the network.

Sixty-six percent of the business network firms responded that they have an adequate say in the way the business network is run, hence implying that the business networks in question are networks of mutual dependence (NoMD). Generally all business network firms responded that they have an equal say in the running of the network and therefore no one network firm or group of network members dictate or control the direction of the business networks. In order to gauge the level of influence the respondent firms have on the overall decision-making of the business network, the
firms were asked to rate their influence on the decision making in the business network on a five-point Likert scale. As Figure 12 depicts, the majority of the business network firms (71%) replied that they had some influence on the decision making process within the business network, albeit to slightly varying degrees, while 29 percent of the respondents highlighted that they do not have any say in the running of the business network. A further 31 percent of these business network firms said that another member firm or a group of member firms control or lead the business network. Of those business network firms who responded in the negative to this question, 67 percent were micro business network firms, with the remaining 33 percent being small in size and they are all members of large business networks (greater than 20 members). In these cases it may be a combination of both the size of the firm themselves and the size of the business network which contributes to the business network firms’ perceived lack of control over the decision making in the network, an issue which may warrant future examination if interested in looking at the optimum number of members in a business network.

Figure 12: Level of influence on the decision making in the business network

Source: Own estimation from survey data collected
6.4.4  Membership of Other Business Networks

When asked if they were involved in other business networks, 55 percent of the business network firms replied in the affirmative. Three percent of the business network firms were unsure how many other business networks they were in, 41 percent are in one other business network, 44 percent are in two to three other business networks, and 12 percent are in four or more other business networks. The types of other business networks that the firms are involved in vary, as shown in Figure 13 below.

Figure 13 shows that the majority of business network firms appear to be in industry specific and trade business networks, while a mere six percent of those that are in other business networks said that they are also a member of an R&D network. This trend is likely to change in the near future or, in essence, is a change that Irish policymakers want to see evolve. For example Enterprise Ireland are funding two of Ireland’s newest network initiatives, more specifically, two business innovation networks, the Enterprise Innovation Network (EIN), and the Irish Software Innovation Network (ISIN), which focus on the promotion of R&D collaborative activities among SMEs in Ireland.

Figure 13: Membership of other business networks

Source: Own estimation from survey data collected
Highlighted thus far is that there are a range of motivations which have enticed firms to become members of their respective formal business networks. Business network firms collaborate with fellow members on a range of issues varying from industry specific to more generic business issues. This collaboration is not restricted geographically and the network firms generally perceive to have an influence on the decision making process within the network. In order to therefore progress the analysis of business networks in operation in Ireland and ascertain how (or if) business network membership impacts on firm performance, the perceived and expected impacts of business network membership are explored in the section that follows.

6.5 Perceived Benefits of Business Network Membership

The benefits of business network membership have been well documented in the business network literature, as highlighted in Chapter 3 (Bengtsson and Kock 1999; Fuller-Love and Thomas 2004; and Julien et al 2004). The aim of this section is to explore the business network firms’ perceived impact of how (or if) business network membership has impacted on various aspects of their firms’ performance, while also attempting to quantify these benefits.

6.5.1 Perceived and Expected Benefits of Business Network Membership

As Figure 14 illustrates, the largest perceived impact by the network firms of business network membership was in terms of the number of jobs safeguarded (according to 68% of the respondents), followed closely by the perception of the respondents that business network membership had a positive impact on turnover, a view held by 66 percent of the respondents. Just over 50 percent of the network firms recognised that membership had a positive impact on their research activities, while over 30 percent of the firms reported that business network membership enabled their firm to create new jobs.
In the case of those respondents who affirmed that business network membership impacted on one of the above factors (as specified in Figure 14), they were subsequently asked to quantify the extent that network membership impacted on these factors. Quantifying the impact of such an initiative is unquestionably a difficult task, as is evidenced by the fact that a number of business network firms were unable to do so when asked. An attempt however was warranted to assess the perceived magnitude of the impact of such activity on their firm.

(i) New jobs created

When asked to quantify the impact business network membership had on new jobs created, Figure 15 outlines what the business network respondents said. As shown when probed further as to how many jobs were created, 21 percent of the business network firms who said that business network membership helped them to create new jobs said there were actually zero jobs created and a further 21 percent said that one additional job was created. Thirty-eight percent created between two to five jobs, while the remaining four percent created ten new jobs (16% could not quantify how many new jobs were created).
The business network firms who responded that they did not know how many new jobs were created were questioned further. Consequently, 44 percent of those firms remained unsure how many jobs were created, however the remaining 66 percent said that between one to ten new jobs were created. Of those business network firms who responded that they experienced an impact on the number of jobs created, 38 percent of these firms expected this to happen when joining the network.

(ii) Jobs safeguarded

In conjunction with enquiring about the number of jobs created by business network firms due to network membership, it was also deemed appropriate to ascertain the number of jobs safeguarded due to such membership. When asked about this, 63 percent of those network firms (68% of the respondents) replied that between one and ten jobs were safeguarded by their firms due to business network membership. Three percent replied that 20 jobs were safeguarded, while a further four percent acknowledged that they had protected in excess of 30 jobs in their business firms, with one large business firm replying that they managed to safeguard 269 jobs due to business network membership. The remaining business network firms could not
quantify how many jobs were safeguarded. When subsequently asked if they expected business network involvement to impact on the number of jobs safeguarded, almost half (45%) of those firms who safeguarded jobs responded that they did expect this to happen.

(iii) Impact sales

Sixty-three percent of the respondent business network firms acknowledged that membership impacted on the sales of their firm. Twenty-nine percent of those firms said that it impacted on the amount of their sales, 17 percent said that it impacted on the markets that they sell to, while 50 percent said that it impacted on both the amount and the location of their sales (the remaining 4% were unsure of the impact on sales).

Twenty-eight percent of the total business network firms who responded that network membership impacted on firms’ sales said that it increased sales by up to five percent, 24 percent remarked that it increased sales by between six to ten percent, 21 percent said that it increased sales by between 11-20 percent, and 12 percent said that it increased sales between 20 to 50 percent. Fourteen percent did not know how it impacted on the amount of their sales. One small Irish-owned manufacturing rural firm, in a regional marketing business network, said that business network membership decreased their sales by between 20 to 50 percent. Of the 85 business network firms who said network involvement impacted on the amount of sales, 36 of those firms (just over 42%) said that they expected membership to impact on the amount of sales. With respect to the firm who experienced a decrease in sales, they responded that they did not expect this decrease in sales to occur when they entered the business network. Due to the lack of an explanation as to why a decrease in sales was experienced by this network firm, one can only assume in this case that the firm in question became involved in an unsuccessful collaboration within the business network. Unsuccessful collaborations can have an adverse impact on firm performance. For example, if a member of a collaboration team withdraws from a team, then a plan or project may be negatively affected. This then affects the remaining firms who face losing the resources they had dedicated to the project and subsequently affects the sales of the firm. Firms may also become locked in to
unsuccessful collaborations which hinders them from collaborating with other more successful partners and hence the possible negative impact on sales.

Fifty-two percent of the business network firms responded that business network involvement impacted on the research activity of their firm. Twenty-six percent of those firms said that it increased the number of people they have employed in R&D. When probed further, 26 percent of these firms said that the number of people increased by up to five percent, 26 percent said that the number of people increased by between six to ten percent, 26 percent said that it increased from between 11 to 20 percent and 22 percent said that the number of people employed in R&D increased between 20-50 percent. Of those firms, 61 percent had expected network membership to impact on the number of people they had employed in R&D activity.

Thirty-seven percent of the respondent firms responded that business network membership did not impact on the number of people employed in R&D, while one percent did not know. One well-established micro manufacturing firm, said that business network membership decreased the number of people they have employed in R&D. When analysing this respondent’s answers further, the respondent did not expect this to happen, yet was not recorded as noting any major downsides to business network involvement, hence a natural assumption to make here is that by collaborating in the R&D network with other member firms, presumably on research
related activities, this firm no longer needed to maintain the same levels of R&D personnel.

(v) New products and processes developed, and impact on existing products and processes

Fifty percent of the respondent business network firms who said that network membership impacted on their research activities (52% of the total respondents) said that membership increased the number of new products developed by their firm. Ninety-three percent of these firms expected business network membership to impact on the new products developed.

Sixty-six percent of the respondent firms who said that business network membership impacted on their research activities (52% of the total respondents), said that membership impacted on existing products/services. Of these firms, 67 percent expected business network membership to impact on existing products/services. Thirty-five percent of the respondent firms who said that business network membership impacted on their research activities (52% of the total respondents), said that network membership impacted on the new processes developed within their firms. Twelve percent of those firms expected membership to impact on new processes developed. Sixty-one percent of the respondents who said that network membership impacted on their research activities said that business network membership impacted on existing processes, while 40 percent expected business network membership to impact on existing processes.

Respondents were also asked to rate on a five-point Likert scale the impact business network membership has had on each of these research activities. The results of which are presented in Figure 16. As shown in this figure, membership to the business networks has a relatively large influence on both the new and existing products/services, and new and existing processes, with a minority of firms citing very little influence (if any) on existing product/services and existing processes.
Figure 16: Impact on new products and processes developed and on existing products and processes

(vi) Additional benefits of network membership

Aside from the five perceived impacts of business network membership as highlighted above, the respondents also commented that business network membership has impacted on their firms in other ways. It provides a forum for business network firms to meet with one another (3%), which according to the network literature is an important benefit for firms in terms of reducing their isolation (Chance and Vlosky 1995). Nine percent of respondents also highlighted that business network membership is important for sharing and receiving information from others. More specifically, this information includes sharing contacts, generic business information, information on local issues, access to advice on various issues, and also the opportunity to learn from best practice activities. Business network membership was also seen by four percent of the respondents as an opportunity for them to improve the firm’s image, while three percent saw it as a potential to gain access to grants.

Source: Own estimation from survey data collected
In summary, when entering the specific business networks, members expected to experience a range of benefits, a number of the business network firms saw these benefits come to fruition, as highlighted thus far. Aside from the potential benefits of business network membership, there can be associated costs. These potential costs are discussed in next section.

6.6 Perceived Costs of Business Network Membership

As the business network literature suggests, there are possible drawbacks to getting involved in a business network. Business networking on occasion has been compared to a double-edged sword and has a potential ‘dark side’ (Gulati et al 2000). This section aims to explore the perceived costs that the business network firms may be experiencing or have experienced since joining their respective business networks.

Figure 17: Perceived costs of business network membership

The greatest concern of being a member of a business network, according to the business network respondents, is the commitment of (in terms of lack of) other business network firms to the business network (depicted in Figure 17), a concern that is also frequently cited in the business network literature (Chance and Vlosky 1995).
Respondents do not perceive business network membership to be costly. The average membership paid by the respondents was approximately €263 per annum, while the average amount of time spent on business network activities per week amount to between one to five hours (according to 94% of the respondents that answered this question). How they spent this time on business network activities varied from attending organised events (42% of the respondents), to 72 percent of the business network firms attending meetings. Additionally, 67 percent reporting spending time on the telephone to other network members with 73 percent reporting time spent in email contact with other members, while 13 percent of the business network firms also spend time doing other business network related activities.

Trust and commitment with business network members has been highlighted throughout the literature as important factors when considering the success of business network relationships (Mayer et al 1995; Johannisson 1998; Mackinnon et al 2004). It was therefore deemed necessary to examine if any of the business network respondents had previously been involved in an unsuccessful relationship within their respective business network. Thirteen percent of the respondents declared that they had previously entered an unsuccessful relationship, which had subsequent impacts for the network firms’ performance in question. A significant proportion of those who entered an unsuccessful relationship remarked that this generated an opportunity cost, both financially (41% of those firms) and in terms of the time consumed (55% of those firms that entered unsuccessful relationships). Half of the business network firms also advocated that it would make them more wary of entering any future collaborations, while it also prevented 14 percent of the business network firms from collaborating with others at the time they were in the futile relationship. Twenty-seven percent of those business network firms responded, however, that the relationship had no impact whatsoever (positive or otherwise) on their firm’s performance.

When asked if the business network firms expected to experience any downsides from network membership, 15 percent of the sample responded that they did expect to encounter some negative aspects, however, a significant and vast majority of the respondent firms (85% to be exact) did not expect to experience any drawbacks to membership. This further implies that when entering their respective business
networks, firms expected that the benefits of membership would outweigh any cost they may incur.

As highlighted above a number of costs can be experienced by firms in formal business networks. These respondent firms were not overly concerned about the possible costs of business network membership and did not expect to encounter any major problems when becoming a member. Given the respondent firms highlighted a number of benefits associated with network membership and some also expressed a few concerns about membership, the perceived overall contribution of business network membership to the firms overall business outcomes was also explored. This is discussed in the next section.

6.7 Additionality – Self Assessment

There are inherent problems associated with asking the business network firms the hypothetical ‘counter-factual’ question of what would have happened had they not become a member of a formal business network, however, this approach has become a consistent feature of evaluations (Hart, Driffield, Roper, and Mole 2008). According to Hart et al (2008), one associated difficulty with this technique is the ‘respondents’ effect’, whereby respondents may deliberately embellish the impact of the program or policy (see also Lenihan 2004). For example, if respondents receive financial assistance from a development agency to join the business network or to partake in business network activities, the respondents may exaggerate the impact of business network membership on firm performance because they may be wary that answering otherwise would reduce their chances of receiving future assistance. Aside from this, other business network firms may attribute their firm’s success to their own personal skills and motivations, rather than to being a member of a business network (Hart et al 2008).

When asked about the overall contribution of their involvement in the business network to the firms’ business outcomes, the following are the responses received. Business outcomes were defined for the business network firms as the overall change in their business activity, in terms of their sales, employment, productivity, and
competitiveness. Table 10 below outlines the results for the business network firms who responded to this question (97% of the sample, the remaining 3% were unsure of the overall contribution and so refrained from answering the question).

Table 10: Overall contribution of business network membership

<table>
<thead>
<tr>
<th>Overall Contribution</th>
<th>Number of Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Definitely would not</em> have achieved similar business outcomes.</td>
<td>8 (5%)</td>
</tr>
<tr>
<td><em>Probably would not</em> have achieved similar business outcomes.</td>
<td>14 (9%)</td>
</tr>
<tr>
<td><em>Would have</em> achieved similar business outcomes, <em>but not as quickly</em>.</td>
<td>45 (27%)</td>
</tr>
<tr>
<td><em>Would have</em> achieved <em>some but not all</em> of the business outcomes.</td>
<td>52 (32%)</td>
</tr>
<tr>
<td><em>Would have</em> achieved similar business outcomes <em>anyway</em>.</td>
<td>45 (27%)</td>
</tr>
</tbody>
</table>

Source: Own estimation from survey data collected

As shown, five percent of the respondents were indebted to their business network for contributing to their overall business outcomes, nine percent were probable that it contributed to their business outcomes, while an additional 27 percent of respondents perceived that they would have achieved similar business outcomes but not as quickly. Thirty-two percent of respondents believed that they would have achieved some but not all of their business outcomes without business network membership. Aside from this however, a further 27 percent of the respondents replied that they would have achieved similar business outcomes anyway, therefore implying no additionality for those participants in their respective business networks. Levels of deadweight from business network membership appear low from these results with

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45 There may of course been some forms of behavioural additionality at play here which are overlooked in this analysis. For more on this notion of ‘behavioural additionality’ the interested reader should refer to the work of Georghiou (2004).
the majority of business network firms reporting some form of partial additionality in terms of either achieving business outcomes more quickly or to a greater extent.

When further probed about the additionality of business network membership, 27 percent of the respondent firms responded in relation to what proportion of the business outcomes they would have expected to achieve without being involved in the network. Figure 18 depicts the results given.

**Figure 18: Percent of business contribution**

![Figure 18: Percent of business contribution](image)

Source: Own estimation from survey data collected

Fifty-eight percent of business network firms expected that they would have achieved between 21-60 percent of their business outcomes without being involved in the business network (29% expected between 21-40% and 29% expected between 41-60%). Eleven percent remarked that they would have achieved less than 20 percent of their business outcomes had they not been part of their business network. On the other end of the spectrum, 14 percent of the business network firms expected that they would have achieved in excess of 80 percent of their business outcomes regardless of being in a business network or not. The results presented here suggest that for a number of the respondent firms, business network membership has not impacted significantly on the contribution it makes to their overall business outcomes, with
almost 60 percent of respondents reporting that they would have achieved between 21 to 60 percent of their business outcomes, irrespective of being a member of their business network.

6.8 Timing of Effects

The business network respondents were also asked to think about the timing of the benefits that their business might have experienced (or expect to experience in the future) as a result of being involved in the formal business network. Table 11 outlines the responses given.

Table 11: Benefits and expected benefits of network membership experienced

<table>
<thead>
<tr>
<th>Number of Firms</th>
<th>Source: Own estimation from survey data collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>No benefits experienced.</td>
<td>6 (4%)</td>
</tr>
<tr>
<td>Have already realised all the benefits.</td>
<td>67 (42%)</td>
</tr>
<tr>
<td>Expect to realise all the benefits in the next year.</td>
<td>23 (14%)</td>
</tr>
<tr>
<td>Expect to realise all the benefits in the next 2 years.</td>
<td>21 (13%)</td>
</tr>
<tr>
<td>Expect to realise all the benefits in the next 3 years.</td>
<td>19 (12%)</td>
</tr>
<tr>
<td>Expect to realise all the benefits in the next 4 years.</td>
<td>1 (1%)</td>
</tr>
<tr>
<td>Expect to realise all the benefits in the next 5 years.</td>
<td>10 (6%)</td>
</tr>
<tr>
<td>Expect to realise all the benefits in longer than 5 years.</td>
<td>13 (8%)</td>
</tr>
</tbody>
</table>
Forty-two percent of the business network firms believe that they have already realised all of the benefits, while a further 46 percent of respondents believe it will take up to five years, while eight percent believe that it will take longer than 5 years to realise the full benefits of business network membership. Four percent of the business network firms have not experienced any benefits. A significant portion of the business network firms however anticipate future benefits from network membership stretching over the next five years or more years. This result has implications for the interpretation of the results of the modelling of the impact of business network membership on firm performance. The implication here is that there may be an underestimation of the overall effects of business network membership on the participant firms.

As shown in this section there are varied responses to the perceived overall contribution business networks make to their participant firms. In essence however a significant proportion of the business network firms remarked that they would not have achieved some or all of their business outcomes without being a member of their respective business network.

Up to this point, the costs and benefits of business network membership have been explored in relation to business networks in general. Given the database possesses information on the specific types of formal business networks, such as R&D, trade, and marketing networks, it is also interesting to examine if the perceived benefits and costs of membership to these different types of business networks vary. This is explored in the next section.

6.9 Benefits and Costs as per Type of Business Network

As noted from the preceding sections, business network firms have perceived network membership to impact both positively, and, on the rare occasion, negatively on their firms’ performance. This section proposes to dissect this information further and explore the costs and benefits of business network membership, as well as the reasons for becoming a member, based on the type of business networks in question. Table 12 outlines the top two reasons as mentioned by the respondent business network
firms for getting involved in their respective business networks, in addition to the benefits and costs they associated with membership.

Table 12: Type of business network membership: motivations, benefits, and costs

<table>
<thead>
<tr>
<th>Reason for getting involved in the network</th>
<th>R&amp;D Network</th>
<th>Trade Network</th>
<th>Marketing Network</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Collaborate on R&amp;D activities.</td>
<td>- Increase firm profit and/or lower costs.</td>
<td>- Collaborate on marketing/branding issues.</td>
</tr>
<tr>
<td></td>
<td>- Collaborate on marketing/branding issues.</td>
<td>- Sustain and/or create employment.</td>
<td>- Increase firm profit and/or lower costs.</td>
</tr>
<tr>
<td></td>
<td>- Safeguard existing jobs.</td>
<td>- Impact on firm turnover.</td>
<td>- Safeguard existing jobs.</td>
</tr>
<tr>
<td>Costs of membership</td>
<td>- Lack of commitment by other members.</td>
<td>- Lack of commitment by other members.</td>
<td>- Lack of commitment by other members.</td>
</tr>
</tbody>
</table>

Source: Own estimation from survey data collected

As this table shows, the reasons for getting involved in the business networks vary by business network type. As expected, the main reason for a firm to become a member of an R&D network is to collaborate with other business network members on R&D activities, while in a similar vein, those that become members of marketing business networks do so to collaborate on marketing and/or branding issues. Business network firms who become members of trade networks refer to increasing their firms’ profits and/or lowering their costs as the prime reason for entering the business network.

In terms of the primary perceived benefits experienced, members of R&D business networks experienced a positive impact on their R&D activities; firms in trade networks safeguarded existing jobs, while firms in marketing networks cited that
membership had a positive impact on their firms’ turnover. In referring to the possible drawbacks of business network membership, the main concern for firms related to the commitment of other members to the business network, regardless of business network type. In the case of both trade and marketing business networks, the second most cited reason was the lack of suitable partners in the business networks. Lack of trust among members, however, was of concern for those firms in R&D business networks, an understandable concern given the sensitivity of collaborating with others on research related activities. An additional point to note here also is that the third most cited cost of business network involvement, irrespective of network type, was the non-reciprocal nature of relationships within the business network. This is another frequently cited concern in the business network literature, where one-sided relationships can act as a barrier for firms to collaborate with others (Sydow 2004).

With respect to the levels of additionality per business network type, as illustrated in Figure 19, 41 percent of the respondent business network firms in R&D business networks would not have achieved all, or even similar, business outcomes without membership of the business network. Additionally, 40 and 45 percent of those in trade and marketing business networks respectively, would not have achieved all or similar business outcomes without being part of their particular business networks.

Figure 19: Levels of additionality by network type

Source: Own estimation from survey data collected
In summary, as highlighted in this section the motivations for, and impact of, business network membership vary slightly depending on the type of business network in question. The costs or concerns associated with business network membership are however the same for the firms, regardless of the type of business network in question.

In reviewing these results, it is apparent that business network membership, as perceived by the network firms, positively impacts on the network firms’ performance. These results however warrant deeper analysis, and to move beyond the ‘monitoring’ phase to the ‘evaluation’ of the impact of business networks. The next section therefore introduces a control group of firms who are not members of formal business networks, the profiles and performance of which can be used to compare against the formal business network firms.

6.10 Control Group: Non Formal Business Network Firms

In order to evaluate the impact of a business network initiative on firm performance, the ideal situation would be if the whole population of potential business network member firms could be surveyed. This would then allow the relationship between business network membership and firm performance to be determined. For practical reasons this is not possible and so a stratified random sample of non-business network firms (defined as, those firms who are not members of formal business networks) to match as closely as possible to those firms who are members of formal business networks was selected. Incorporating a control group into the study adds significantly more validity to any evidence base around the measurement of the impact formal business network membership has on firm performance (Storey 2000). It is important to note that while one can try to obtain a stratified sample of non-business network firms that matches as closely as possible to the business network group, this can never be perfect because there are potentially a wide range of firm level characteristics (Hart et al 2008).

The control group of 100 non-business network firms was selected, at random, to match the profile of the business network firms as closely as possible. The control
firms were chosen based on their, size, age, sector, location, and ownership. The control group completed a questionnaire via a telephone interview (see Appendix B for the control group questionnaire). The questions in the control group questionnaire matched those of the network firms’ questionnaire. The objective of the questionnaire was to ascertain information regarding details of the firms’ characteristics, such as their market orientation and R&D activity carried out in the firm. Information was also gathered on the firm MDs’ characteristics (e.g. age of MD and their qualifications), and the firms’ performance profiles in the two-year period 2008 to 2010.

The following section provides descriptives regarding the control group of firms. In terms of firm size, the majority of the non-business network firms were micro and small firms, which account for 80 percent of the respondents, while the majority of non-business network firms were regarded as well-established (set-up over 20 years ago). Non-business network firms were geographically dispersed throughout Ireland, 59 percent of the sample are classed as urban firms, with the remaining 41 percent as rural firms. The non-business network firms also represent an array of sectors, 56 percent of the sample are service firms and 44 percent manufacturing firms. The majority of firms in the non-business network sample are Irish owned, 88 percent of the sample. The descriptives of this sample of non-business network firms match relatively closely to the firms who are members of formal business networks.

The remainder of this section aims to delve deeper into the analysis of firms who are members of formal business networks and those firms who are not members of formal business networks, by drawing comparisons between additional firm-level factors such as, the export orientation of the firms, innovation carried out, firm performance, and various MD characteristics between the two groups. These comparisons further highlight the key similarities and differences between the business network and non-business network sample firms.
(i) MD Characteristics: business network and non-business network firms

Firstly, comparisons between the characteristics of MDs of business network and non-business network firms are made. It is worth noting the difference in leadership characteristics between the two groups because previous research has shown that the characteristics and background of the MD of a firm may help shape its growth performance (see for example Barkham, Hart, and Hanvey 1996; Mole, Hart, Roper, Storey, and Saal 2007).

Table 13: Role of MD or owner: business network and non-business network firms

<table>
<thead>
<tr>
<th></th>
<th>Business network firms</th>
<th>Non-business network firms</th>
<th>All firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD has ownership stake (&gt; 20 per cent)</td>
<td>96.7</td>
<td>86.7</td>
<td>93.3</td>
</tr>
<tr>
<td>MD is involved in other businesses</td>
<td>23.9</td>
<td>21.3</td>
<td>23</td>
</tr>
<tr>
<td>MD has been involved in starting other businesses</td>
<td>39.5</td>
<td>34.4</td>
<td>37.8</td>
</tr>
<tr>
<td>MD would be willing to share equity to grow the business</td>
<td>43.8</td>
<td>40.1</td>
<td>42.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Notes: A significant difference exists in the equity ownership of MDs, ($\chi^2 (1) = 6.6576, \rho = 0.036$); No significant difference exists for those MDs who are involved in other businesses ($\chi^2 (1) = 0.1611, \rho = 0.688$) or for MDs who had previously started other businesses ($\chi^2 (0.4409) = .3670, \rho = 0.507$); and no significant difference exists for those who would be willing to share equity to grow the business ($\chi^2 (1) = 0.1348, \rho = 0.714$).

As shown in Table 13, a significant difference exists for firms in terms of the percent of equity the MDs own, between the two groups of firms. Almost 97 percent of the MDs of business network firms have in excess of 20 percent equity in the firm compared to 87 percent of MDs’ of non-business network firms. No significant difference exists however, in terms of, whether or not firms have previously started other businesses, or if they are currently involved in other business, and if they are
willing to share equity to grow the firm between the business network and non-business network firms.

Table 14 indicates that there is a significant difference between the qualification profiles of the MDs of business network firms and non-business network firms. Although, when one compares the percentages in each category, the difference does not appear to be large between the two groups. Sixty-four percent of the non-business network firms compared to 76 percent of the business network firms have a post Leaving certification qualification or less.

**Table 14: Highest qualification level of MD or owner: business network and non-business network firms**

<table>
<thead>
<tr>
<th></th>
<th>Business network firms</th>
<th>Non-business network firms</th>
<th>All firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaving Certificate or less</td>
<td>47.1 %</td>
<td>31.6 %</td>
<td>41.9 %</td>
</tr>
<tr>
<td>Post Leaving Certificate, Diploma</td>
<td>29 %</td>
<td>33.3 %</td>
<td>30.5 %</td>
</tr>
<tr>
<td>Degree or higher</td>
<td>23.9 %</td>
<td>35.1 %</td>
<td>27.6 %</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100 %</strong></td>
<td><strong>100 %</strong></td>
<td><strong>100 %</strong></td>
</tr>
</tbody>
</table>

Notes: A significant difference was evident between the qualification profile of the MDs of network and non-business network firms ($\chi^2 (2) = 3.561, \rho = 0.0592$)\(^\text{46}\).

A significant difference is also found to exist in the age profile (Table 15) of MDs in business network and non-business network firms. The results indicate that the MD of business network firms tend to be younger, while older MDs or owners tend to run the non-business network firms.

\(^{46}\) The Kruskall Wallis, a non-parametric test, is used to test the relationship between an ordinal dependent variable and a categorical independent variable.
Table 15: Age band of MD or owner: business network and non-business network firms

<table>
<thead>
<tr>
<th></th>
<th>Business network firms %</th>
<th>Non-business network firms %</th>
<th>All firms %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 44 years</td>
<td>38.8</td>
<td>24.6</td>
<td>34.1</td>
</tr>
<tr>
<td>Between 45 to 54 years</td>
<td>40.5</td>
<td>31.1</td>
<td>37.3</td>
</tr>
<tr>
<td>Older than 55 years</td>
<td>20.7</td>
<td>44.3</td>
<td>28.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Notes: A significant difference was evident between the age profile of the MDs of network and non-business network firms ($\chi^2 (2) = 11.2733, \rho = 0.004$). Mann-Whitney-U, non parametric test results, ($Z = 3.010, \rho = 0.0026$).

(ii) Firm Sales: business network and non-business network firms

Comparing the profiles of export intensity highlights no significant difference between the business network and non-business network firms (Table 16). The percentage of sales exported did not vary greatly between business network and non-business network firms, with just over 30 percent of both categories (30.8 and 32.5 percent for business network and non-business network firms respectively) exporting up to five percent of their sales. Business network firms do appear however to export a greater proportion of their sales with just over 24 percent of business network firms exporting in excess of 51 percent of their sales compared to 13.5 percent of non-business network firms exporting that amount.

---

47 The age of the MDs in the category ranged from 35 to 44 years.
Table 16: Export intensity: business network and non-business network firms

<table>
<thead>
<tr>
<th>Percent Export Sales</th>
<th>Business network firms</th>
<th>Non-business network firms</th>
<th>All firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 5</td>
<td>30.8%</td>
<td>32.5%</td>
<td>31.3%</td>
</tr>
<tr>
<td>Between 6 – 10</td>
<td>12.8%</td>
<td>13.5%</td>
<td>13%</td>
</tr>
<tr>
<td>Between 11 – 15</td>
<td>4.3%</td>
<td>8.1%</td>
<td>5.4%</td>
</tr>
<tr>
<td>Between 16 – 25</td>
<td>13.8%</td>
<td>16.2%</td>
<td>14.5%</td>
</tr>
<tr>
<td>Between 26 – 50</td>
<td>13.8%</td>
<td>16.2%</td>
<td>14.5%</td>
</tr>
<tr>
<td>Between 51 – 75</td>
<td>9.6%</td>
<td>2.7%</td>
<td>7.6%</td>
</tr>
<tr>
<td>More than 75</td>
<td>14.9%</td>
<td>10.8%</td>
<td>13.7%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
<td><strong>100%</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Notes: No significant difference was evident between the export orientation of network and non-business network firms ($\chi^2 (6) = 2.9431, \rho = 0.816$). Mann-Whitney-U, non parametric test results, ($Z = -0.083, \rho = 0.4063$).

There was also no significant difference between the local market orientation of the business network and non-business network firms (Table 17). Although 45 percent of the non-business network firms sell in excess of 50 percent of their sales locally compared to 26 percent of the business network firms.
Table 17: Proportion of sales which are local (within 30km): business network and non-business network firms

<table>
<thead>
<tr>
<th>Percent Local Sales</th>
<th>Business network firms</th>
<th>Non-business network firms</th>
<th>All firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 10 %</td>
<td>26.3</td>
<td>20.3</td>
<td>24.1</td>
</tr>
<tr>
<td>Between 11 – 20 %</td>
<td>12.3</td>
<td>6.3</td>
<td>10.1</td>
</tr>
<tr>
<td>Between 21 – 30 %</td>
<td>14.1</td>
<td>7.8</td>
<td>11.8</td>
</tr>
<tr>
<td>Between 31 – 40 %</td>
<td>14.9</td>
<td>14.1</td>
<td>14.6</td>
</tr>
<tr>
<td>Between 41 – 50 %</td>
<td>6.1</td>
<td>6.2</td>
<td>6.2</td>
</tr>
<tr>
<td>More than 50 %</td>
<td>26.3</td>
<td>45.3</td>
<td>33.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Notes: No significant difference was evident between the local market orientation of network and non-business network firms ($\chi^2 (5) = 7.9146, p = 0.161$). Mann-Whitney-U, non parametric test results, (Z = 1.228, $p = 0.21936$).

Significant differences were evident, in terms of the location of sales between business network and non-business network firms (Table 18). Non-business network firms tend to sell their products or services locally (this is also reflected in the proportion of sales that non-business network firms make locally), while business network firms tend to sell to customers based elsewhere in Ireland and to firms based overseas. Almost 65 percent of business network firms compared to 44 percent of those firms who are not in formal business networks sell overseas, while 81 percent of business network firms compared to 63 percent of non-business network firms sell to customers based elsewhere in Ireland. The proportion of sales made by business network and non-business network firms to customers based elsewhere in the region and to customers based in Northern Ireland are relatively the same. Results presented here therefore indicate that firms in formal business networks tend to sell more outside of their respective regions, both at a national and international level.
Table 18: Location of sales: business network and non-business network firms

<table>
<thead>
<tr>
<th></th>
<th>Business network firms</th>
<th>Non-business network firms</th>
<th>All firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Local customers, within 30 km of their site</td>
<td>78.7</td>
<td>89</td>
<td>82.5</td>
</tr>
<tr>
<td>Customers based elsewhere in the region</td>
<td>74.6</td>
<td>78</td>
<td>75.8</td>
</tr>
<tr>
<td>Customers based elsewhere in Ireland, but outside of the region</td>
<td>81</td>
<td>63</td>
<td>74.3</td>
</tr>
<tr>
<td>Customers based in Northern Ireland</td>
<td>52.7</td>
<td>47</td>
<td>50.6</td>
</tr>
<tr>
<td>Customers based overseas</td>
<td>64.5</td>
<td>44</td>
<td>56.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Notes: Statistics are as follows for firms reporting sales to local customers of network and non-business network firms ($\chi^2 (1) = 4.6239, \rho = 0.032$); Regional sales of network and non-business network firms ($\chi^2 (1) = .4066, \rho = 0.524$); National sales by network and non-business network firms ($\chi^2 (1) = 10.7508, \rho = 0.001$); Sales to Northern Ireland by network and non-business network firms ($\chi^2 (1) = .8059, \rho = 0.369$); International sales by network and non-business network firms ($\chi^2 (1) = 10.7615, \rho = 0.001$).

(iii) **Firm Purchases: business network and non-business network firms**

As part of the survey, respondents were also asked about their purchasing patterns in terms of identifying the location of their suppliers. There was no statistical difference between business network and non-business network firms, in terms of, the various locations that they purchase supplies from (Table 19). The majority of purchases made by business network and non-business network firms are from local suppliers (that is, suppliers based within 30km of their site).
Table 19: Sources of inputs: business network and non-business network firms

<table>
<thead>
<tr>
<th>Source of Inputs</th>
<th>Business network firms %</th>
<th>Non-business network firms %</th>
<th>All firms %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other parts of your parent company</td>
<td>7.7</td>
<td>9</td>
<td>8.1</td>
</tr>
<tr>
<td>Local suppliers, within 30km of their site</td>
<td>63.9</td>
<td>66</td>
<td>64.7</td>
</tr>
<tr>
<td>Suppliers based elsewhere in the region</td>
<td>45.6</td>
<td>54</td>
<td>48.7</td>
</tr>
<tr>
<td>Suppliers based elsewhere in Ireland, but outside of the region</td>
<td>59.2</td>
<td>65</td>
<td>61.34</td>
</tr>
<tr>
<td>Suppliers based in Northern Ireland</td>
<td>23.7</td>
<td>28</td>
<td>25.3</td>
</tr>
<tr>
<td>Suppliers based overseas</td>
<td>58</td>
<td>61</td>
<td>59.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Notes: Statistics are as follows for firms reporting purchases from parent company of network and non-business network firms ($\chi^2 (1) = 0.1431, \rho = 0.705$); Local purchases by network and non-business network firms ($\chi^2 (1) = .1207, \rho = 0.728$); Purchases made regionally by network and non-business network firms ($\chi^2 (1) = 1.7904, \rho = 0.181$); National purchases by network and non-business network firms($\chi^2 (1) = .9000, \rho = 0.343$); Purchases from Northern Ireland of network and non-business network firms ($\chi^2 (1) = .6240, \rho = 0.430$); International purchases by network and non-business network firms ($\chi^2 (1) = .2358, \rho = 0.627$).
In terms of comparing the extent of local purchases made by the business network and non-business network firms, no significant differences were evident (Table 20).

**Table 20: Extent of local purchasing: business network and non-business network firms**

<table>
<thead>
<tr>
<th>Percent Local Purchases</th>
<th>Business network Firms</th>
<th>Non-business network firms</th>
<th>All firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 10</td>
<td>21.3%</td>
<td>32.1%</td>
<td>25.6%</td>
</tr>
<tr>
<td>Between 11 – 20</td>
<td>12.5%</td>
<td>17%</td>
<td>14.3%</td>
</tr>
<tr>
<td>Between 21 – 30</td>
<td>10%</td>
<td>13.2%</td>
<td>11.3%</td>
</tr>
<tr>
<td>Between 31 – 40</td>
<td>10%</td>
<td>1.9%</td>
<td>6.8%</td>
</tr>
<tr>
<td>Between 41 – 50</td>
<td>7.5%</td>
<td>3.8%</td>
<td>6%</td>
</tr>
<tr>
<td>More than 50</td>
<td>38.7%</td>
<td>32%</td>
<td>36%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Notes: No significant difference was evident in terms of the extent of local purchases by network and non-business network firms ($\chi^2 (5) = 6.4309, \rho = 0.267$). Mann-Whitney-U, non-parametric test results, ($Z = -1.586, \rho = 0.1128$).

(iv) **Firm R&D activities: business network and non-business network firms**

A significant difference is found between R&D activity undertaken by business network and non-business network firms (Table 21). Non-business network firms are more inclined to be non-innovators, while those firms who are members of formal business networks tend to produce new products/services that are new to their business and 33 percent of business network firms produce goods/services which they class as being new to the world compared to 19 percent of non-business network firms.
Table 21: R&D and innovation activity: business network and non-business network firms

<table>
<thead>
<tr>
<th></th>
<th>Business network firms</th>
<th>Non-business network firms</th>
<th>All firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>No innovation</td>
<td>22.5</td>
<td>43</td>
<td>30.1</td>
</tr>
<tr>
<td>New products/services to</td>
<td>44.4</td>
<td>38</td>
<td>42</td>
</tr>
<tr>
<td>their business</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New products/services</td>
<td>33.1</td>
<td>19</td>
<td>27.9</td>
</tr>
<tr>
<td>outside of their business</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Notes: There is a significant difference in terms of innovation activity between network and non-business network firms ($\chi^2 (2) = 13.8922, \rho = 0.001$).

(v) Firm Growth: business network and non-business network firms

Table 22 below summarises the key growth comparisons for business network and non-business network firms. There is a significant difference between the growth rates of business network and non-business network firms in terms of employment and turnover growth, however there is no significant difference in terms of productivity growth between the two groups. These results suggest that during the two-year period (2008 to 2010), firms in business networks achieved, on average, positive firm growth rates relative to the firms who are not members of formal business networks.
Table 22: Firm growth: business network and non-business network firms

<table>
<thead>
<tr>
<th></th>
<th>Business network firms</th>
<th>Non-business network firms</th>
<th>All firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean %</td>
<td>Mean %</td>
<td>Mean %</td>
</tr>
<tr>
<td>Employment growth 2008 – 2010</td>
<td>1.4</td>
<td>-17.9</td>
<td>-5.8</td>
</tr>
<tr>
<td>Turnover growth 2008 – 2010</td>
<td>14.2</td>
<td>-22.3</td>
<td>-0.4</td>
</tr>
<tr>
<td>Productivity growth 2008 – 2010</td>
<td>15.7</td>
<td>6.6</td>
<td>12.0</td>
</tr>
</tbody>
</table>

Notes: There is a significant difference between the employment growth and turnover growth of business network and non-business network firms. Employment growth (Z = -4.464, \( \rho = 0.0000 \)); Turnover growth (Z = -2.996, \( \rho = 0.0027 \)). No significant difference in productivity growth between business network and non-business network firms (Z = -1.171, \( \rho = 0.2415 \)).

An attempt was also made to estimate the value added at firm level over the period 2008 to 2010 by using a proxy based on the percentage of annual turnover taken up by purchased inputs. This proxy was developed in recognition of the difficulty in obtaining Gross Value Added (GVA) information directly from the respondent firms through the telephone survey. A GVA figure for each firm is constructed for 2008 and 2010 by deriving an actual figure for purchased inputs using the percentage provided by the respondents. Once obtained an overall GVA figure was calculated for the business. In light of this, there is a significant difference in GVA growth between business network and non-business network firms (Table 23). The average growth of GVA growth for business network firms is 5.5 percent compared to a negative average GVA growth of 19.6 percent for non-business network firms.
Table 23: Value added: business network and non-business network firms

<table>
<thead>
<tr>
<th></th>
<th>Business network firms</th>
<th>Non-business network firms</th>
<th>All firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>GVA growth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008-2010</td>
<td>5.5</td>
<td>-19.6</td>
<td>-5.8</td>
</tr>
<tr>
<td>GVA per head growth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008-2010</td>
<td>4.0</td>
<td>0.2</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>N = 61</td>
<td>N = 40</td>
<td>N = 101</td>
</tr>
</tbody>
</table>

Notes: There is a significant difference in the GVA growth of network and non-business network firms. \(Z = -1.861, \rho = 0.0627\). No significant difference in GVA per head growth of network and non-business network firms \(Z = -1.148, \rho = 0.2510\).

Overall, these results support the perceptions of the business network firms, who reported positive impacts related to business network membership. The results provided here further compound the belief that those firms who are members of formal business networks reap a number of benefits from such membership. When compared to their non-business network counterparts, business network firms are significantly more likely to be innovative, export orientated, and on average have experienced better growth rates in the two-year period specified. If the evaluation of the impact of these formal business networks on firm performance relied on the views of the business network firms, in conjunction with the comparisons made against the control group of non-business network firms, then the conclusion would be that business networks positively impact on firm performance.

Two questions emanate from these results however. Firstly, is it possible that it is the actual characteristics of the business network firms that impacts on their firm performance rather than actually being a member of a business network? Secondly, are there also selection effects at play here? The evaluation of these business networks is therefore taken to the most sophisticated level of Storey’s six-steps evaluation approach in Chapter 7, where both of these questions are addressed.
6.11 Conclusion

In conclusion, business network firms perceive a number of benefits to business network membership. Business network firms advocated that they collaborate on a number of issues with other network members; these collaborations vary from generic business issues to more industry specific issues. Business network firms who collaborate in terms of research related activities tend to collaborate with research organisations, while business network firms who collaborate on marketing issues do so with other members who produce similar goods and services as themselves. Collaboration with other network members is not geographically restricted, with respondents reporting that they collaborate with other network members on a local, regional, and national level. International collaboration does not appear to be a dominant feature of business networks in Ireland. This is an issue which was also highlighted in ITT’s (2005) report on business networks in Ireland. One of the key recommendations that emanated from this report was that a support programme is needed to help Irish business networks to collaborate at an international level.

The most frequently cited benefits of business network membership, according to the network firms include: the safeguarding of existing jobs, impact on the business network firms’ research activities, and sales, while business network firms also noted an increase in firm employment. Of prime concern for network firms was the issue of commitment by other members to the network. A related concern was the issue of trust among business network members. Overall however, the perceived impacts of network membership, as expressed by the respondent business network firms, provides some clear positive evidence regarding the relative importance business networks have on their member firms. Low levels of deadweight are associated with business network membership with the majority of respondents reporting some partial additionality from network membership. With respect to timing issues, some 54 percent of business network respondents have yet to realise full benefits of business network membership, a result which needs to be considered when interpreting the estimates of the evaluation model developed in Chapter 7.

To delve deeper into these results, however, a control group of non-business network firms was incorporated into the study. The control group of non-business network
firms was sampled on the business network firms, based on those firms’ core characteristics. The characteristics of the control group firms therefore matched as closely as possible to that of the firms in formal business networks. Tests of association were carried out to ascertain if these two groups differed in various other aspects of their firms’ profiles. The results indicate that significant differences do exist between the MDs of business network and non-business network firms. MDs of business network firms are generally younger, while statistically they were also found to be less qualified (although the percentage difference between the two groups was small). Significant differences were also found in terms of the export orientation and research activities of business network and non-business network firms. Business network firms are more inclined to sell to customers at a national and international level, while they are also more likely to be innovative. A significant difference was also found in terms of the average growth rates experienced by the two groups of firms over the two-year period with business network firms outperforming their non-business network counterparts.

These results further emphasise the merits to being a member of a formal business network. If one was to read these results in isolation, without going further in the evaluation process, then the results presented suggest that membership to formal business networks enables firms to achieve improved firm performance. A natural question which emerges from these results however is, whether it is membership to the business network that is positively influencing the performance of the business network firms, or does it in fact relate to the characteristics of the business network firms themselves? These results also beg the question of whether or not there is a selection-effect issue at play here as well. Chapter 7 develops an evaluation framework to address both of these questions. More specifically, an econometric evaluation framework is developed to estimate the impact of business networks on firm performance, whilst controlling for firm-level and MD characteristics, and selection effects.
Chapter 7: Estimating the Firm Level Effects of Business Network Membership
7.1 Introduction

The theoretical and empirical literature reviewed in earlier chapters and the perceived impacts highlighted by the surveyed business network firms, as well as the comparisons made between the firm performance of business network and non-business network firms indicate that firms reap a number of benefits from membership to business networks. These benefits need however to be examined in light of two questions raised in the conclusion section of Chapter 6. The first question that emerges is whether it is actually the characteristics of the business network firms themselves rather than being a member of a business network, which influences firm performance? Secondly, are there selection-effects at play as well? More specifically, are faster growing firms choosing to become members of formal business networks? This chapter tackles both of these questions through the development of a Heckman two-step econometric model, which controls for firm level, MD, and selection effects. The chapter is structured as follows; Section 7.2 outlines the network impact model, while Section 7.3 addresses the problem of selection and also the limitations and challenges of dealing with such an issue. Sections 7.4 and 7.5 specify the selection and outcome models respectively, while Section 7.6 concludes the chapter. The principal objective of this chapter is to develop an evaluation framework which can be used to estimate the impact of business networks on firm performance. As alluded to throughout the thesis, this is an aspect which has been overlooked in previous research.

7.2 Business Network Impact Model

Prior to developing an econometric model to address the two issues highlighted above, it is necessary to first outline the data measurement and variables to be used in the models developed, as well as the model specification and diagnostics; each of which are discussed in this section.
The general empirical specification of the model to be estimated is given by equation (1) below. The objective of the econometric analysis is to test how (or if) business network membership impacts on firm performance.

\[ Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \ldots + \beta_k X_k + \varepsilon \]  

(1)

Where \( Y \), the dependent variable, is the estimate of firm performance and subsequently the independent variables are made up of controls for the firms’ and the MDs’ characteristics, and for whether or not a firm is in a formal business network (a dummy variable); discussion on these variables is included in Section 7.2.1. The error term \( \varepsilon \) (also known as the disturbance term), captures the effects of all missing variables, while the constant \( \beta_0 \) corresponds to the value that would be estimated for the dependent variable if all the independent variables were simultaneously equal to zero (Cameron and Trivedi 2005).

### 7.2.1 Data Measurement and Discussion of Variables

To recap, data for the empirical model was collected through the use of a telephone survey. The field study covered 169 firms involved in formal business networks and 100 firms who formed a control group (those firms who are not in formal business networks). The inclusion of a control group to ascertain the true impact of business networks on firm performance was necessary because this enables the comparison of the behaviour of the business network and non-business network firms to be made (Storey 2000, Hart et al 2008). In the case of the business network firms, only managing directors/owners or those directly involved in the business network were interviewed, while managing directors/owners were also interviewed in the case of the non-business network firms, which ensured that the quality of the data collected was generally reliable and of a high quality.

Prior to delving into the regression models, the variables included in the evaluation model are outlined (Table 24) and are subsequently discussed.
Table 24: Variables descriptives

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Expected Impact on Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent</strong></td>
<td>log difference 2008 to 2010 of employment turnover productivity (turnover per employee)</td>
<td></td>
</tr>
<tr>
<td><strong>Control variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age of Firm</td>
<td>Residual: Newer firms (1-10 years)</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>1 = established firms (11-20 years); 0 = otherwise</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 = well established firms (greater 20 years); 0 = otherwise</td>
<td></td>
</tr>
<tr>
<td>Business Network</td>
<td>1 = member of formal business network; 0 = otherwise</td>
<td>+</td>
</tr>
<tr>
<td>Innovator</td>
<td>Residual: No innovation</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>1 = new to business; 0 = otherwise</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 = new outside of business; 0 = otherwise</td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td>1 = urban; 0 = rural</td>
<td>+</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>1 = manufacturing; 0 = services</td>
<td>+/-</td>
</tr>
<tr>
<td>MD Age</td>
<td>Residual: &lt; 44 years(^{48})</td>
<td>+/-</td>
</tr>
<tr>
<td></td>
<td>1 = 45-54 years; 0 = otherwise</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 = 55+; 0 = otherwise</td>
<td></td>
</tr>
<tr>
<td>MD Qualifications</td>
<td>Residual: Leaving Certificate or Less</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>1 = post leaving cert, diploma; 0 = otherwise</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 = degree or higher; 0 = otherwise</td>
<td></td>
</tr>
<tr>
<td>MD Only Business</td>
<td>1 = only business the MD is involved in; 0 = otherwise</td>
<td>-</td>
</tr>
<tr>
<td>MD Other Business</td>
<td>1 = MD has started other businesses; 0 = otherwise</td>
<td>+</td>
</tr>
</tbody>
</table>

\(^{48}\) The age of the MDs in the category ranged from 35 to 44 years.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (Firm)</td>
<td>log of employment in 2008</td>
<td>-</td>
</tr>
<tr>
<td>Sell locally</td>
<td>Local customers (within 30km) = 1; otherwise = 0</td>
<td>+/-</td>
</tr>
<tr>
<td>Sell to others regionally</td>
<td>Regional customers (excluding local) = 1; otherwise = 0</td>
<td>+/-</td>
</tr>
<tr>
<td>Sell to others in Ireland</td>
<td>National customers (excluding local and regional) = 1; otherwise = 0</td>
<td>+</td>
</tr>
<tr>
<td>Source locally</td>
<td>Local suppliers (within 30km) = 1; otherwise = 0</td>
<td>+/-</td>
</tr>
<tr>
<td>Source regionally</td>
<td>Regional suppliers (excluding local) = 1; otherwise = 0</td>
<td>+/-</td>
</tr>
<tr>
<td>Source nationally</td>
<td>National suppliers (excluding local and regional) = 1; otherwise = 0</td>
<td>+</td>
</tr>
<tr>
<td>Source internationally</td>
<td>International suppliers = 1; otherwise = 0</td>
<td>+</td>
</tr>
</tbody>
</table>

(i) Growth Variables

In the data, there are three potential measures of firm performance, output (sales of the firm), employment, and a proxy for productivity. According to Hart et al (2008) when estimating the impact of regional selective assistance (RSA) and selective finance for investment in England (SFIE), firm output is naturally the most appealing measure of performance although it can also be the most problematic, in that for example, the price of the final good or service sold by the firm is unobservable. Hermelo and Vassolo (2007) however, when examining the determinants of firm growth in Argentinean firms, highlighted that the sales of a firm is a good measure of firm growth because it measures the total volume of business that a given firm does.

Firm productivity can be measured in a number of ways, although this also depends on the availability of data. The various methods include single factor productivity, which include measures such as labour productivity and capital productivity, and
multifactor productivity measures, which include capital and labour productivity, and capital, labour, and intermediate inputs (energy, materials, services) productivity (OECD 2001). Given the availability of data in this study, the proxy for productivity is labour productivity, output per employee. The advantages of using the labour productivity measure include the relative simplicity in its measurement and interpretation, while an associated disadvantage is that it is a partial productivity measure and mirrors the combined influence of a number of factors (OECD 2001). The final measure of growth is employment. This measure is somewhat biased against capital-intensive firms (Hermelo and Vassolo 2007), although for the purpose of business network membership it is appropriate, as one of the main motivations of business network membership, according to the business network respondents, was to increase firm employment.

According to Penrose (1959) there are two categories of ‘causes’ of firm growth, namely, those that are external to the firm, and those that are internal. She further explained that while the external causes (such as for example demand conditions) are interesting, they cannot be completely understood without exploring the nature of the firm itself (Pitelis 2009). As shown therefore in Table 24, a set of firm explanatory variables are outlined, as are firm strategy variables (e.g. if firm is an exporter and/or an importer). Penrose (1959) also highlighted that firm expansion and growth can on occasion be influenced by human and managerial resources, and so managing director characteristics are also outlined. The third column of Table 24 also highlights the expected impact each of these variables would have on firm growth, + indicates a positive effect; - a negative effect; and +/- indicates that the association is unclear. The associated and expected relationships of the variables relating to firm, MD characteristics, as well as business network membership, with firm growth are now discussed.

(ii) Control Variables: Firm, MD, and Business Network Membership

The general consensus in firm growth literature is that young and small firms will experience a rapid rise in growth rates, while older and larger firms will experience lower growth rates. Hermelo and Vassolo (2007) for example, while examining the
determinants of firm growth highlighted the works of Mata (1994), and Becchetti and Trovato (2002), who each found a negative relationship between firm growth and the size of the firm. This implies that smaller firms grow faster than larger firms. Firm sector and location may also be important in determining firm growth since the environment that a firm operates in can influence its’ growth rates. In terms of location for example, a firm can in many respects be dependent on its local market. Whether or not a firm exports and/or innovates is also believed to potentially impact upon changes in firm growth rates (McGuinness and Hart 2004).

In reviewing the third column of Table 24, the expected association with firm growth with respect to the age of the firm, is that older firms are expected to have lower growth rates than their younger counterparts, this is also the case for the size of the firm whereby larger firms are expected to have lower growth rates than smaller firms. The expected growth sign attributed to the type of firm, that is whether it is a manufacturing or services firm, is not determined. A service firm may for example have higher turnover growth, while a manufacturing firm may have higher employment growth, hence the indecision on this variable. Relative to a rural firm, it would be expected that an urban firm would achieve higher rates of growth. Urban firms are closer to the market, have access to a larger customer base, and as such should experience faster rates of growth.

No definite association, positive or negative, has been attributed to the expected relationships of whether firms sell to, and/or source supplies at a local and regional level. In reference to the data at hand, the majority of firms in the sample (business network and non-business network) are micro and small sized firms. The natural assumption here is that, given the size of the firms in question, they would be generally more likely to supply to, and purchase from, their local and regional markets. The fact that the firms can source their supplies and sell their products or services at a local and regional level can have a positive effect on the firm, reducing costs of transaction of operating outside their immediate market. On the other hand, firms may only operate at these geographical levels because they don’t have the capabilities or resources to engage in sourcing or selling at a national and international level, hence the indecision regarding the expected impacts on firm growth. In line with this, it would be expected that firms who can source their resources from and sell
their products/services at a national and international level would have higher growth rates than those firms who do not. Furthermore, firms who engage in innovative activity would be expected to have higher growth rates than those firms who do not.

A manager’s individual characteristics can also influence firm growth; such traits include, for example, experience and education (Gray and Mabey 2005). Anderson and Tell (2009) in reviewing MD characteristics which may influence firm growth highlighted a manager’s traits and characteristics, their motivations or aspirations, and the manager’s role as having potential to influence firm growth. In terms of MD characteristics it would generally be expected therefore that those MDs who are involved in other businesses or who have been involved in starting previous businesses would be associated with firms with a faster growth rate, hence the positive expected sign associated with these variables in the third column of Table 24. It would also be expected that MDs who have higher qualifications would have greater levels of experience and are generally more motivated. Such characteristics should then have a positive impact on the performance of the firm. No definite relationship, positive or negative, can be specified in terms of MD age. It can be assumed that younger MDs are more motivated and growth driven, however, older MDs would be more knowledgeable and have greater expertise from their years in business (experience), hence the undetermined sign associated with this control variable.

Finally, the expected sign associated with membership to a business network is a positive one. Empirical evidence in the business network literature, as well as the results produced in Chapter 6, indicate that firms who are members of formal business networks have higher growth rates than those firms who are not members of such networks.

The data descriptions above provide some insights into the relationships that are expected between the control variables and the growth rate of the firm. Prior to testing these assumptions, it is necessary to specify the models being used and to run the necessary tests on these models.
7.2.2 Model Specification and Diagnostics

Before presenting the estimated coefficients, the appropriate model specification needs to be addressed. Cross-sectional data was used, which refers to data gathered by examining many subjects at the same point of time. The subjects in this research refer to firms that are members of formal business networks and a control group of firms who are not members of formal business networks. Models are estimated using ordinary least squares (OLS), while a probit to estimate selection to a formal business network is also estimated. The econometric package Stata 10 was used to estimate the equations because of its capability to handle data. It provides first-rate documentation of procedures and results, while it is also ideal for those who are developing or transforming statistical measures (Acock 2005).

A normal test for various transformations of the continuous variables was run. This tested each distribution for normality, with the resulting transformation with the lowest $\chi^2$ statistic being the most suitable transformation for the dependent variable in question. Such transformations included using the raw, cubic, square, square-root, log or reciprocal root of the variables in question. As outlined in Table 24 above, the log of the three dependent variables was taken as it presented the lowest $\chi^2$ for each of the variables concerned. The variables are now all normally distributed following their transformation.

The data was also tested for any influential outliers. Outliers can arise from the incorrect entry of values, or in cases where the sample is taken from a small population, a number of members of the population may be very different from the rest of the population (Woolridge 2003). Outliers were detected, however, following rigorous testing, (for example, omitting the outliers, and winsorising the variables concerned), no influential outliers were detected in the sample. No observations were therefore omitted from the sample because deleting the outliers would limit the generalisability of the results (Hair, Black, Babin, and Anderson 2010).

As already mentioned, OLS is one choice of method used to estimate the models, whose assumptions include that the model is linear in parameters; the data comes
from a random sample of the population, the errors are statistically independent from one another; the expected value of the errors is always zero; the independent variables are not too strongly collinear; and variance and the errors are normally distributed (Woolridge 2003). According to the Gauss Markov theorem, an OLS regression should be BLUE, best linear unbiased estimator (Woolridge 2003). Therefore, after running the first OLS regressions using the variables outlined in Table 24, a number of tests were performed. More specifically, the levels of multicollinearity were assessed and tests to examine whether or not the error terms were homogenous in the regression were also conducted.

(i) Multicollinearity

Since the measured variables used in estimating the model might be inter-related, a test of multicollinearity was preformed using the Variance Inflation Factor (VIF). VIF is an indicator of the effect that the other independent variables have on the standard error of a regression coefficient ($\beta_i$) (Hair et al 2010). It is generally accepted that the higher VIF, the higher the variance of the estimated regression coefficient ($\beta_i$), and the greater the chance of finding that regression coefficient insignificant, which subsequently means that severe multicollinearity effects are present (rule of thumb advises that VIF greater than five suggests the presence of multicollinearity) (Hair et al 2010). Table 25 outlines the results of the VIF for the model developed. These results, with the mean variances for the employment, turnover, and productivity models of 1.46, 1.69, and 1.70 respectively, are far below the criterion; hence, multicollinearity is not an issue in these models.
Table 25: Variance inflation factor

<table>
<thead>
<tr>
<th></th>
<th>Employment</th>
<th>Turnover</th>
<th>Productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>1.66</td>
<td>1.89</td>
<td>1.92</td>
</tr>
<tr>
<td>Age:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Established</td>
<td>1.51</td>
<td>1.76</td>
<td>1.76</td>
</tr>
<tr>
<td>Well established</td>
<td>2.10</td>
<td>3.00</td>
<td>3.02</td>
</tr>
<tr>
<td>Urban</td>
<td>1.13</td>
<td>1.18</td>
<td>1.20</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>1.17</td>
<td>1.36</td>
<td>1.37</td>
</tr>
<tr>
<td>Exporter</td>
<td>1.65</td>
<td>1.72</td>
<td>1.72</td>
</tr>
<tr>
<td>Innovator:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td>1.48</td>
<td>1.58</td>
<td>1.58</td>
</tr>
<tr>
<td>Outside business</td>
<td>1.48</td>
<td>1.70</td>
<td>1.74</td>
</tr>
<tr>
<td>Sell locally</td>
<td>1.40</td>
<td>1.53</td>
<td>1.57</td>
</tr>
<tr>
<td>Sell to others regionally</td>
<td>1.53</td>
<td>1.60</td>
<td>1.61</td>
</tr>
<tr>
<td>Sell to others in Ireland</td>
<td>1.73</td>
<td>1.88</td>
<td>1.89</td>
</tr>
<tr>
<td>Source locally</td>
<td>1.17</td>
<td>1.56</td>
<td>1.57</td>
</tr>
<tr>
<td>Source regionally</td>
<td>1.24</td>
<td>1.32</td>
<td>1.39</td>
</tr>
<tr>
<td>Source nationally</td>
<td>1.20</td>
<td>1.38</td>
<td>1.39</td>
</tr>
<tr>
<td>Source internationally</td>
<td>1.28</td>
<td>1.38</td>
<td>1.37</td>
</tr>
<tr>
<td>MD Only Business</td>
<td>1.36</td>
<td>1.45</td>
<td>1.45</td>
</tr>
<tr>
<td>MD Other Business</td>
<td>1.39</td>
<td>1.65</td>
<td>1.66</td>
</tr>
<tr>
<td>Business Network</td>
<td>1.78</td>
<td>2.34</td>
<td>2.33</td>
</tr>
<tr>
<td><strong>Mean VIF</strong></td>
<td><strong>1.46</strong></td>
<td><strong>1.69</strong></td>
<td><strong>1.70</strong></td>
</tr>
</tbody>
</table>

(ii) **Heteroskedasticity**

Another key assumption of regression models is that the errors have the same variance throughout the sample. Since OLS regression assumes a constant error variance, heteroskedasticity causes the OLS estimates to be inefficient. In addition, a second consequence of this problem is that the estimates of the variances may also be biased which invalidates the tests of significance. The Breusch-Pagan Lagrange Multiplier (LM) test is commonly used to determine the presence of heteroskedasticity, a common problem in cross sectional data (Breusch and Pagan 1980). The LM test for homoskedasticity of the residual variances is computed by regressing the squared residuals on the squared fitted values from the regression. An additional test is Breusch-Pagan / Cook-Weisberg test for heteroskedasticity, where the null hypothesis is that there is constant variance (homoskedasticity) (equation 2), that is:

$$H_0 : \sigma_1^2 = \sigma_2^2 = \sigma_3^2 = \ldots = \sigma_N^2$$  \hspace{1cm} (2)
After running the aforementioned OLS regression, the models were tested for the presence of heteroskedasticity. The results of these tests (Table 26) show a P value of less than 0.05 for each of the three models, which means we cannot accept the null hypothesis, and hence heteroskedasticity is present in the model. The implication of the presence of heteroskedasticity is that rather than being constant across all observations, the variance of the error term changes depending on the observation. Heteroskedasticity causes standard errors to be biased and thus do not allow for the best linear unbiased estimates to be produced (Hair et al 2010). The presence of heteroskedasticity violates the Gauss Markov theorem because the OLS estimates are not efficient, that is, they do not have a minimum variance. Heteroskedasticity also causes OLS to underestimate the variances and standard errors of the estimated coefficients (thus rendering the t-tests and F-tests unreliable). It causes the t-statistics to be higher, which leads to the rejection of the null hypothesis in cases when in fact it should be accepted (Hair et al 2010).

Table 26: Breusch-Page / Cook-Weisberg test for heteroskedasticity

<table>
<thead>
<tr>
<th>Breusch-Page / Cook-Weisberg test for Heteroskedasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ho: Constant Variance</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Variables: fitted values of change in employment</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Variables: fitted values of change in turnover</td>
</tr>
<tr>
<td>Variables: fitted values of change in productivity</td>
</tr>
</tbody>
</table>

It is not possible to accept the null hypothesis that there is constant variance in each of the three models, thus heteroskedasticity is present in the models. In terms of correcting this problem, robust standard error regressions are used because robust standard errors address the problem of errors that are not independent and not identically distributed (Woolridge 2003). OLS assumes that errors are both independent and identically distributed. Robust standard errors relax either or both of those
assumptions, hence, when heteroskedasticity is present, robust standard errors tend to be more trustworthy.

In summary, therefore, the models are free from statistical bias of multicollinearity; however, they are not free from heteroskedasticity. Heteroskedasticity is a common problem found in cross sectional data and is one that can be corrected by running robust standard error regressions. Details of which are outlined in the ensuing section. All models were therefore run using robust standard error methodology.

Given the model specifications and diagnostics have been outlined and the problem of heteroskedasticity corrected for, it is now appropriate to continue to address the questions which emanated from the results presented in Chapter 6. To recap, business network membership was perceived by the business network firms to have a positive impact on their firms. Furthermore, when compared with the control group of non-business network firms, significant differences existed between the two groups of firms in terms of their characteristics and growth rates. More specifically, business network firms were more export and innovative driven, while they also recorded, on average, faster growth rates during the 2008 to 2010 period. These results subsequently begged the following questions. Firstly, is it being a member of a formal business network which is influencing the better performance rates of business network firms or is it the firms characteristics themselves? Secondly, are there possible selection effects at play here as well? The ensuing section firstly addresses the selection issue, while the limitations of the Heckman selection model, which is used to correct for a selection effect is also discussed (Section 7.3.1). Section 7.4 then develops a probit model to estimate the likely selection to a business network, that is, the characteristics of those firms and MDs who are likely to be members of formal business networks are identified.

7.3 Addressing the Problem of Selection

The problem to be addressed is the issue of sample selection. In order to address the issue of selection, being a member of a business network needs to be treated, not as an exogenous variable (something determined outside of the system) but as endogenous,
that is, that the likelihood of a firm being a member of a business network is in part dependent on the quality of the firm (Hart et al 2008). One possible solution to correct for this problem is to use a Heckman model. Heckman (1979) highlighted that selection bias may occur because of two reasons. In the context of the current study, it may occur because of self-selection by the firms themselves who opt to become a member of a business network, or there may be sample selection by the policymakers promoting the initiative. The advantage of using the Heckman selection model is that it allows for the investigation of two connected questions. Firstly, it explores which firms become members of business networks. This step includes estimating a probit model, which seeks to explain the probability of a firm being a member of formal business network. The purpose of this is to test whether there are any common characteristics in business network firms, and to also capture additional characteristic differences between business network and non-business network firms. If the probit fails to identify any systematic patterns in the business network firms one can revert to original OLS estimates (without having to control for any selection effects). If the probit does however identify systematic patterns, then the second step is to estimate the impact of network membership on firm performance, while controlling for the type of firms that self-select, or are selected, to become members of business networks (Hart et al 2008).

In summary, the focus here is to estimate the impact of business network membership on firm performance. If $\pi$ is any potential indicator of firm performance, a basic model that summarises these effects can be defined as follows:

$$
\pi = \beta x + \delta z + \epsilon
$$

(3)

Where: $x$ is a vector of firm characteristics and $z$ is a binary variable taking value 1 if a firm is in a formal business network and 0 otherwise. In this model, the size, sign and significance of the coefficient on the ‘treatment’ term (i.e. $\delta$) will give an indication of the impact business network membership has on firm growth. Where there is any element of systematic selection, the coefficient on the treatment term will reflect these effects (Roper and Hewitt-Dundas 2001).
Rather than directly estimating equation (3) a more preferred approach is to allow for the selection bias (Hart et al. 2008). More specifically, it is assumed that the probability of being a member of a business network ($z^*$) is related to a set of firm and MD characteristics. This then suggests a model of the form (Greene 1995 p.642):

$$
\begin{align*}
\pi &= \beta'x + \delta'z + \varepsilon \\
 z^* &= \gamma'v + w
\end{align*}
$$

What is presented above is a categorical variable which indicates whether a firm is a member of a business network or not ($z_i^*$). The standard estimation method in this situation is the two-stage Heckman (1979) model. This two-stage model involves, as previously outlined, the estimation of a probit to estimate the probability of a firm being a member of a business network and the incorporation of a selection parameter in the outcome model for business performance. In these terms, a positive (negative) and significant coefficient on the selection term (the Inverse Mills Ratio (IMR)) indicates a positive (negative) sample selection problem, business network membership being skewed towards high (low) performance firms (Sinani and Meyer 2004).

### 7.3.1 Limitations of Heckman Type Model

This approach does however also have its limitations. An important issue to consider when using the Heckman two-step model is to avoid too much overlap between the selection and performance models. This is known as an identification problem (Florens, Heckman, Meghir 2008). For identification, it is important to include enough information in the selection equation to make sure that they are unique with respect to those in the outcome equation. According to Brandt and Schneider (2004) the most common method of identification is to include unique regressors that only appear in the selection equation. This approach may provide further problems because the excluded variables need to be good instruments for the selection process. Misspecification of the selection process can lead to further bias. Sartori (2003)
advocated that because of the identification issue, it is necessary to have at least one independent variable that appears in the selection equation but is not in the outcome equation (that is, a variable which affects selection but does not affect the outcome). Further to this, according to Hart et al (2008) the crucial requirement is that the two equations (selection and outcome equations) are separately identified. There needs to be at least one variable which impacts on the selection equation (Stage 1) but not on the outcome equation (Stage 2) and vice versa.

In light of this issue the independent variables in the selection equation include firm and MD characteristics which may have provided the basis for targeting of, or self-selection to, formal business networks. The outcome equations therefore include more organisational factors such as firm characteristics which may have contributed to firm performance. More specifically, the instrument variables included in the selection equation, which are not in the outcome equations, are MD age and MD qualifications.

### 7.4 Selection into a Formal Business Network

The first step of the two-stage methodology developed by Heckman (1979) involves the development of a probit model of the likelihood of being a member of a formal business network. This is now estimated and from this the Inverse Mills Ratio (IMR) is extracted and included in the second-stage OLS as part of an explicit control for selection into a business network. Table 27 presents the model for selection into a formal business network. The dependent variable takes the form of a dichotomous variable, 1 = a firm is a member of a formal business network; 0 = otherwise, that is, the control group of firms who are not members of formal business networks. The independent variables include the firm characteristics and the instrument variables of MD age and MD qualifications.
Table 27: Probit model for selection into formal business networks

<table>
<thead>
<tr>
<th>Business Network (Probit)</th>
<th>Marginal Effects</th>
<th>Backward Stepwise Probit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>.682 (.406)*</td>
<td>1.045 (.304)***</td>
</tr>
<tr>
<td>Size</td>
<td>-.553 (.108)***</td>
<td>-.157 (.034)***</td>
</tr>
<tr>
<td></td>
<td>-.547 (.099)***</td>
<td></td>
</tr>
<tr>
<td>Firm Age:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Established</td>
<td>-.093 (.456)</td>
<td>-.027 (.134)</td>
</tr>
<tr>
<td>Well established</td>
<td>-1.01 (.439)**</td>
<td>-.283 (.112)**</td>
</tr>
<tr>
<td>Urban</td>
<td>.124 (.274)</td>
<td>.035 (.079)</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>.553 (.262)**</td>
<td>.156 (.071)**</td>
</tr>
<tr>
<td>Exporter</td>
<td>.778 (.278)***</td>
<td>.238 (.085)***</td>
</tr>
<tr>
<td>Innovator:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td>.822 (.293)**</td>
<td>.216 (.068)**</td>
</tr>
<tr>
<td>Outside of the business</td>
<td>.456 (.347)</td>
<td>.115 (.078)</td>
</tr>
<tr>
<td>MD Age:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>.223 (.318)</td>
<td>.062 (.086)</td>
</tr>
<tr>
<td>Older</td>
<td>-.528 (.370)</td>
<td>-.163 (.123)</td>
</tr>
<tr>
<td>MD Qualification:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>.129 (.337)</td>
<td>.036 (.091)</td>
</tr>
<tr>
<td>Higher</td>
<td>.668 (.338)**</td>
<td>.180 (.085)**</td>
</tr>
<tr>
<td>Pseudo-R²</td>
<td>.4188</td>
<td>.4188</td>
</tr>
<tr>
<td>χ²</td>
<td>73.43***</td>
<td>73.43***</td>
</tr>
</tbody>
</table>

*significant at 0.10 level; ** significant at 0.05 level; *** significant at 0.01 level

Note: Robust standard errors are presented in the parenthesis

As Table 27 highlights, the key MD characteristics that influence participation in a network are qualifications, implying that, the more qualified the MD, the more likely he/she will be a member of a formal business network, while an older MD is less likely to be a member of a formal business network (as reported from the backward stepwise regression, column 4). The key firm characteristics include the firm’s age, size, sector, and their business strategies. In effect, a young firm rather than a more established firm is more likely to be a member of a formal business network, while a smaller firm is also likely to be a member of a formal business network. Relative to a
service-orientated firm, a manufacturing firm is likely to be a member of a formal business network, while those firms who export and firms that engage in innovative activities are also more likely to be members of formal business networks.

The marginal effects are presented so that the magnitude of the effects can be interpreted (column 3 of the above table). For example, a larger firm is 0.157 times less likely to become a member of a formal business network relative to a smaller firm, while compared to a non-exporter a firm that exports is 0.238 times more likely to become a member of a formal business network. This model is explained sufficiently well, with a high Pseudo-$R^2$ and a statistically significant $\chi^2$.

At this stage, it is also interesting to note any key distinctions between firms who are members of the different types of formal business networks (R&D, trade, and marketing business networks). Three further probit models were therefore estimated to examine the likely firm and MD characteristics of members of each type of business network. The results of the probit models are provided in Table 28.

The probit results below suggest the following with respect to members of R&D, trade, and marketing business networks. The results indicate that firms in an R&D network are more likely to be younger firms who are run by an MD who is unlikely to have a post-leaving certificate qualification. Firms in R&D networks are also more likely to be engaged in research activity which results in developing a new product or service that is new to the sector or completely new to the world. Members of a trade network are more likely to be urban based manufacturing firms who are run by a relatively young MD. Finally, membership of a marketing network is more likely to be dominated by relatively well-established service firms who are run by a relatively older MD.
Table 28: Probit models for selection into R&D, trade, and marketing business networks

<table>
<thead>
<tr>
<th></th>
<th>R&amp;D Network</th>
<th>Trade Network</th>
<th>Marketing Network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-.663 (.616)</td>
<td>-.674 (.493)</td>
<td>.039 (.512)*</td>
</tr>
<tr>
<td>Size</td>
<td>.196 (.143)</td>
<td>.049 (.106)</td>
<td>-.155 (.110)</td>
</tr>
<tr>
<td>Firm Age:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Established</td>
<td>-1.253 (.634)**</td>
<td>-.074 (.380)</td>
<td>.623 (.365)*</td>
</tr>
<tr>
<td>Well established</td>
<td>-.738 (.506)</td>
<td>.204 (.349)</td>
<td>.156 (.348)</td>
</tr>
<tr>
<td>Urban</td>
<td>-.460 (.318)</td>
<td>.593 (.274)**</td>
<td>-.321 (.268)</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>-.082 (.329)</td>
<td>.651 (.271)**</td>
<td>-.630 (.265)**</td>
</tr>
<tr>
<td>Exporter</td>
<td>-.251 (.385)</td>
<td>-.199 (.324)</td>
<td>.236 (.324)</td>
</tr>
<tr>
<td>Innovator:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td>.499 (.384)</td>
<td>.098 (.337)</td>
<td>-.363 (.354)</td>
</tr>
<tr>
<td>Outside business</td>
<td>.672 (.407)*</td>
<td>.233 (.385)</td>
<td>-.445 (.358)</td>
</tr>
<tr>
<td>MD Age:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>-.489 (.374)</td>
<td>-.837 (.303)***</td>
<td>.998 (.303)***</td>
</tr>
<tr>
<td>Older</td>
<td>.682 (.482)</td>
<td>-.575 (.381)</td>
<td>.244 (.363)</td>
</tr>
<tr>
<td>MD Qualification:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>-.959 (.503)**</td>
<td>-.028 (.396)</td>
<td>.372 (.392)</td>
</tr>
<tr>
<td>Higher</td>
<td>-.008 (.385)</td>
<td>-.141 (.389)</td>
<td>.071 (.369)</td>
</tr>
<tr>
<td>Pseudo-R$^2$</td>
<td>.2079</td>
<td>.1328</td>
<td>.1952</td>
</tr>
<tr>
<td>$\chi^2$</td>
<td>20.610**</td>
<td>17.400</td>
<td>29.79***</td>
</tr>
</tbody>
</table>

*significant at 0.10 level; ** significant at 0.05 level; *** significant at 0.01 level.

Note: Robust standard errors are given in the parentheses.

The results of these probit models provide further insights into the types of firms and their MDs that are likely to be members of the specific business networks. As expected, more innovative firms are likely to be members of R&D business networks, while manufacturing and service firms are likely to be members of trade and marketing business networks respectively. Manufacturing firms may wish to collaborate with others to reach new markets, hence their likely membership to a trade business network, while service firms may need to collaborate to avail of marketing or
branding opportunities, and so are more likely to be members of marketing business networks.

Each of the four probit models presented (full probit of business network membership as well as the three probit models for the individual types of business networks) are well specified and the significance of the probit models indicates that selection into business networks has the potential to be systematic in nature. This implies that selection bias is a likely problem.

The probit model for business network membership was sufficiently well specified, with the model’s F-test indicating that we could reject the hypothesis that the model coefficients were jointly zero. The significance of the probit model indicates that selection into business networks is possibly systematic in nature, implying that selection bias is a likely issue. Given the probit model was sufficiently well specified, this facilitates the estimation of the two-stage procedure. The IMR, the selection parameter, is then estimated from this probit. The inclusion of the selection parameter as a regressor in the final OLS is intended to reduce any bias that may be present in the estimates of the outcome effect (Angrist 1997). Taking account of the problem of selection bias is the most sophisticated step of Storey's (2000) steps to heaven evaluation framework. The outcome model presented in Section 7.5, by controlling for firm and selection effects, gives a true reflection of the effect business network membership has on firm performance.

7.5 Firm Growth Estimation Results

The probit model to estimate the likely membership to a formal business network indicates that selection to a business network is a likely issue. Most probably, the form of selection in effect is ‘self-selection’. That is, faster growing firms opt to become members of formal business networks. The next step following the extraction of the IMR from the probit model estimated is to run an OLS regression to estimate the impact of business network membership on firm performance, while controlling
for firm-level, MD, and selection effects. In this section the estimates of the effect of business network members on employment growth are presented\textsuperscript{49}.

### 7.5.1 The Outcome Model

Table 29 presents the results of the final stage of the Heckman two-step selection model, the employment growth model, which controls for firm level and selection effects (column 3). For comparison purposes the results of the initial employment growth model, which controlled solely for firm’s characteristics is presented in column 2.

The results of the initial employment growth model are first discussed, although the results of this model should be read with caution because selection bias is not taken into account. The results of the initial employment growth model, which controls for firm effects, indicate that larger firms and firms who source their supplies regionally have higher employment growth, while older firms, firms who produce goods or services that are new to the world and firms who are members of formal business networks tend to have lower employment growth.

While the finding that older firms have lower growth than younger firms concurs with the general firm growth literature, the result that larger firms have higher growth rates tends to be at odds with the literature, although there are other studies which have shown the inverse to be true also (that is that, firm growth and size can be positively related). Mishra (2004) in analysing the growth trends in the Indian computer industry for the period 1991 to 2002, outlined a number of these studies which included the works of Amirkhalkhali and Mukhopadhyay (1993), Monte and Papagni (2003), and Pfaffermayr (2004) who each found a positive relationship between firm size and growth. Subsequent to the analysis of these studies, Mishra (2004) recapitulated that additional factors should be considered when considering the relationship between firm growth and firm size. For example, firms that are

\textsuperscript{49} Equations were also run for turnover and productivity growth but both models were not significant and so are not reported in this section. Both models are however presented in Appendix C.
committed to R&D have a higher rate of growth, while additional factors could include the export orientation of the firms and their foreign affiliation (Mishra 2004).

Firms who source their resources regionally are shown to have higher employment growth. Turnover growth is also shown to be higher for firms who source their resources regionally (this model is presented in Appendix C, Table A). The fact therefore, that firms can readily avail of supplies and other resources they may need to operate, positively impacts on the growth of the firm. More specifically, firms who source their supplies within their region have higher employment and turnover growth.

The initial OLS results also indicate that firms who engage in R&D activity and produce goods or services that are new to the world have lower employment growth than firms who do not innovate. Two plausible explanations for this result is that, the type of innovation in question may be process innovation and so increased personnel are not a direct impact of the firm’s research activities, while a second reason may be that the timeframe included in the model is not long enough to take account of the impact of the innovation undertaken by the firm.

The expectation prior to running this model, based on the perceptions of the business network firms from the questionnaire results collated, and based on the comparisons made between the performance profiles of business network and non-business network firms, was that being a member of a business network would result in higher growth rates for those firms. These results indicate however, that when firms’ and MDs’ characteristics are controlled for, firms who are members of formal business networks have lower employment growth than firms who are not members of formal business networks. If the model was to be concluded at this stage, a possible reason for a result like this is that the timeframe included in the model may not be satisfactory to estimate the full effects of business network membership.

Once again however, caution should be taken when reading these results because controls for selection effects have not as of yet been incorporated into the model. The next plausible step therefore, is to re-run the initial OLS with the inclusion of the selection parameter, the results of which are presented in column 3 of Table 29.
Table 29: Regression results for outcome model

<table>
<thead>
<tr>
<th></th>
<th>Employment Growth</th>
<th>Outcome Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>5.580 (.007)***</td>
<td>5.567 (.101)</td>
</tr>
<tr>
<td>Size</td>
<td>.006 (.002)***</td>
<td>.004 (.002)*</td>
</tr>
<tr>
<td>Age:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Established</td>
<td>-.005 (.004)</td>
<td>-.005 (.004)</td>
</tr>
<tr>
<td>Well established</td>
<td>-.008 (.004)*</td>
<td>-.013 (.005)**</td>
</tr>
<tr>
<td>Urban</td>
<td>.003 (.003)</td>
<td>.004 (.003)</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>.001 (.004)</td>
<td>.002 (.004)</td>
</tr>
<tr>
<td>Innovator:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td>-.003 (.004)</td>
<td>.002 (.004)</td>
</tr>
<tr>
<td>Outside business</td>
<td>-.006 (.004)*</td>
<td>-.002 (.004)</td>
</tr>
<tr>
<td>Sell locally</td>
<td>-.006 (.004)</td>
<td>-.006 (.005)</td>
</tr>
<tr>
<td>Sell to others regionally</td>
<td>-.001 (.005)</td>
<td>.003 (.005)</td>
</tr>
<tr>
<td>Sell to others in Ireland</td>
<td>-.001 (.005)</td>
<td>.001 (.006)</td>
</tr>
<tr>
<td>Exporter</td>
<td>.001 (.005)</td>
<td>.005 (.005)</td>
</tr>
<tr>
<td>Source locally</td>
<td>-.001 (.003)</td>
<td>-.006 (.005)</td>
</tr>
<tr>
<td>Source regionally</td>
<td>.006 (.003)**</td>
<td>.005 (.003)*</td>
</tr>
<tr>
<td>Source nationally</td>
<td>.003 (.004)</td>
<td>.002 (.004)</td>
</tr>
<tr>
<td>Source internationally</td>
<td>-.001 (.003)</td>
<td>-.001 (.003)</td>
</tr>
<tr>
<td>MD only business</td>
<td>-.004 (.003)</td>
<td>-.004 (.004)</td>
</tr>
<tr>
<td>MD other business</td>
<td>.004 (.004)</td>
<td>.005 (.003)</td>
</tr>
<tr>
<td>Business network</td>
<td>-.010 (.005)**</td>
<td>-.005 (.004)</td>
</tr>
<tr>
<td>Selection term</td>
<td></td>
<td>.014 (.009)</td>
</tr>
<tr>
<td>Number of observations</td>
<td>179</td>
<td>179</td>
</tr>
<tr>
<td>R²</td>
<td>0.2675</td>
<td>.2891</td>
</tr>
<tr>
<td>F-test</td>
<td>2.45**</td>
<td>1.98**</td>
</tr>
</tbody>
</table>

*significant at 0.10 level; ** significant at 0.05 level; *** significant at 0.01 level.

Note: Robust standard errors are given in the parentheses.

As shown in Table 29 above, the selection term is not significant, which generally suggests that the initial OLS results were unbiased. Given, however, that the probit model was so well specified, this indicates that selection bias is a likely issue. When comparing the results of the initial OLS and the final outcome model a number of differences in the results are also apparent. The results show that the original OLS results over-estimated the significance of being a member of a formal business network and over-estimated the impact of innovation in terms of producing goods or services that are new to the business or completely new to the world. The results also over-estimated the impact that sourcing resources regionally has on employment growth, while they under-estimated the impact firm age has on firm growth. So, in
effect, even though the selection term is not statistically significant, the change in the significance in the variables specified above, in conjunction with how well the probit model for selection to a business network was specified, there does appear to be some selection effects at play. The final results show that being a member of a business network, when firm, MD, and selection effects are controlled for, does not impact on firm growth.

7.6 Conclusion

The overriding objective of this chapter was to develop an evaluation framework to estimate the impact of business network initiatives on firm performance, controlling for any possible firm level, MD, and selection effects that may influence firm growth. A Heckman two-step model was therefore developed to control for these effects on firm growth. The first step of the Heckman model was to estimate a probit for the likelihood of selection to a formal business network. The results of this probit model highlighted that the key firm characteristics that influence selection into a business network are the firm’s age, size, sector, and their business strategies. More specifically, firms in business networks are more likely to be a small, young, manufacturing firm, who export their goods/services, and who engage in innovative activities. These firms are also more likely to be run by a well-qualified MD. This probit model was well specified, which indicated that selection to a formal business network is a likely problem.

In order to control for these selection effects, the IMR was extracted from the probit and included in the final outcome model as an additional parameter to control for these likely selection effects. When firm, MD, and selection effects were controlled for, membership of a formal business network is not shown to impact on firm growth. Although the selection parameter was not statistically significant, the results of the probit combined with the change in significance of the firm control variables and the network variable suggests that selection is an issue. The result being that, being a member of a formal business network does not impact on firm growth, rather it is the firm’s characteristics that influence firm growth. This in effect answers the overriding research question of this thesis, with the outcome being that when firm, MD, and
selection effects are controlled for, being a member of a formal business network does not impact on firm performance.

This result highlights the importance of taking account of selection bias, that is, reaching Step 6 of Storey’s six-steps approach to evaluation. When relying on the recipients views of the impact of network membership on firm performance, the results showed that the firms perceived a number of benefits from such membership. When the control group of non-business network firms were included, firms who are members of formal business networks were shown to outperform non-business network firms. Without accounting for selection bias these results over-estimate the impact business network membership has on its participant firms and hence subsequently highlights the over-riding need to take account of such effects.

In conclusion the development of the ex-post evaluation framework has made a significant contribution to the business network and evaluation literatures. This framework does not pose to address every issue related to business network evaluation, however, it does hope to act as the catalyst for further development in this area. Further discussion of these results, as well as highlighting the implications, contributions, and limitations of this research are highlighted in the next chapter. Possibilities of future research are also outlined.
Chapter 8: Conclusions and Recommendations
8.1 Introduction

The core objective of this thesis was to develop an ex-post evaluation framework to estimate the impact formal business networks have on their member firms’ performance. The development of this framework makes a significant contribution to an otherwise deficient literature surrounding the evaluation of business network initiatives. Additionally, from a policy perspective, the thesis provides important policy insights regarding, the creation, development, and evaluation of business network initiatives. The current chapter brings together the main findings of this thesis and outlines the key results of the study. Section 8.3 presents the key contributions of this research, while Section 8.4 specifies the main limitations of the research. Opportunities for future research are discussed in Section 8.5. Section 8.6 concludes the thesis.

8.2 Summary of Main Findings

Chapter 2 concluded that the origins of network theory can be found within the theory of the firm. In relation to this thesis, the theory of the firm and the various streams that have developed from it, have grown to incorporate network theory. Marshall (1895) for example, recognised the advantages of firm cooperation through the selling of complementary products, while Coase (1937) acknowledged that the cost of arranging extra transactions within the firm grows as the firm grows and so a point is reached whereby it may be less costly to organise activities in the market, and therefore firms will coordinate activities with other firms so as to decrease the transaction costs of the firm.

Furthermore Alchian and Demsetz (1972) identified the firm as a specific unit for organising cooperative productive activity, while Jensen and Meckling (1976) highlighted that a firm is the nexus of contract relationships between employees, customers, and suppliers. Richardson (1972) recognised that networks of cooperation are necessary because capabilities within a firm can be limited and so firms need to coordinate complementary activities and Williamson’s (1975; 1985) transaction cost theory advocated that firms while trying to reduce their transaction costs will try to
find the most efficient governance structure according to the varying nature of connections between firms by which to arrange an activity. The RBV of the firm, adopting an alternative approach to that presented from a transaction cost perspective, recognises the firm as a set of productive resources organised under an administrative framework. The reason for collaboration according to the RBV is to combine sets of complementary but different resources and capabilities to enable firms to generate greater returns than either a market transaction or complete internalisation (Peteraf 1993). What is clearly evident from Chapter 2 is that the theory of the firm has developed and grown to incorporate a number of various streams. Although these streams are treated independently and vary slightly in their emphases, each incorporate network theory, highlighting business networks as a beneficial and on occasion necessary action for firms to take. The theory of the firm and the various streams that it now incorporates thus provide the theoretical underpinnings for this thesis.

Also highlighted in Chapter 2 was the need to distinguish between the terms network and networking, where the noun business network refers to the network structure, while the verb to network and the participative networking relates to the actions of creating, developing, and maintaining relationships with others (Chell and Baines 2004). The interdisciplinary nature of networks has led to the lack of a standard definition existing in the network literature, however, following examination of the various definitions that exist, it was that of Besser et al (2006) which was deemed most appropriate to adopt for this study. More specifically, business networks are the structures in which independent firms and organisations cooperate with one another on either a formal or informal basis and exchange information and resources with each other.

It was clearly evident from the detailed overview of the various typologies of business network structures in Chapter 3 that these network structures can be defined in terms of their levels of formality and in terms of the governance of the network structures (networks of direction and networks of mutual dependence). For the purpose of this study business networks were defined in terms of their level of formality, more specifically formal (hard) and informal (soft) business networks. Formal business networks are regarded as networks where the participant firms come together to share
common objectives and are generally profit driven (Ffowcs-Williams 2000). Informal business networks on the other hand are occupied by loosely connected firms who are not driven by any specific or common goal (Kingsley and Malecki 2004).

Highlighting the different business network structures implores the question of why firms actually get involved in a business network? Chapter 3 critically examines the possible benefits and the potential ‘dark side’ associated with business network membership. The benefits of business networks have been illustrated from both a micro and macro level. Such benefits have included for example information sharing (Best 1998; Witt 2004), innovation (Julien et al 2004), increased profits (Loe and Thomas 2004), improvements in trade (Combes et al 2004), and firm development and growth (Brüderl and Preisendorfer 2000), while benefits have also been seen to accrue at a macro level (Besser et al 2006). Less dominant in the literature however are the possible downsides associated with business network membership. Sharing information with others, while regarded as an advantage by many, is also seen as a potential drawback to business network involvement (Dean et al 1997). This case is particularly applicable if relationships are one-sided and non-reciprocal (Witt 2004). Furthermore, many firms wish to remain independent from others, while trust and commitment issues amongst members of business networks also pose a threat for many firms (Witt 2004).

Chapter 4 examined the support policymakers, at a national and international level, have given to various business network initiatives. It was the Emilia Romagna region in Northern Italy which first highlighted the benefits that could be attained by firms from collaborating with others. Policymakers in Denmark recognised these benefits evident in Italy and so developed a business network program at fostering such benefits. One key difference between business network developments in Italy and in Denmark is that a culture of interfirm collaboration existed in Italy prior to any policy intervention, while businesses in Denmark did not have any prior natural history of interfirm collaboration. Although no prior history of business networks existed in Denmark, firms did participate in its business network program with the result being that their network initiative was heralded somewhat of a success and was emulated by a number of countries; Ireland being one of those countries.
In tracing the history of business network initiatives in Ireland, it is evident that Irish network initiatives have varied from initial top-down approaches to more recent bottom-up network initiatives. Although faced with stringent budgets, the Irish government has maintained its focus on promoting business networks (for example the Enterprise Innovation Network and the Irish Software Innovation Network, being two recent network initiatives introduced in 2009 and 2010 respectively), while at a European level, business networks are also seen as a tool to help firms achieve benefits they would not be able attain independently. Given that policymakers, at a national and international level, have and do currently promote the use of business networks, there is a need to evaluate such initiatives. Chapter 5 therefore critically examined why evaluation is needed and also disentangled the literature surrounding the evaluation of business networks. No standard network evaluation methodology exists and in view of this, Chapter 5 explored the reasons as to why this is the case. Huggins (2001) highlighted that the lack of a standard methodology to evaluate business networks rests with the interdisciplinary nature of the topic.

Given the background as highlighted above, the primary aim of this thesis was to develop an appropriate evaluation framework to estimate the impact business networks have on firm performance. Prior to being able to undertake this task however, the choice of evaluation methods available were examined. Due to the dishevelled nature of the literature surrounding the evaluation of business networks, previous evaluation studies centred on the business network concept were divided into three categories, namely, (i) the evaluation of business networking activity, (ii) the evaluation of business network structures, and (iii) the evaluation of the impact of business networks at micro and macro levels. The reason for examining these empirical evaluations was to better understand the techniques previously employed in evaluating business network activity. The overriding conclusion in this regard is that no standard evaluation technique exists. Prominent in this detailed analysis was that the majority of the evaluations in the business network literature may actually be classed as ‘monitoring’ if one was to adopt Storey’s (2000) six-steps to heaven approach to evaluation. ‘Evaluation’ should compare the performance of assisted (business network) and non-assisted (non-business network) firms, while it should also take account of selection bias. In order therefore to contribute to existing business network literature, to the empirical evidence of business networks, and to
contribute methodologically in terms of the development of an appropriate evaluation framework, the fieldwork part of this study was introduced in Chapter 6.

A database of business networks in Ireland was developed, where business networks were defined in terms of their level of formality, that is, formal and informal business networks were identified in Ireland. Formal business networks were chosen for the purpose of this study because of the likely tangible impacts membership of these business networks would have on their member firms’ performance. Based on a telephone survey of 169 firms (42.7% response rate of the usable sample), the types of firms who participate in business networks were identified, their reasons for doing so, and their perceptions of anticipated and achieved benefits and costs of business network membership. The respondent firms were predominantly SMEs who were geographically dispersed throughout Ireland and represented a wide array of industries. All were members of a formal business network, which included being a member of either an R&D, marketing, or trade focused business network.

The main motivations for the respondents’ involvement in business networks were, according to the respondent firms, to increase sales, for marketing or branding purposes, to increase their business’ profit, to increase or sustain employment in the firm, to improve relations with other firms, and to improve their research activities. Firms collaborated with others in the business network on various issues ranging from generic business issues to more industry specific issues. Firms also reported that they collaborated with others to boost their sales, and also on R&D and marketing issues. Responses such as these are unsurprising given that the formal business networks under evaluation were trade, R&D and marketing business networks. Collaboration with others was generally not restricted geographically, with respondents citing collaborations with others at a regional, national, and to a much lesser extent international level. The lack of collaboration with others at an international level is an issue which ITT (2005) highlighted as an issue that Irish business networks need to address. Collaboration with research organisations was predominately at a national level. A reasonable explanation for the lack of collaboration at a local and regional level with research institutions or organisations may be due to the lack of the presence of a suitable research institution at these levels in Ireland. Business network
membership also resulted in almost half of the respondents collaborating on a range of issues with others outside of the business network.

The perceived impacts of business network membership according to the business network respondents included increased turnover, improvements in their R&D activity, and on the employment of the firm, in terms of new jobs created and current jobs safeguarded. When asked to quantify these impacts of business network membership, a number of firms were unable to do so. For those that did respond however, 59 percent of the respondents created between one to five new jobs, while four percent created ten new jobs. In terms of the number of jobs safeguarded, five percent replied that they protected in excess of 20 jobs, while 63 percent of those who responded perceived that membership protected between one and ten jobs.

In terms of the perceived impact on sales, 29 percent who acknowledged that membership impacted on the sales of their firm replied that it impacted on the volume of their sales, while 17 percent said that it impacted on the markets that they sell to. Fifty percent said that it impacted on both the amount and the location of their sales. Business network membership was also shown to impact on the research activities for 52 percent of the respondent firms. Membership impacted on the number of people employed in R&D for 26 percent of the firms. For 52 percent of the total respondents, membership also increased the number of new products developed by their firm, 37 percent reported that membership increased the amount of new processes developed within the firm, while 61 percent of the respondents remarked that business network membership impacted on existing processes.

In general the respondents did not associate any major costs with business network membership. Of prime concern however for over 40 percent of the respondents was the commitment of others to the business network, while for 30 percent of the respondents, non-reciprocal relationships were also of concern. Other cited costs included the lack of trust among members, lack of suitable partners in the business network, and to a lesser extent the cost and time associated with membership. In terms of the overall contribution of business network membership to the respondent firms, five percent of the respondents were indebted to their business network for contributing to their overall business outcomes. In all, 73 percent of the respondents
attributed some part of their business outcomes to business network membership, with just over a quarter of the respondents (27%) responding that they would have achieved similar business outcomes anyway, irrespective of whether or they were a member of the business network or not. In terms of quantifying the level of additionality attributed to business network membership, 11 percent of the respondents remarked that they would have achieved less than 20 percent of their business outcomes had they not been part of their business network, while 58 percent expected that they would have achieved between 21-60 percent of their business outcomes had they not been part of their respective business networks. When considering these levels of additionality, the levels of deadweight, as perceived by the business network firms, are relatively low. Aside from this, over half of the respondents (54%) believe that they have not realised the full benefits of business network membership yet.

Overall therefore, in examining the responses of the business network firms regarding their perceptions of the impact of business network membership on their respective firms’ performance, it is clear that business network member firms did not associate any major costs to network membership. On the positive side, they did however attribute a range of benefits to business network membership, with over 70 percent of the firms attributing part of their business success to business network membership. In order however to derive a more accurate account of the performance of these business network firms, a control group of 100 non-business network firms (sampled on the business network firms’ characteristics) was included in Chapter 6. Through the inclusion of this control group, the evaluation model developed attained Step 4 of Storey’s (2000) six-steps to heaven approach and more importantly progresses beyond the ‘monitoring’ phase of assessing the impact of business networks on firm performance.

The core objective of introducing this control group was to compare both groups of firms, that is, to establish if there were differences in the firm, MD, and performance characteristics of business network and non-business network firms. Chapter 6 therefore concludes by highlighting the differences and similarities that exist between business network and non-business network firms. In terms of MD characteristics, MDs of network firms generally own more than 20 percent equity of their firms, while MDs of non-business network firms have higher levels of education, although
the percentage difference between both groups in this case is small. MDs of non-business network firms tended to be older than the MDs of business network firms.

When comparing the markets that business network and non-business network firms sell to, and purchase from, non-business network firms tend to sell their products or services locally, while business network firms sell to customers based elsewhere in Ireland and overseas. Business network firms do not therefore tend to rely on customers based locally. No significant difference was found in terms of the levels of intensity of local and export sales between the two groups, nor was there a statistical difference in terms of the locations that business network and non-business network firms source their supplies from. A significant difference was found however in terms of the R&D activity undertaken by the business network and non-business network firms, whereby business network firms tend to be more innovative than their non-business network counterparts. In terms of firm growth for the period 2008 to 2010, a significant difference was found in terms of employment, turnover and GVA growth between business network and non-business network firms. In this case, business network firms appear to have experienced better firm performance during the reported period compared to those firms who are not members of formal business networks.

From a business network perspective and from a policymaking perspective these findings are very positive and support the claim that business networks are an important tool that can be used to promote firm growth. The question that stems from these findings however is that if individual firm characteristics are controlled for, would business network firms still enjoy better firm performance than those firms who are not members of business networks? A subsequent question to be addressed is, are there selection effects that influence membership of a formal business network? The natural step therefore at this juncture was to develop an evaluation framework which controlled for both of these effects. Such a framework was developed in Chapter 7. The framework developed reached the most sophisticated step (Step 6: Taking account of selection bias) of Storey’s (2000) six-steps to heaven evaluation approach.
In light of the above, Chapter 7 developed an ex-post evaluation framework to estimate the impact of business networks on firm performance, controlling for any possible firm level, MD, and selection effects that may influence firm growth.

The model adopted and developed to estimate the impact of business networks on firm performance, while controlling for firm level, MD, and selection effects was the Heckman two-step model (1979). The first step of this model included estimating a probit which examined the probability of a firm being a member of a formal business network. The probit results suggested that a business network firm is most likely to be a young small manufacturing firm; to be export orientated and innovative; while, the MDs of business network firms are likely to be highly qualified. The probit model also lead to the conclusion that there was a selection issue evident, most likely an issue of self-selection, where firms who are younger and smaller, and who are export driven and innovative, are more likely to opt to become members of formal business networks.

The Inverse Mills Ratio (IMR, the selection parameter) was then estimated from this probit and included as a regressor in the final OLS regression with the aim of reducing any bias which may be present in the estimates of the participation effect. The end result was that the selection term was not found to be significant which is generally interpreted as there not being any sample selection issue. In further comparing the initial OLS and the final selection model results there were however a few differences noted. The original OLS was found to over-estimate the significance of being a member of a formal business network, while it under-estimated variables relating to the characteristics of the firms. Although the selection term was not found to be statistically significant, the change in the significance in these variables implied a presence of selection bias. In relation to estimating the impact of business networks on firm performance, the results of the outcome model highlighted that when firm, MD, and selection effects are controlled for, business network membership does not impact on firm performance. The firm growth differences between business network and non-business network firms which were highlighted in Chapter 6 therefore were more likely to be influenced by the business network firms’ characteristics than the fact that they are members of business networks. In this respect, faster growing firms
are more likely to be members of formal business networks, and as such, it is these firm characteristics which determine the performance of business network firms.

The results provided here have implications for business network policy. A worrying implication being that for any business network evaluation that merely reaches Step 3 or even Step 4 of Storey’s (2000) six-steps evaluation approach, may report significant benefits to business network membership, but fail to take account or control for firm characteristics and selection issues which may actually be impacting on this performance. These results would present a less than full view of the impact of business network initiatives and would in effect over-estimate the impact of business network membership on the participant firms’ performance.

A further implication of these results is that policymakers need to be aware of this self-selection issue. Faster growing firms self-select to become members of formal business networks, which poses the question as to why slower growing firms are less likely to opt to become members of formal business networks? Is it the formal structure of the business network which acts as a deterrent for these firms?

The results of the outcome model indicate that firm growth was achieved irrespective of membership to formal business networks, which raises an issue relating to the opportunity cost of policymakers’ resources. Would policymakers’ resources be best put to other uses rather than being used in the promotion of business networks? Past history from the cases of Italy and Denmark would suggest not, while the preliminary results of this study also highlighted that business network firms perceived a number of benefits to business network membership. Five percent of the business network firms responded that they were indebted to their business network for contributing to their overall business outcomes, while 73 percent of the business network firms attributed some part of their business outcomes to business network membership. While the results of the outcome model indicate business network membership does not impact on firm performance, one must be mindful that approximately half of the business network firms responded that they have not yet realised all the benefits of business network membership, hence the timeframe incorporated in the model may not be long enough to account for the full impacts of network membership on firm performance.
The results highlighted in this research also link closely to one of the recommendations made by InterTradeIreland in their 2005 report on business networks on the island of Ireland. More specifically, ITT emphasised that there is a need for Irish networks to improve international collaborations. It was envisaged by ITT (2005 p.59) that improving international collaborations would act as an instrument for “identifying, training, and supporting ‘network multipliers’ across the island; create appropriate international contacts and links; and operate an international network ‘matching’ resource”. The results of this study also highlight the lack of international collaboration by the network firms, with just over 20 percent of network firms remarking that they collaborate with others on an international level. This is one area of network development that needs to be addressed in Irish network policy. At the EU level attempts are being made to increase collaboration between European regions through various initiatives such as RAPIDE, IRE, and the Enterprise European Network. Involvement in these initiatives may be one way for Irish networks to address the lack of international collaborations by Irish firms.

8.3 Contributions of this Research

This research makes an original and timely contribution to an area that is under-researched from academic and policymaking perspectives. In summary, the contribution of this research is fivefold. These contributions are now discussed.

Firstly, this research makes a valuable methodological contribution in terms of developing an ex-post evaluation framework. Due to the inter-disciplinary nature of the topic and the varying typologies of network structures no standard framework to evaluate the effect of business network membership on firm performance exists. It also appears that if one refers to Storey’s (2000) six-steps to heaven approach to evaluation, then the vast majority of literature examining the effect of business network membership can be classed as ‘monitoring’ rather than an ‘evaluation’ of the initiatives. The aim of this research therefore was to make a methodological contribution and move beyond the ‘monitoring’ of business networks to the ‘evaluation’ of such initiatives. Through the inclusion of a control group of non-business network firms, a Heckman two-step model (1979) was developed to estimate
the impact of business network membership on firm performance. While this Heckman two-step model is academically robust, it also has the potential to ensure a policy relevant application.

In conjunction with making a methodological contribution, this research also fills a gap in the international business network and evaluation literatures. It provides empirical evidence on the perceived impacts, both positive and negative, of business network membership, while it also highlights the motivations as to why firms become members of such initiatives. Aside from the perceived impacts as highlighted by the business network firms, the results of the econometric framework developed suggest that when firm and selection effects are controlled for, business network membership does not impact on firm growth. While business network firms may report higher growth than their non-business network counterparts, these growth rates may be attributed to the firm’s characteristics rather than their business network membership.

From an Irish perspective there is a lacuna of research on business networks and as highlighted by ITT (2005) there was a need to develop credible data relating to business networks in Ireland. With this in mind, a database of all business networks in Ireland was compiled, which provided evidence regarding the types of networks in operation in Ireland, as well as identifying their specific objectives. From this database, formal business networks were chosen for the study and firm level data was compiled based on the results of the telephone questionnaire which provided evidence as to the motivations and perceived impacts and levels of additionality associated with business network membership. The third contribution made by this research therefore is to Irish industrial/enterprise policy literature and the general shortage of literature on Irish business networks and their evaluation.

A subsequent contribution is to policy formation, implementation, and evaluation of business networks. The results of the ex-post evaluation yield important policy recommendations for business network promotion and development. The results indicate that faster growing firms are more likely to become members of formal business networks. While these firms may very well need a business network to achieve their desired firm growth and membership to a business network generates a number of benefits to these firms, future formal business network promotion needs to
address the lack of slower growing firms in these formal business networks. The results of this research therefore should stimulate further debate on business networks and on their evaluation.

Finally, the fifth contribution of this research is at the firm level. Business network literature suggests that business networks can be a source of competitive advantage for firms and that these networks allow firms to achieve results that they would be unable to achieve on their own (Birley 1985; Humphrey and Schmitz 1996). While the outcome model indicates that business network membership does not impact on firm performance, the perceived benefits of business network membership from the business network firms’ perspective, suggests that there are a number of benefits to be gained from business network membership. The results provided would therefore be of keen interest to any firm who is trying to attain a competitive advantage over their rivals or to achieve outcomes that they cannot attain on their own.

8.4 Limitations

The findings presented in this thesis need to be considered in light of the limitations of this study. Information regarding contact details of members of formal business networks was in many instances confidential, therefore while the response rate achieved was high and acceptable to generalise the results found, a proportion of firms were not contactable because of the unavailability of their contact information.

‘No firm is an island’ according to Håkansson and Snehota (2006) which implies that every firm is a member of some form of network (business or otherwise). This implies that a completely pure control group of firms who are not involved in any form of business network is unattainable. The control group developed in this research of firms who are not members of formal business networks is therefore the most appropriate and most suitable given the restrictions presented.

In relation to the identification problem associated with the application of the Heckman-two step model (1979), the most common means of identification is to include some unique regressors which are only in the selection equation. The main
way of ensuring identification is done correctly is to include enough information in the selection equation regressors to make sure that they are unique in terms of the specification of the outcome equation. Both the selection and outcome equations developed in this research are specified differently and results showed that they were specified well. Such specification however was limited by the available data.

While key policymakers were interviewed at the initial phases of this research, the study is primarily limited to the views of single informants, the business network firms. As stated earlier however, the key informants in the business network firms themselves were MDs or owners who were directly related to the business network activity of the firm, and were therefore best placed to make judgements on the firm’s business network activities, its impacts, and information regarding their performance levels.

The study also adopted the view that firms are primarily concerned with economic results, a limitation of this research may be that this definition is too narrow and while such a study was warranted and justified, future research may try to broaden this definition to incorporate less tangible impacts of business network membership on firm performance.

8.5 Opportunities for Future Research

From the outset, it needs to be acknowledged that this field of study provides ample opportunities for future research. Future research could take the evaluation framework developed in this research and apply it in other countries. The research when completed would confirm whether the results found in the Irish case are generic or idiosyncratic to all formal business networks.

By focusing on estimating the impact of formal business networks on firm performance, informal business networks were excluded from the study. Clearly, this also provides a fruitful line for further research inquiries.
The timeframe of the study may be deemed to be too short to get a true estimate of the impact of business networks on firm performance. The undertaking of a longitudinal approach may however address this problem. The ideal situation would be to gather firm level information at three stages as follows: (1) prior to business network membership, (2) while firms are a member of the business network, and (3) after they leave the network (if in fact they do so). This longitudinal study would incorporate an ex-ante and ex-post evaluation of a business network initiative.

While the measurable additionalities of business network membership (as perceived by the business network members) were accounted for in this research, the study did not allow for the behavioural additionalities of business network membership to be measured. Future research could aim to account for these behavioural changes, which although less tangible from a measurement point of view could prove to be significant.

As the results showed, a significant proportion of firms reported that business network membership allowed them to safeguard existing jobs. This is an important factor for firms given the turbulent economic climate that they now operate in. In order to capture both the growth of employment and safeguarding of existing jobs, future research could re-specify the employment growth model so that a sensitivity analysis to capture the safeguarding of existing jobs can be incorporated into the results. The current sample size was not sufficient to allow such an analysis.

8.6 Overall Conclusion

In conclusion, this study set out to develop an ex-post evaluation framework to estimate the impact of business networks on firm performance. Existing business network literature was reviewed in order to provide a theoretical basis for the research in addition to garnering key insights provided by previous research. From this exercise it was quite apparent that there was a distinct shortage of literature relating to the evaluation of business networks and a lack of any appropriate methodological framework to evaluate such initiatives. In light of these issues empirical data was gathered from firms involved in formal business networks and a control group of non-
business networks was also incorporated. Subsequently, an ex-post evaluation framework to estimate the impact of business network membership on firm performance was developed. The results indicated that when selection effects and firm and MD characteristics were controlled for, business network membership did not impact on firm performance.

This study makes a solid contribution to the international business network and evaluation literatures and it addresses the lack of research in the area from an Irish perspective. The findings also potentially have important policy implications. The overriding belief is that this research makes a novel and timely contribution to existing research. This research does not propose to answer all the questions regarding the evaluation of business networks and their impact at a micro level, it does however add to the debate as to how best to evaluate the impact of business networks on firm performance. It is hoped that the methodological framework developed and validated in this study forms the basis for future discussion and research on the evaluation of business network initiatives.
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Appendices
Appendix A: Questionnaire to Business Network Firms

SECTION A – INTRO/SCREENERS

ASK ALL
Good morning/afternoon, my name is Nicola Lynch and I’m calling from the Graduate Centre of Business at the Kemmy Business School, University of Limerick.

IF NAMED CONTACT ON SAMPLE
Could I please speak to (NAME FROM SAMPLE)?

  •  IF NAMED CONTACT NOT AVAILABLE: Could I speak to either the owner, managing director, or the person involved in (NAME OF NETWORK)?

IF NO NAMED CONTACT ON SAMPLE
Please can I speak to the owner, managing director or the person involved in (NAME OF NETWORK)?

ASK ALL
I am a PhD student from the University of Limerick and I am hoping to speak to firms that are members of formal business networks to find out more about how this network involvement has impacted on your firm. It will take around 20 minutes, depending on your answers. Is it convenient to speak to you now or would you prefer to make an appointment for another time?

ADD IF NECESSARY

  •  This research will cover areas such as your business performance and strategy, your experiences of being part of the network and the impact that network involvement has had on your business.

  •  All of the answers you give are strictly confidential and anonymous. Participation in this survey is voluntary.
• The responses of all organisations taking part will be combined into a report. Your firm or the business network that you are a member of will not be identifiable in the report.

• Your organisation was selected at random from a list I have collated of business network members.
SECTION S: SCREENING

ASK ALL

S1. So, firstly can I just confirm that your business is a member of (NAME OF NETWORK)?
   Yes ----------------------------- 1
   No ----------------------------- 2 – GO TO S2
   (Don’t know) ------------------- 3 – ASK FOR REFERRAL TO SOMEONE BETTER PLACED TO TALK ABOUT THE COMPANIES PARTICIPATION IN THE NETWORK.

IF NO AT S1

S2. Are you involved in any of the following formal business networks...?
   An R&D network ---------------------- 1
   A trade network --------------------- 2
   A marketing/branding network ------- 3
   Or a purchasing network ------------- 4
   None of these -------------------- 5 - CLOSE
   (Don’t know) --------------------- 6 - CLOSE

IF CODES 1-4 AT S2

S3. What is the name of this business network?

NOTE: IF INVOLVED IN MORE THAN ONE FORMAL BUSINESS NETWORK ASK THEM JUST TO TELL ME ABOUT THE ONE THEY ARE MOST INVOLVED IN/KNOW MOST ABOUT

............................................................................................................................................................................................................................................................................
............................................................................................................................................................................................................................................................................

235
ASK ALL
Throughout this interview I’m going to focus just on the (NAME OF BUSINESS NETWORK) your firm participates in.

SECTION A: BUSINESS PROFILE

ASK ALL
I’d like to start by getting some information on the background of your business and its organisational structure.

ASK ALL
A1a So firstly, is the business Irish owned or foreign owned?

- Irish-owned ----------------------------------------------- 1
- Foreign-owned --------------------------------------------- 2
- (Joint Irish and foreign owned) --------------------------- 3
- (Don’t know) --------------------------------------------- 4

IF SOME FOREIGN OWNERSHIP (CODES 2 OR 3 AT A1a)
A1b What country is the parent company based in?

(Specify)

(Don’t know)........................................................................... 2

ASK ALL
A2 Is your business …?

- A single site organisation ------------------------------- 1
- Or, part of a multiple-site organisation ------------------ 2
- (Don’t know) ................................................................. 3
ASK ALL

A3a What is the main business activity carried out at this site?

ADD AS NECESSARY

What does it make, or what service does it provide?

A – Agriculture, forestry or hunting ........................................ 1
B – Fishing .................................................................................. 2
C – Mining & quarrying ............................................................... 3
D – Manufacturing
  • Manufacture of food products, beverages and tobacco .......... 4
  • Manufacture of textiles and textile products ......................... 5
  • Manufacture of leather and leather products ..................... 6
  • Manufacture of wood and wood products ......................... 7
  • Manufacture of pulp, paper and paper products; publishing and
    printing .................................................................................. 8
  • Manufacture of coke, refined petroleum products and nuclear
    fuel ....................................................................................... 9
  • Manufacture of chemicals, chemical products and man-made
    fibres ..................................................................................... 10
  • Manufacture of rubber and plastic products ...................... 11
  • Manufacture of other non-metallic mineral products ........... 12
  • Manufacture of basic metals and fabricated metal products... 13
  • Manufacture of machinery and equipment n.e.c. ............... 14
  • Manufacture of electrical and optical equipment ............... 15
  • Manufacture of transport equipment ................................. 16
  • Manufacturing n.e.c. .............................................................. 17
E – Electricity, gas & water supply .......................................... 18
F – Construction ........................................................................ 19
G – Wholesale, retail & certain repair .................................... 20
H – Hotels & restaurants .......................................................... 21
I – Transport, storage or communication ................................ 22
J – Finance .................................................................................. 23
K – Real estate, renting or business activities ......................... 24
L – Public administration & defence .............................. 25
M – Education .................................................................. 26
N – Health & social work ................................................... 27
O – Community, social & personal services ..................... 28
P – Private households with employees ......................... 29
Q – Extra territorial organisations ............................... 30
Other (SPECIFY) .............................................................. 31

IF MULTIPLE SITE ORGANISATION (CODE 2 AT A2)
A3b  Is this also the main activity of the organisation as a whole?
Yes  .................................................................................. 1
No  .................................................................................. 2
(Don’t know) ................................................................. 3

IF CODE 2 AT A3b
A3c  What is the main business activity of the organisation as a whole?
ADD AS NECESSARY
What does it make, or what service does it provide?

A – Agriculture, forestry or hunting ............................... 1
B – Fishing ........................................................................ 2
C – Mining & quarrying ................................................. 3
D – Manufacturing
  • Manufacture of food products, beverages and tobacco .... 4
  • Manufacture of textiles and textile products ................. 5
  • Manufacture of leather and leather products .............. 6
  • Manufacture of wood and wood products ................. 7
  • Manufacture of pulp, paper and paper products; publishing and printing ................................................. 8
  • Manufacture of coke, refined petroleum products and nuclear fuel ............................................................ 9
  • Manufacture of chemicals, chemical products and man-made fibres ......................................................... 10
- Manufacture of rubber and plastic products ......................... 11
- Manufacture of other non-metallic mineral products ............... 12
- Manufacture of basic metals and fabricated metal products..... 13
- Manufacture of machinery and equipment n.e.c.................... 14
- Manufacture of electrical and optical equipment............... 15
- Manufacture of transport equipment................................. 16
- Manufacturing n.e.c. .................................................... 17

E – Electricity, gas & water supply ......................................... 18
F – Construction ...................................................................... 19
G – Wholesale, retail & certain repair ..................................... 20
H – Hotels & restaurants ....................................................... 21
I – Transport, storage or communication .................................. 22
J – Finance ........................................................................... 23
K – Real estate, renting or business activities ........................... 24
L – Public administration & defence ......................................... 25
M – Education ....................................................................... 26
N – Health & social work ....................................................... 27
O – Community, social & personal services ............................ 28
P – Private households with employees .................................. 29
Q – Extra territorial organisations ......................................... 30
Other (SPECIFY) ................................................................. 31

**ASK ALL**

**A4a** (IF MULTIPLE SITE ORGANISATION (CODE 2 AT A2) Thinking now just about the site at which you work, How many people are currently employed by your business at this site?)

*Please give me the full time equivalent, so count part-time employees according to the proportion of time that they work.*

WRITE IN NUMBER (ROUND TO NEAREST WHOLE NUMBER)

(Refused)

(Don’t know) – PROMPT WITH RANGES
A4b If you had to estimate, approximately how many people are employed by your business at this site?

Zero................................................................. 1
1-10... ............................................................... 2
11-24 ................................................................. 3
25-49 ................................................................. 4
50-99 ................................................................. 5
100-249 ............................................................ 6
250+... .............................................................. 7
(Don’t know)....................................................... 8
(Refused)......................................................... 9

ASK ALL

A5 How long ago was your business established?

ADD AS NECESSARY: This means when the business started trading.
ADD AS NECESSARY This means the business in its current form.
ADD AS NECESSARY: This means the business at this site.

Within the last year ------------------------------- 1
Over 1, up to 2 years ago ------------------------ 2
Over 2, up to 3 years ago ------------------------ 3
Over 3, up to 4 years ago ------------------------ 4
Over 4, up to 5 years ago ------------------------ 5
Over 5, up to 10 years ago ---------------------- 6
Over 10, up to 20 years ago --------------------- 7
Over 20 years ago ------------------------------ 8
(Don’t know) ------------------------------------ 9
(Refused) ---------------------------------------- 10
IF MULTIPLE SITE ORGANISATION (CODE 2 AT A2)

A6 Can I just ask, is the site at which you work …?

<table>
<thead>
<tr>
<th>Option</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>The headquarters of your organisation</td>
<td>1</td>
</tr>
<tr>
<td>A franchise</td>
<td>2</td>
</tr>
<tr>
<td>A wholly-owned subsidiary of a foreign firm</td>
<td>3</td>
</tr>
<tr>
<td>A wholly-owned subsidiary of an Irish firm</td>
<td>4</td>
</tr>
<tr>
<td>A joint venture with other foreign firms</td>
<td>5</td>
</tr>
<tr>
<td>A joint venture with Irish firms</td>
<td>6</td>
</tr>
<tr>
<td>Or something else (SPECIFY)</td>
<td>7</td>
</tr>
<tr>
<td>(Don’t know)</td>
<td>8</td>
</tr>
</tbody>
</table>

IF CODES 2-8 AT A6

A7 Where is the head office of your organisation located?

ADD AS NECESSARY: And by that I mean the location where significant business decisions are made for your site (e.g. sourcing, new products and processes, tactical and strategic decision making)?

<table>
<thead>
<tr>
<th>Option</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elsewhere in (REGION)</td>
<td>1</td>
</tr>
<tr>
<td>Elsewhere in Ireland (but not in your region)</td>
<td>2</td>
</tr>
<tr>
<td>In Northern Ireland</td>
<td>3</td>
</tr>
<tr>
<td>Overseas (write in country)</td>
<td>4</td>
</tr>
<tr>
<td>(This is the head office)</td>
<td>5</td>
</tr>
<tr>
<td>(Don’t know)</td>
<td>6</td>
</tr>
</tbody>
</table>

ASK ALL

A8 Is the business (IF SOME FOREIGN OWNERSHIP (CODES 2 OR 3 AT A1a) in Ireland) a … ?

<table>
<thead>
<tr>
<th>Option</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sole trader</td>
<td>1</td>
</tr>
<tr>
<td>A partnership</td>
<td>2</td>
</tr>
<tr>
<td>A limited company (Ltd)</td>
<td>3</td>
</tr>
<tr>
<td>A public limited company (Plc)</td>
<td>4</td>
</tr>
<tr>
<td>(Or, something else (SPECIFY))</td>
<td>5</td>
</tr>
<tr>
<td>(Don’t know)</td>
<td>6</td>
</tr>
</tbody>
</table>
ASK ALL

I would now like to ask you some questions about the markets in which you sell your goods and services.

ASK ALL

B1 So firstly, to which of the following markets or locations does (IF SINGLE SITE (CODES 1 OR 3 AT A2) your business/IF MULTI-SITE (CODE 2 AT A2) this site sell to? Do you sell to...

- Customers within 30km of your site .......................................................... 1
- Customers elsewhere in (REGION) (excluding local) ............................... 2
- Customers based elsewhere in the Republic of Ireland (excluding local and region) ......................................................................................................... 3
- Customers in Northern Ireland .................................................................... 4
- Customers based overseas ........................................................................... 5
- (None of these/no sales) ............................................................................. 6
- (Don’t know) ............................................................................................. 7
- (Refused) ..................................................................................................... 8

B2 Please can you tell me the approximate percentage of (IF SINGLE SITE (CODES 1 OR 3 AT A2) your business’/IF MULTI-SITE (CODE 2 AT A2) this site’s) sales that each of these markets accounts for? Please just give me your best estimate and make sure that the total adds up to 100%. So firstly, what proportion of your sales go to…?

ADD AS NECESSARY I just need your best estimate

(a) Local, within 30km from your site
(b) (REGION) (excluding local)
(c) The Republic of Ireland (excluding local and regional)
(d) Northern Ireland
(e) Overseas countries
ASK ALL

I’d now like you to think about all of your purchased inputs. By that I mean everything that you buy in to the company, so basically everything except labour costs.

ASK ALL

B3a Are your purchased inputs sourced from …?

(IF CODE 2 AT A2) Other parts of your parent company ------- 1
Local suppliers, within 30km of your site ------------------ 2
Suppliers based elsewhere in (REGION) (excluding local) ---- 3
Suppliers based elsewhere in Ireland (excluding (REGION)) --- 4
Suppliers based in Northern Ireland------------------------ 5
Suppliers based overseas --------------------------------- 6
(Don’t know) -------------------------------------------- 7
(Refused) ----------------------------------------------- 8

ASK IF MORE THAN ONE CODES 1-6 AT B3a

B3b What percentage of your purchased inputs are sourced from …?

ADD AS NECESSARY I just need your best estimate

Write in % -
(Refused)
(Don’t know)
ASK ALL

I would now like to ask you some questions about any new products or services that you may have introduced.

B4a Have you introduced any new products or services (A5 Codes 1 to 4 over the last four years /A5 codes 5 -10 since you began your business)?

Yes ---------------------------------- 1
No ----------------------------------- 2
(Don’t know)--------------------------- 3
(Refused)----------------------------- 4

IF CODE1 AT B4a

B4b And are these new products or services…?

Just new to your business --------------------------------- 1
New to your industry or sector --------------------------- 2
Completely new to the world ---------------------------- 3
(Or are some just new to the business and some are completely new) 4
(Don’t know) ------------------------------------------ 5
(Refused) --------------------------------------------- 6

ASK ALL

B5a Does your firm conduct any in-house new product or service development activity or R&D activity?

ADD AS NECESSARY: By this I mean developing new products, services or processes or improving existing ones
ADD AS NECESSARY: By in-house I mean new product or service development conducted by your own staff rather than commissioning someone external to do it.

Yes ---------------------------------------- 1
No ---------------------------------------- 2
(Don’t know) ----------------------------- 3
(Refused) ------------------------------- 4
**B5b** Approximately how many of your employees are engaged either wholly or partially in?

ADD AS NECESSARY: *i.e. in either new product or service development?*

<table>
<thead>
<tr>
<th>Number of Employees</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero</td>
<td>1</td>
</tr>
<tr>
<td>One</td>
<td>2</td>
</tr>
<tr>
<td>2-4</td>
<td>3</td>
</tr>
<tr>
<td>5-10</td>
<td>4</td>
</tr>
<tr>
<td>11-24</td>
<td>5</td>
</tr>
<tr>
<td>25-49</td>
<td>6</td>
</tr>
<tr>
<td>50-99</td>
<td>7</td>
</tr>
<tr>
<td>100-249</td>
<td>8</td>
</tr>
<tr>
<td>250+</td>
<td>9</td>
</tr>
<tr>
<td>(Don’t know)</td>
<td>10</td>
</tr>
<tr>
<td>(Refused)</td>
<td>11</td>
</tr>
</tbody>
</table>

**ASK ALL**

**B6a** And in the last year have you commissioned anyone external to your business to conduct any new product or service development activity for you?

<table>
<thead>
<tr>
<th>Response</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
</tr>
<tr>
<td>(Don’t know)</td>
<td>3</td>
</tr>
</tbody>
</table>
SECTION C: Business Network Involvement

ASK ALL
I now want to ask you just a few questions about your involvement in (NAME OF NETWORK)

C1 So firstly, what is the main objective of this business network? Is it…?
   An R&D network -------------------------- 1
   A trade network -------------------------- 2
   A marketing/branding network ----------- 3
   (Or something else (SPECIFY)) ---------- 4
   (Don’t know) ------------------------------ 5

ASK ALL
C2 How long have you been involved in the business network, have you joined…?
   Within the last year -------------------------- 1
   Over 1, up to 2 years ago ------------------- 2
   Over 2, up to 3 years ago ------------------- 3
   Over 3, up to 4 years ago ------------------- 4
   Over 4, up to 5 years ago ------------------- 5
   Over 5, up to 10 years ago ------------------ 6
   Over 10, years ago ------------------------- 7
   (Don’t know) ------------------------------- 8
   (Refused) ------------------------------- 9

ASK ALL
C3a Do you pay a membership fee to this business network?
   Yes ---------------------------------------- 1
   No ---------------------------------------- 2
   (Don’t know) ------------------------------- 3
   (Refused) ---------------------------------- 4
IF CODE 1 AT C3a

C3b Can you tell me how much your membership fee is per year?

ADD AS NECESSARY: I am just after your best estimate

(Don’t know)
(Refused)

ASK ALL

C4a Can you tell me who the members of the business network are? Are they primarily…?

Businesses that provide a similar product or service to your business ---- 1
Businesses that provide a different product or service to your business ---- 2
Research organisations (including private or state run, and/or Universities) 3
(Or anyone else (SPECIFY)) --------------------------------------------- 4
(Don’t know) --------------------------------------------------------------- 5

ASK ALL

C4a1 And are these businesses (IF CODE 6 at C4A or research organisations) primarily…?

From the same region as your business (including local businesses) --- 1
From different regions in Ireland -------------------------------------------- 2
Businesses outside of Ireland ---------------------------------------------- 3
(Or anyone else (SPECIFY)) --------------------------------------------- 4
(Don’t know) --------------------------------------------------------------- 5
ASK ALL

C5a  The following are a list of reasons as to why you may have become involved in this business network. Please can you tell me how important each of these were in your decision to join the network using a 5 point scale where 1 is “Not at all important” and 5 is “Very important”.

REMINDE AS NECESSARY: So how important was that in your decision to join (NETWORK NAME)?

(i) To sustain and/or create employment in your business;
(ii) To increase the business’ profit or lower your costs;
(iii) To collaborate with others in terms of research activities;
(iv) To collaborate with others in terms of increasing sales;
(v) To collaborate with others in terms of marketing/branding of the business’ products/services;
(vi) To improve relations with other suppliers or customers;
(vii) To participate in a joint venture

1 – Not at all important ------------------------- 1
2 ---------------------------------- 2
3 ------------------------------- 3
4 ------------------------------- 4
5 – Very important ------------------------- 5
(Don’t know) ------------------------------- 6
(Refused) ------------------------------- 7

ASK ALL

C5b  And are there any other important reasons why you became involved in this business network?

Yes (SPECIFY) ------------------------------- 1
No, no other reasons-------------------------- 2
(Don’t know) ------------------------------- 3
(Refused) ------------------------------- 4
ASK IF YES AT C5B

C5c  And how important was this reason?

ADD AS NECESSARY: **On a scale of 1 to 5 was the reason you just mentioned...**

ADD AS NECESSARY **In your decision to join the network**

1 – Not at all important  ------------------------- ---------  1
2  ------------------------------  2
3  ------------------------------  3
4  ------------------------------  4
5 – Very important  ------------------------------  5
(Don’t know)  ------------------------------  6
(Refused)  ------------------------------  7
SECTION D: Collaboration in the Business Network

ASK ALL

D1 Have you collaborated or worked with any of the other members in (NAME OF NETWORK)?

ADD AS NECESSARY By collaboration, I mean co-operated with, made alliances or begun joint ventures.

Yes........................................................... 1
No.......................................................... 2
(Don’t know) .............................................. 3
(Refused)................................................... 4

D1a With which of the following business network members have you collaborated with?

Other Businesses who produce similar products or services to your business ---------------------------------------- 1
Other Businesses who produce different products or services to your business ----------------------------------- 2
Research organisations and Universities ---------------- 3
(Any others (PLEASE SPECIFY))------------------------- 4
(Don’t know) ------------------------------------------ 5
(Refused) ------------------------------------------ 6

IF CODE 1 AT D1a

D2a Thinking about the other businesses who produce similar products or services to you, in what ways do you collaborate with these businesses? Do you…?

(i) Discuss generic business issues;
(ii) Discuss more industry specific issues;
(iii) Work together on research and development projects;
(iv) Work together on joint marketing projects;
(v) Work together to increase your business’ sales or profit;
ADD AS NECESSARY: through targeting new markets or improving existing ones

Yes ----------------------------------------------- 1
No ----------------------------------------------- 2
(Don’t know) -------------------------------------- 3
(Refused) ----------------------------------------- 4

CODE 1 AT ANY D2a
D2b And would you say that this collaboration is…?

ADD AS NECESSARY: Thinking just about the other businesses who produce similar products or services to you,

Informal in nature (i.e. no clear goals set out) ------------------ 1
Formal in nature (i.e. you have a common goal to be achieved) --- 2
(Or is a combination of both) ----------------------------------- 3
(Don’t know) -------------------------------------------------- 4

IF CODE 1 AT D1a
D2c Have you collaborated with these businesses on more than one occasion?
ADD AS NECESSARY: By that I mean more than one project or particular issue
ADD AS NECESSARY: Thinking just about the other businesses who produce similar products or services to you,

Yes ----------------------------------------------- 1
No ----------------------------------------------- 2
(Don’t know) -------------------------------------- 3
(Refused) ----------------------------------------- 4
IF CODE 1 AT D2C

D2d  Approximately how many times have you collaborated with them?

ADD AS NECESSARY: Thinking just about the other businesses who produce similar products or services to you,

2-3 times ---------------------------------- 1
4-5 times ---------------------------------- 2
6-10 times -------------------------------- 3
11-20 times --------------------------- 4
More than 20 times ----------------------- 5
(Only collaborated once)------------------- 6
(Don’t know) ----------------------------- 7
(Refused) --------------------------------- 8

D2e  Is this collaboration with…?

ADD AS NECESSARY: Still thinking just about the other businesses who produce similar products or services to you,

Businesses based elsewhere in (REGION)..... 1
Elsewhere in The Republic of Ireland ........... 2
Businesses based in Northern Ireland .......... 3
Businesses based Overseas ..................... 4
(Don’t know) .................................... 5
(Refused) ....................................... 6

IF CODE 2 AT D1a

D3a  (IF CODE 1 AT D1A Now moving on to think just/IF NOT CODE 1 AT D1A Thinking) about the businesses who produce different products or services to you, in what ways do you collaborate with these businesses? Do you…?

(i)  Discuss generic business issues;
(ii) Discuss more industry specific issues;
(iii) Work together on research and development projects;
(iv) Work together on joint marketing projects;
(v)  Work together to increase your business’ sales or profit;
ADD AS NECESSARY: through targeting new markets or improving existing ones

Yes ------------------------------------------- 1
No -------------------------------------------- 2
(Don’t know) ----------------------------------- 3
(Refused) -------------------------------------- 4

IF CODE 1 AT ANY D3a

D3b  And would you say that this collaboration is…?

ADD AS NECESSARY: Thinking just about the other businesses who produce different products or services to you,

Informal in nature (i.e. no clear goals set out) ------------------------------- 1
Formal in nature (i.e. you have a common goal to be achieved) ---- 2
(Or is a combination of both) --------------------------------------------- 3
(Don’t know) ------------------------------------------------------------- 4

IF CODE 2 AT D1a

D3c  Have you collaborated with these businesses on more than one occasion?

ADD AS NECESSARY: By that I mean more than one project or particular issue.
ADD AS NECESSARY: Thinking just about the other businesses who produce different products or services to you.

Yes --------------------------------------------- 1
No --------------------------------------------- 2
(Don’t know) ------------------------------------ 3
(Refused) --------------------------------------- 4
D3c2  Approximately how many times have you collaborated with them?

ADD AS NECESSARY: Thinking just about the other businesses who produce different products or services to you,

2-3 times --------------------------- 1
4-5 times --------------------------- 2
6-10 times -------------------------- 3
11-20 times ------------------------ 4
More than 20 times ----------------- 5
(Only collaborated once)------------ 6
(Don’t know) ----------------------- 7
(Refused) -------------------------- 8

D3d  Is this collaboration with…?

ADD AS NECESSARY: Still thinking just about the other businesses who produce different products or services to you,

Businesses based elsewhere in (REGION) ... 1
Elsewhere in The Republic of Ireland ....... 2
Businesses based in Northern Ireland ....... 3
Businesses based Overseas .................. 4
(Don’t know).................................. 5
(Refused)..................................... 6
Thinking about the research organisations, in what ways do you collaborate with them? Do you…?

(i) Discuss generic business issues;
(ii) Discuss more industry specific issues;
(iii) Work together on research and development projects;
(iv) Work together on joint marketing projects;
(v) Work together to increase your business’ sales or profit;
ADD AS NECESSARY: through targeting new markets or improving existing ones

Yes ----------------------------------------- 1
No ------------------------------------------ 2
Don’t know ------------------------------- 3
Refused ---------------------------------- 4

And would you say that this collaboration is…?
ADD AS NECESSARY: Thinking just about the research organisations, and Universities.

Informal in nature (i.e. no clear goals set out) --------------- 1
Formal in nature (i.e. you have a common goal to be achieved) -- 2
Or is a combination of both --------------------------------- 3
(Don’t know) ------------------------------------------- 4
IF CODE 3 AT D1a

D4c Have you collaborated with these research organisations on more than one occasion?

ADD AS NECESSARY: By that I mean more than one project or particular issue.
ADD AS NECESSARY: Thinking just about the research organisations, and Universities.

Yes --------------------------------------------- 1
No --------------------------------------------- 2
(Don’t know) ------------------------------------- 3
(Refused) ---------------------------------------- 4

IF CODE 1 AT D4C

D4c2 Approximately how many times have you collaborated with them?

ADD AS NECESSARY: Thinking just about the research organisations, and Universities.

2-3 times ---------------------------------------- 1
4-5 times ---------------------------------------- 2
6-10 times --------------------------------------- 3
11-20 times -------------------------------------- 4
More than 20 times ----------------------------- 5
(Only collaborated once)------------------------- 6
(Don’t know) ------------------------------------ 7
(Refused) --------------------------------------- 8
D4d  Is this collaboration with…?

ADD AS NECESSARY: Still thinking just about the research organisations, and Universities

Organisations based elsewhere in (REGION) ----- 1
Elsewhere in The Republic of Ireland --------------- 2
Organisations based in Northern Ireland ----------- 3
Organisations based Overseas --------------------- 4
(Don’t know) ---------------------------------- 5
(Refused) -------------------------------------- 6

ASK ALL

D5a  And has being a member of (NAME OF NETWORK) enabled you to collaborate or work with any businesses or research organisations outside of your business network?

Other Businesses who produce similar products or services to your business -------------------------------- 1
Other Businesses who produce different products or services to your business --------------------------------- 2
Research organisations and Universities ------------- 3
Any others (PLEASE SPECIFY) --------------------- 4
No – not collaborated/worked with anyone outside of network --- 5
(Don’t know) ---------------------------------- 6
(Refused) -------------------------------------- 7
D5b Thinking about these other businesses or research organisations outside of your business network, in what ways do you collaborate with them? Do you…?

(i) Discuss generic business issues;
(ii) Discuss more industry specific issues;
(iii) Work together on research and development projects;
(iv) Work together on joint marketing projects;
(v) Work together to increase your business’ sales or profit;
ADD AS NECESARY: through targeting new markets or improving existing ones

Yes ------------------------------- 1
No ------------------------------- 2
Don’t know ----------------------- 3
Refused ------------------------- 4
SECTION E – Firm Impact

ASK ALL

E1a Do you think that your involvement in the business network has...?

(i) Impacted on your Turnover;
(ii) Impacted on your Research and development activities
(iii) Created any new Jobs
(iv) Safeguarded any existing Jobs

Yes ---------------------- 1
No ------------------------ 2
(Don’t know) -------------- 3
(Refused) ------------------ 4

ASK ALL

E1b And has your network involvement had any other significant impacts to your business that I haven’t covered?

______________________________________________________________

E2b How many new jobs have you created as a result of getting involved in this business network?

ADD AS NECESSARY: Please give me the full time equivalent, so count part time employees according to the proportion of time that they work.

WRITE IN NUMBER (ROUND TO NEAREST WHOLE NUMBER)
(Refused)
(Don’t know) – PROMPT WITH RANGES

IF DON’T KNOW AT E2b
E2b2  If you had to estimate, how many new jobs you have created as a result, would you say it was…?

1-10  ----------------------------------------  1
11-24  ----------------------------------------  2
25-49  ----------------------------------------  3
50-99  ----------------------------------------  4
100-249 ----------------------------------------  5
250 or more----------------------------------- 6
(Don’t know) -----------------------------------  7
(Refused) --------------------------------------- 8

E2c  Did you expect to create any new jobs when you joined this business network?

Yes ----------------------------------------  1
No ----------------------------------------  2
Don’t know ----------------------------------- 3
Refused --------------------------------------- 4

E2d (IF CODE 1 AT E2a(i) And) How many jobs have you safeguarded as a result of getting involved in this business network?

ADD AS NECESSARY: Please give me the full time equivalent, so count part time employees according to the proportion of time that they work.

WRITE IN NUMBER (ROUND TO NEAREST WHOLE NUMBER)
(Refused)
(Don’t know) – PROMPT WITH RANGES
E2d2  If you had to estimate, how many jobs you have **safeguarded** as a result, would you say it was…?

1-10 ----------------------------------------------- 1  
11-24 ----------------------------------------------- 2  
25-49 ----------------------------------------------- 3  
50-99 ----------------------------------------------- 4  
100-249 ------------------------------------------- 5  
250 or more---------------------------------------- 6  
(Don’t know) ------------------------------------- 7  
(Refused) ---------------------------------------- 8  

E2e  Did you **expect** to safeguard any existing jobs when you joined this business network?

Yes ----------------------------------------------- 1  
No ----------------------------------------------- 2  
Don’t know -------------------------------------- 3  
Refused ----------------------------------------- 4  

IF CODE 1 AT E1a(ii)

E3a  You mentioned earlier that involvement in this business network has, or will, impact on your turnover. Is this..?

The amount of sales ---------------------- 1  
The locations or markets you sell to--- 2  
Or both the amount and the locations -- 3  
(Don’t know) -------------------------- 4  
(Refused) ----------------------------- 5  

261
IF CODES 1 OR 3 AT E3a

E3b Can you quantify the impact that business network involvement has had on your sales? Have your sales…?

ADD AS NECESSARY: As a direct result of your involvement in (NAME OF NETWORK)

- Increased by up to 5%-------- 1
- Between 6-10% -------------- 2
- Between 11-20% ----------- 3
- Between 20-50% ----------- 4
- Increased by more than 50% -- 5
- (Decreased) --------------- 6
- (Don’t know) -------------- 7
- (Refused) ------------------ 8

IF CODES 6 AT E3b

E3b2 By how much have your sales decreased as a result of your business network involvement? Have your sales…?

ADD AS NECESSARY: As a direct result of your involvement in (NAME OF NETWORK)

- Decreased by up to 5%-------- 1
- Between 6-10% -------------- 2
- Between 11-20% ----------- 3
- Between 20-50% ----------- 4
- Decreased by more than 50% -- 5
- (Don’t know) -------------- 6
- (Refused) ------------------ 7
**IF CODES 1 OR 3 AT E3a**

**E3c**  Did you expect this change to your sales when you joined this business network?

- Yes ---------------------------------------- 1
- No ----------------------------------------- 2
- (Don’t know) ------------------------------- 3
- (Refused) ----------------------------------- 4

**IF CODES 2 OR 3 AT E3a & CODES 1-5 AT B1**

**E3d**  You mentioned that involvement in the business network has impacted on the locations or markets that you sell your products or services to. Has there been a change in your sales to...?

- Customers based elsewhere in (REGION)------------------ 1
- Customers based elsewhere in The Republic of Ireland---- 2
- Customers based in Northern Ireland ------------------------- 3
- Customers based Overseas ------------------------------------- 4
- (None of these) -------------------------------------------------- 5
- (Don’t know) ---------------------------------------------------- 6
- (Refused) -------------------------------------------------------- 7

**IF CODES 2 OR 3 AT E3a**

**E3e**  Did you expect to sell to new markets when you joined this business network?

- Yes ----------------------------------------- 1
- No ----------------------------------------- 2
- (Don’t know) ----------------------------------- 3
- (Refused) ------------------------------------- 4
I’d now like to try and quantify the impact network involvement has had on your business’ research and development activities? So firstly…?

E4bi1 Has business network involvement impacted on the number of people engaged in R&D activities?

ADD AS NECESSARY As a direct result of your business’ network involvement?

Yes, Increased 1
Yes, Decreased 2
No 3
(Don’t know) 4
(Refused) 5

IF CODES 1 OR 2 AT E4bi1

E4bi2 And by approximately what percentage has the number of people you employ in R&D activities (IF CODE 1 AT E4bi1 increased/IF CODE 2 decreased)? Has the number of people you employ (IF CODE 1 AT E4bi1 increased/IF CODE 2 decreased) by…?

ADD AS NECESSARY: As a direct result of your involvement in (NAME OF NETWORK)

Up to 5% 1
Between 6-10% 2
Between 11-20% 3
Between 20-50% 4
By more than 50% 5
(Stayed the same) 6
(Don’t know) 7
(Refused) 8
IF CODES 1 OR 2 AT E4Bi1

E4bi3 And did you expect your involvement in the network to impact on the number of people engaged in R&D activities?

Yes ----------------------------------------- 1
No ------------------------------------------ 2
(Don’t know) ------------------------------- 3
(Refused) ----------------------------------- 4

IF CODE 1 AT E1a (iii)

E4bi1 Has business network involvement impacted on the number of new products or services developed?

ADD AS NECESSARY As a direct result of your business’ network involvement?

Yes, Increased ------------------ 1
Yes, Decreased ----------------- 2
No -------------------------------- 3
(Don’t know) ------------------- 4
(Refused) ----------------------- 5
E4bii2 To what extent has network involvement impacted on your new product or service development?

Please could you give me a score of 1 to 5, where 5 means it has had a ‘very significant impact’ and 1 means it has had ‘no impact at all’ on your new product or service development.

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No impact at all</td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Very significant impact</td>
</tr>
<tr>
<td>6</td>
<td>(Don’t know)</td>
</tr>
<tr>
<td>7</td>
<td>(Refused)</td>
</tr>
</tbody>
</table>

E4bii3 And did you expect your involvement in the network to impact on your new product or service development?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
</tr>
<tr>
<td>(Don’t know)</td>
<td>3</td>
</tr>
<tr>
<td>(Refused)</td>
<td>4</td>
</tr>
</tbody>
</table>
IF CODE 1 AT E1a (iii)

E4biii1 Has network involvement impacted on the number of new processes developed?

ADD AS NECESSARY As a direct result of your business’ network involvement?

- Yes, Increased 1
- Yes, Decreased 2
- No 3
- (Don’t know) 4
- (Refused) 5

IF CODES 1 OR 2 AT E4biii1

E4biii2 To what extent has network involvement impacted on your new process development?

Please could you give me a score of 1 to 5, where 5 means it has had a ‘very significant impact’ and 1 means it has had ‘no impact at all’ on your new process development.

- 1 – No impact at all
- 2
- 3
- 4
- 5 – Very significant impact
- (Don’t know) 6
- (Refused) 7
IF CODES 1 OR 2 AT E4iii1

E4iii3 And did you expect your involvement in the network to impact on your new process development?

Yes ----------------------------------------- 1
No ------------------------------------------ 2
(Don’t know) --------------------------------- 3
(Refused) ----------------------------------- 4

IF CODE 1 AT E1a (iii)

E4biv1 Has network involvement impacted on your existing processes?

Please could you give me a score of 1 to 5, where 5 means it has had a ‘very significant impact’ and 1 means it has had ‘no impact at all’ on your existing processes.

1 – No impact at all 1
2 2
3 3
4 4
5 – Very significant impact 5
(Don’t know) 6
(Refused) 7

E4biv2 And did you expect your involvement in the network to impact on your existing processes?

Yes ----------------------------------------- 1
No ------------------------------------------ 2
(Don’t know) --------------------------------- 3
(Refused) ----------------------------------- 4
IF CODE 1 AT E1a (iii)

E4bv1 Has network involvement impacted on your existing products or services?

Please could you give me a score of 1 to 5, where 5 means it has had a ‘very significant impact’ and 1 means it has had ‘no impact at all’ on your existing products or services.

1 – No impact at all
2
3
4
5 – Very significant impact
(Don’t know)
(Refused)

1 2 3 4 5 6 7

CODES 1 TO 5 AT E4bv2

E4bv2 And did you expect your involvement in the network to impact on your existing products or services?

Yes ------------------------------------------ 1
No ------------------------------------------ 2
(Don’t know) ----------------------------- 3
(Refused) ----------------------------- 4
ASK ALL
I now want to talk about any possible negatives or downsides you may have experienced from your time in the network.

ASK ALL
E6b Have you experienced any of the following while involved in this business network?

a) Membership in the network is very costly (in financial terms);
b) Membership in the network takes up too much time;
c) Relationships in the network can be one-sided with other members not willing to share information or resources;
d) There is a lack of trust among members in the network;
e) There is a lack of suitable partners in the network for you to work with;
f) You have concerns about losing control and independence of your business;
g) Other members are not as committed to the network.

Yes, always---------- 1
Yes, sometimes------ 2
No ------------------- 3
(Don’t know) --------- 4
(Refused) ------------ 5

ASK ALL
E6b2 And have you experienced any other downsides to being involved in the network that I haven’t covered?

........................................................................................................................................................................
........................................................................................................................................................................
........................................................................................................................................................................

(None – no others)---- 97
(Don’t know) --------- 98
(Refused)------------ 99
ASK ALL

E6c Did you expect to experience any downsides when you joined this network?

Yes ---------------------------------------------- 1
No ------------------------------------------------- 2
(Don’t know) -------------------------------------- 3
(Refused) ----------------------------------------- 4

ASK ALL

E7a How much time do you dedicate to this network per week?

ADD AS NECESSARY: I just want an estimate of the number of hours you spend.

NOTE: IF RANGE IS GIVEN THEN JUST INPUT MIDPOINT;
ENTER WHOLE NUMBERS OF HOURS.
IF RESPONDENT SAYS IT VARIES FROM WEEK TO WEEK ASK THEM JUST TO ANSWER FOR AN AVERAGE WEEK.

WRITE IN NUMBER OF HOURS

Less than an hour------------------------ 1
Don’t know -------------------------- 2
Refused --------------------------------- 3
IF DON’T KNOW AT E7a

E7b  If you had to estimate the amount of time you dedicate to this network per week, would it roughly be…?

NOTE: IF RESPONDENT SAYS IT VARIES FROM WEEK TO WEEK ASK THEM JUST TO ANSWER FOR AN AVERAGE WEEK

Less than 1 hour --------------- 1
Between 1-5 hours -------------- 2
Between 6-10 hours -------------- 3
Between 11-20 hours -------------- 4
More than 20 hours -------------- 5
(Don’t know) --------------------- 6

IF FIGURE GIVEN AT E7A OR CODES 1-5 AT E7B

E7c And is any of this time spent…?

Attending meetings ............................... 1
Organising events................................. 2
On the telephone to others in the network .... 3
Emailing others in the network ................. 4
Anything else (SPECIFY)......................... 5
(None of these)................................. 6
(Don’t know).................................... 7

ASK ALL

E8a  Have you ever entered a relationship in this network that has been unsuccessful?

Yes -------------------------- 1
No --------------------------- 2
(Don’t know) --------------- 3
(Refused) ------------------- 4
IF CODE 1 AT E8a

E8b And thinking about this unsuccessful relationship(s), which of the following impacts did it have on your business?

Did it prevent your business from collaborating with others in the same timeframe...... 1
Was it costly in financial terms................................................................. 2
Was it time consuming.............................................................................. 3
Did it make you wary of entering other similar relationships..................... 4
Or did it have no impact at all on your business........................................ 5
(Any other impact (SPECIFY)).................................................................. 6
(Don’t know)............................................................................................. 7
(Refused)................................................................................................. 8
SECTION F: Additionality

ASK ALL

F1a Which of the following statements best describes your view on the overall contribution your involvement in the network has made to your business?

ADD AS NECESSARY: By business outcome I mean the overall change in your business activity, in terms of sales, employment, productivity, competitiveness etc.

We would have achieved similar business outcomes anyway ------------ 1
We would have achieved similar business outcomes, but not as quickly -- 2
We would have achieved some but not all of the business outcomes ------ 3
We probably would not have achieved similar business outcomes -------- 4
We definitely would not have achieved similar business outcomes ------- 5
(None of these) --------------------------------------------- 6
(Don’t know) --------------------------------------------- 7
(Refused) --------------------------------------------- 8

IF CODE 3 AT F1a

F1b Roughly what proportion of the business outcomes would you have expected to achieve without being involved in this network?

ADD AS NECESSARY: Please just provide me with your best estimate.

RECORD AS A PERCENTAGE

Write in %

(Don’t know)

(Refused)
ASK IF DON’T KNOW AT F1b

**F1b2** If you had to estimate this proportion, into which of the following bands would it fall?

Less than 20% ----------------------------------------------- 1
20-40% of it ----------------------------------------------- 2
40-60% of it ----------------------------------------------- 3
60-80% of it ----------------------------------------------- 4
More than 80% of it ----------------------------------------- 5
(Would have realised all of it without the network) ------ 6
(Would not have realised any of it without the network)-- 7
(Don’t know) ---------------------------------------------- 8
(Refused) -------------------------------------------------- 9

ASK ALL

**F1c** Thinking about all of the benefits that your business might experience as a result of being involved in this network, would you say that….?

You have already realised the benefits ------------------ 1
You expect to realise all the benefits in the next year ---- 2
You expect to realise them in the next 2 years ---------- 3
In the next 3 years -------------------------------------- 4
In the next 4 years -------------------------------------- 5
In the next 5 years -------------------------------------- 6
Or will it take more than 5 years to fully realise all benefits 7
(No benefits experienced)------------------------------- 8
(Don’t know) ------------------------------------------ 9
(Refused) -------------------------------------------- 10
SECTION G – Governance of the Network and Other Network Involvement

ASK ALL.

G1a Moving on to think about the way in which your network is run, do you think that you have an adequate say in the way the network is run?

Yes ------------------------------------------ 1
No ------------------------------------------- 2
(Don’t know) ---------------------------------- 3
(Refused) ------------------------------------- 4

IF CODE 2 AT G1a

G1c Would you say that any one firm, or group of firms, controls or leads the network?

Yes ------------------------------------------ 1
No ------------------------------------------ 2
(Don’t know) ----------------------------- 3
(Refused) ----------------------------- 4

ASK ALL.

G1b How would you rate the level of influence you have on the overall decision-making of the network?

Please give me a rating on a scale of 1 – 5, where 1 means that you have no influence at all and 5 means that you have a large amount of influence.

No influence at all ------------------ 1
2 ------------------------------------------ 2
3 ------------------------------------------- 3
4 ------------------------------------------- 4
5 A large amount of influence ------- 5
(Don’t know)----------------------------- 6
(Refused) ----------------------------- 7
ASK ALL

G2a Are you a member of any other business network(s)?

Yes ------------------------------------- 1
No ------------------------------------- 2
(Don’t know) --------------------------- 3
(Refused) --------------------------- 4

IF CODE 1 AT G2a

G2b How many other business network(s) are you involved in?

One ------------------------------------ 1
2-3 ------------------------------------ 2
4-5 ------------------------------------ 3
6 to 10 --------------------------------- 4
More than 10 ------------------------- 5
(Don’t know) ------------------------- 6
(Refused) ------------------------- 7

IF CODE 1 AT G2a

G2c What type of other business network(s) are you involved in?

R&D network ----------------------------- 1
Trade network --------------------------- 2
Marketing network ----------------------- 3
Local business network ------------------ 4
Industry specific network --------------- 5
Any other network type (SPECIFY) ------ 6
(Don’t know) -------------------------- 7
(Refused) --------------------------- 8
SECTION H: Business Performance

ASK ALL
I would now like to focus on how your business at this site has developed over the last few years.

ASK ALL
H1a IF VALUE GIVEN AT A4a/b: You mentioned earlier that (NUMBER FROM A4a/b) people are employed (IF SINGLE SITE by your company, IF MULTI-SITE at this site).
Approximately how many people were employed (IF SINGLE SITE by your company, IF MULTI-SITE at this site) in January 2008, so around this time two years ago?

IF DON’T KNOW/REFUSED AT A4a/b: Approximately how many people were employed (IF SINGLE SITE by your company, IF MULTI-SITE at this site) in January 2008, so around this time two years ago?

NOTE AS NECESSARY: Please give me the full time equivalent, so count part time employees according to the proportion of time that they work

REASSURE AS NECESSARY: I am just after your best estimate

WRITE IN TO NEAREST WHOLE NUMBER
(Refused)
(Don’t know)
(Site not in existence two years ago)
IF DON’T KNOW AT H1a

H1b Were there more people employed (IF SINGLE SITE by your company, IF MULTI-SITE at this site) around this time two years ago, less people employed, or about the same number?

More two years ago than now ........................................... 1
Less two years ago than now ............................................ 2
About the same number .................................................... 3
(Don’t know) ..................................................................... 4
(Refused) .......................................................................... 5
(Site not in existence two years ago) ................................. 6

ASK ALL

H2a Moving on now to thinking about your annual turnover.

IF ESTABLISHED MORE THAN A YEAR AGO OR DON’T KNOW/REFUSED AT A5 What is the current annual turnover of your business (IF MULTI-SITE at this site)?

IF ESTABLISHED LESS THAN A YEAR AGO AT A5 What do you anticipate will be the turnover of your business (IF MULTI-SITE at this site) in the first year of trading?

ADD AS NECESSARY By turnover I mean your annual sales, income or receipts;
REASSURE AS NECESSARY: I am just after your best estimate;
ADD AS NECESSARY Please just answer for your Irish business, but include any export sales from Ireland.

WRITE IN AMOUNT IN
(Refused)
(Don’t know) – PROMPT WITH RANGES
H2b If you had to estimate your annual turnover for your last financial year, into which of the following bands would you put it?

ADD AS NECESSARY Please just answer for your Irish business, but include any export sales from Ireland

€100,000 or less ---------------------------------- 1
€100,001- €500,000 ---------------------------------- 2
€500,001 - €2million ---------------------------------- 3
€2million - €10million -------------------------------- 4
€10million - €50million ------------------------------ 5
€50million + -------------------------------------- 6
(Don’t know) --------------------------------------- 7
(Refused) ------------------------------------------ 8

ASK ALL WITH SOME FOREIGN OWNERSHIP (IF CODES 2-3 AT A1a)

H2c Approximately what proportion of these sales are to other group companies or sites?

REASSURE AS NECESSARY: I am just after your best estimate

WRITE IN PERCENTAGE
(Don’t know) - PROMPT WITH BANDS
(Refused)
IF DON’T KNOW AT H2c

H2d If you had to estimate this proportion, into which of the following bands would you place it?

- Zero/nothing .......................... 1
- Up to 10% ............................. 2
- 11-20% .................................. 3
- 21-30% .................................. 4
- More than 30% ............................ 5
- (Don’t know) ............................. 6
- (Refused) ................................... 7

ASK ALL

H3a Approximately what proportion of your current turnover is accounted for by purchased inputs?

AS NECESSARY: By purchased inputs I mean everything that you buy into the company, so basically everything except your labour costs.

REASSURE AS NECESSARY: I am just after your best estimate

WRITE IN PERCENTAGE

(Don’t know) - PROMPT WITH BANDS

(Refused)

IF DON’T KNOW AT H3a

H3b If you had to estimate this proportion, into which of the following bands would you place it?

- Zero/nothing ................................................. 1
- Up to 10% ................................................. 2
- 11-20% ..................................................... 3
- 21-30% ..................................................... 4
- More than 30% .......................................... 5
- (Don’t know) .......................................... 6
- (Refused) ............................................. 7
ASK ALL EXCEPT NOT IN EXISTENCE TWO YEARS AGO AT A5 OR (CODE 6 AT H1a/b) OR (CODE 6 AT H4b)

**H4a** What was the annual turnover of your business (IF MULTI-SITE at this site) in January 2008, so around this time **two years ago**?

**REASSURE AS NECESSARY:** *I am just after your best estimate*  

**ADD AS NECESSARY** By turnover I mean your annual sales, income or receipts;  

**REASSURE AS NECESSARY:** *I am just after your best estimate;*  

**ADD AS NECESSARY** Please just answer for your Irish business, but include any export sales from Ireland.

**WRITE IN AMOUNT**  
(Refused)  
(Don’t know)

**IF DON’T KNOW AT H4a**

**H4b** Would you say that the annual turnover of your business (IF MULTI-SITE at this site) was higher **two years ago** (in January 2008) than this year, lower, or about the same?

Higher two years ago than this year ...................... 1  
Lower two years ago than this year ...................... 2  
About the same ..................................................... 3  
(Don’t know).......................................................... 4  
(Refused)................................................................. 5  
(Site not in existence two years ago) ..................... 6
ASK ALL EXCEPT NOT IN EXISTENCE TWO YEARS AGO AT A5 OR (CODE 6 AT H1a/b) OR (CODE 6 AT H4b)

**H5a**  IF VALUE GIVEN AT H3: You mentioned earlier that around ( % FROM H3a/b) of your current turnover is accounted for by purchased inputs. Has this proportion changed at all in the last two years (so since January 2008)?

IF DON’T KNOW/REFUSED AT H3a/b: Can I just check, has the proportion of your sales accounted for by purchased inputs changed at all in the last 2 years (so since January 2008)?

Yes ........................................................................................... 1
No............................................................................................. 2
(Don’t know).................................................................................. 3
(Refused)........................................................................................ 4

IF YES AT H5a

**H5b**  What was it in January 2008, so around two years ago?

AS NECESSARY: The proportion of your sales accounted for by purchased inputs;
REASSURE AS NECESSARY: I am just after your best estimate

WRITE IN PERCENTAGE

(Don’t know)
(Refused)
H5c  Around January 2008, was the proportion of your sales accounted for by purchased inputs higher than it is now, lower, or about the same?

Higher in 2008 than now ............................................. 1
Lower in 2008 than now ............................................. 2
About the same .......................................................... 3
(Don’t know) .............................................................. 4
(Refused) ................................................................. 5
SECTION I: Main Partner/Managing Director

This is the final section and I just want to ask a few questions about the main partner/managing director of the business.

I1 Are you the main partner or managing director in this business?

Yes ------------------------- 1
No -------------------------- 2
(Don’t know) --------------  3
(Refused) ------------------ 4

TEXT IF NOT MAIN PARTNER/MD (CODE 2 at I1)

For the following questions I’d like you to answer, to the best of your knowledge, about the main partner or managing director. If you’re not sure of the answer just let me know and I’ll move on to the next question.

NOTE: IF MORE THAN ONE MAIN PARTNER OR MANAGING DIRECTOR ASK RESPONDENT TO ANSWER ABOUT THE ONE THEY KNOW BEST.

I2 IF CODE 1 AT I1 ‘Do you’/IF CODE 2-4 AT I1: ‘Does the main partner or managing director) hold more than 20% of the equity in this firm?

Yes ------------------------- 1
No -------------------------- 2
Don’t know ------------------ 3
Refused --------------------- 4
I3  Is this the only business with which (IF CODE 1 AT I1 you are/ IF CODE 2-4 AT I1: they are) currently involved in any capacity?

<table>
<thead>
<tr>
<th>Option</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
</tr>
<tr>
<td>Don’t know</td>
<td>3</td>
</tr>
<tr>
<td>Refused</td>
<td>4</td>
</tr>
</tbody>
</table>
I6a  Have (IF CODE 1 AT I1: you / IF CODES 2-4 AT I1: they) been involved in starting any other businesses apart from this one?

Yes --------------------------- 1
No --------------------------- 2
(Don’t know) ------------------- 3
(Refused) --------------------- 4

IF CODE 1 AT I6a

I6b  How many?

Just one other company --------------------------- 1
Two or three other companies ------------------- 2
More than three other companies --------------- 3
(Don’t know) ----------------------------------- 4
(Refused) ----------------------------------- 5

I7  (IF CODE 1 AT I1 Would you / IF CODES 2-4 AT I1: To the best of your knowledge, would your main partner or managing director) be willing to issue equity and dilute (IF CODE 1 AT I1 your / IF CODES 2-4 AT I1: their) own ownership of the business to improve its long term business performance?

Yes ----------------------------------------- 1
No ------------------------------------------ 2
(Don’t know) ----------------------------- 3
(Refused) ----------------------- 4
SECTION J: Wrap-Up

ASK ALL

That is the end of the interview, thank you very much for taking part. I just need to check a few things before you go.

ASK ALL

J1 Firstly would you be willing to take part in any future research on this topic?

Yes ------------------------------------  1
No ------------------------------------  2
(Don’t know) ---------------------------  3

J2 And finally may I take note of your name?

Standard Thanks & Close
Appendix B: Questionnaire to Control Firms

SECTION A – INTRO/SCREENERS

ASK ALL

Good morning/afternoon, my name is Nicola Lynch and I’m calling from the Graduate Centre of Business at the Kemmy Business School, University of Limerick.

IF NAMED CONTACT ON SAMPLE

Could I please speak to (NAME FROM SAMPLE)?

- IF NAMED CONTACT NOT AVAILABLE: Could I speak to either the owner, or managing director?

IF NO NAMED CONTACT ON SAMPLE

Please can I speak to the owner, or managing director?

ASK ALL

I am a PhD student from the University of Limerick and I am hoping to speak to firms about their business performance as part of a research project I am undertaking in the Business School. It will take around 10 minutes depending on your answers. Is it convenient to speak to you now or would you prefer to make an appointment for another time?

- This research will cover areas such as your business performance and strategy that your business may engage in.
- All of the answers you give are strictly confidential and anonymous. Participation in this survey is voluntary.
- The responses of all organisations taking part will be combined into a report.
- Your organisation was selected at random from a list I have collated of all businesses in Ireland.
SECTION S: SCREENING

ASK ALL

S1. So, firstly can I just ask, are you involved in any of the following formal business networks...?

- An R&D network --------------------------------- 1 - CLOSE
- A trade network --------------------------------- 2 - CLOSE
- A marketing/branding network ------------------ 3 - CLOSE
- Or a purchasing network ---------------------- 4 - CLOSE
- None of these --------------------------------- 5 - CONTINUE
- (Don’t know) ----------------------------------- 6

If Codes 1-4 in S1 then finish call; Otherwise continue.
SECTION A: BUSINESS PROFILE

ASK ALL
I’d like to start by getting some information on the background of your business
and its organisational structure.

ASK ALL
A1a So firstly, is the business Irish owned or foreign owned?
- Irish-owned ------------------------------------------ 1
- Foreign-owned -------------------------------------- 2
- (Joint Irish and foreign owned) ---------------------- 3
- (Don’t know) --------------------------------------- 4

IF SOME FOREIGN OWNERSHIP (CODES 2 OR 3 AT A1a)
A1b What country is the parent company based in?

- (Don’t know).............................................................. 2

ASK ALL
A2 Is your business …?
- A single site organisation --------------------------- 1
- Or, part of a multiple-site organisation -------------- 2
- (Don’t know) ---------------------------------------- 3
ASK ALL

**A3a What is the main business activity carried out at this site?**

ADD AS NECESSARY **What does it make, or what service does it provide?**

| A | – Agriculture, forestry or hunting | 1 |
| B | – Fishing | 2 |
| C | – Mining & quarrying | 3 |
| D | – Manufacturing |
|   | • Manufacture of food products, beverages and tobacco | 4 |
|   | • Manufacture of textiles and textile products | 5 |
|   | • Manufacture of leather and leather products | 6 |
|   | • Manufacture of wood and wood products | 7 |
|   | • Manufacture of pulp, paper and paper products; publishing and printing | 8 |
|   | • Manufacture of coke, refined petroleum products and nuclear fuel | 9 |
|   | • Manufacture of chemicals, chemical products and man-made fibre | 10 |
|   | • Manufacture of rubber and plastic products | 11 |
|   | • Manufacture of other non-metallic mineral products | 12 |
|   | • Manufacture of basic metals and fabricated metal products | 13 |
|   | • Manufacture of machinery and equipment n.e.c. | 14 |
|   | • Manufacture of electrical and optical equipment | 15 |
|   | • Manufacture of transport equipment | 16 |
|   | • Manufacturing n.e.c. | 17 |
| E | – Electricity, gas & water supply | 18 |
| F | – Construction | 19 |
| G | – Wholesale, retail & certain repair | 20 |
| H | – Hotels & restaurants | 21 |
| I | – Transport, storage or communication | 22 |
| J | – Finance | 23 |
| K | – Real estate, renting or business activities | 24 |
| L | – Public administration & defence | 25 |
| M | – Education | 26 |
| N | – Health & social work | 27 |
O – Community, social & personal services................................. 28
P – Private households with employees.................................... 29
Q – Extra territorial organisations........................................... 30
Other (SPECIFY)........................................................................ 31

IF MULTIPLE SITE ORGANISATION (CODE 2 AT A2)

A3b Is this also the main activity of the organisation as a whole?

Yes ----------------------------------------------- 1
No ----------------------------------------------- 2
(Don’t know) ---------------------------------------- 3
A3c What is the main business activity of the organisation as a whole?

ADD AS NECESSARY What does it make, or what service does it provide?

A – Agriculture, forestry or hunting ............................................. 1
B – Fishing ....................................................................................... 2
C – Mining & quarrying ................................................................. 3
D – Manufacturing
  • Manufacture of food products, beverages and tobacco .................. 4
  • Manufacture of textiles and textile products .................................. 5
  • Manufacture of leather and leather products .................................. 6
  • Manufacture of wood and wood products ...................................... 7
  • Manufacture of pulp, paper and paper products; publishing and printing 8
  • Manufacture of coke, refined petroleum products and nuclear fuel ...... 9
  • Manufacture of chemicals, chemical products and man-made fibres ..... 10
  • Manufacture of rubber and plastic products .................................. 11
  • Manufacture of other non-metallic mineral products ..................... 12
  • Manufacture of basic metals and fabricated metal products .............. 13
  • Manufacture of machinery and equipment n.e.c ........................... 14
  • Manufacture of electrical and optical equipment ............................ 15
  • Manufacture of transport equipment ............................................. 16
  • Manufacturing n.e.c ...................................................................... 17
E – Electricity, gas & water supply ................................................. 18
F – Construction .............................................................................. 19
G – Wholesale, retail & certain repair ............................................. 20
H – Hotels & restaurants ................................................................. 21
I – Transport, storage or communication ......................................... 22
J – Finance ...................................................................................... 23
K – Real estate, renting or business activities ..................................... 24
L – Public administration & defence ............................................... 25
M – Education ................................................................................. 26
N – Health & social work ............................................................... 27
ASK ALL

A4a (IF MULTIPLE SITE ORGANISATION (CODE 2 AT A2) Thinking now just about the site at which you work) How many people are currently employed by your business at this site?

Please give me the full time equivalent, so count part time employees according to the proportion of time that they work.

WRITE IN NUMBER (ROUND TO NEAREST WHOLE NUMBER)
(Refused)
(Don’t know) – PROMPT WITH RANGES

IF DON’T KNOW AT A4a

A4b If you had to estimate, approximately how many people are employed by your business at this site?

Zero........................................................................................................ 1
1-10........................................................................................................ 2
11-24.................................................................................................... 3
25-49.................................................................................................... 4
50-99.................................................................................................... 5
100-249............................................................................................... 6
250+..................................................................................................... 7
(Don’t know)...................................................................................... 8
(Refused)........................................................................................... 9
ASK ALL

A5 How long ago was your business established?

ADD AS NECESSARY: This means when the business started trading.
ADD AS NECESSARY This means the business in its current form.
ADD AS NECESSARY: This means the business at this site.

Within the last year ----------------------------------------- 1
Over 1, up to 2 years ago ----------------------------------- 2
Over 2, up to 3 years ago ------------------------------------ 3
Over 3, up to 4 years ago ------------------------------------ 4
Over 4, up to 5 years ago ------------------------------------ 5
Over 5, up to 10 years ago ---------------------------------- 6
Over 10, up to 20 years ago --------------------------------- 7
Over 20 years ago ------------------------------------------- 8
(Don’t know) ------------------------------------------------ 9
(Refused) ----------------------------------------------------- 10

IF MULTIPLE SITE ORGANISATION (CODE 2 AT A2)

A6 Can I just ask, is the site at which you work …?

The headquarters of your organisation -------------------- 1
A franchise ----------------------------------------------- 2
A wholly-owned subsidiary of a foreign firm ---------- 3
A wholly-owned subsidiary of an Irish firm ----------- 4
A joint venture with other foreign firms ------------- 5
A joint venture with Irish firms ---------------------- 6
Or something else (SPECIFY) -------------------------- 7
(Don’t know) ------------------------------------------- 8
IF CODES 2-8 AT A6

A7 Where is the head office of your organisation located?
ADD AS NECESSARY: And by that I mean the location where significant business decisions are made for your site (e.g. sourcing, new products and processes, tactical and strategic decision making)?

<table>
<thead>
<tr>
<th>Location</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elsewhere in (REGION)</td>
<td>1</td>
</tr>
<tr>
<td>Elsewhere in Ireland (but not in your region)</td>
<td>2</td>
</tr>
<tr>
<td>In Northern Ireland</td>
<td>3</td>
</tr>
<tr>
<td>Overseas (write in country)</td>
<td>4</td>
</tr>
<tr>
<td>(This is the head office)</td>
<td>5</td>
</tr>
<tr>
<td>(Don’t know)</td>
<td>6</td>
</tr>
</tbody>
</table>

ASK ALL

A8 Is the business (IF SOME FOREIGN OWNERSHIP (CODES 2 OR 3 AT A1a) in Ireland) a … ?

<table>
<thead>
<tr>
<th>Type</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sole trader</td>
<td>1</td>
</tr>
<tr>
<td>A partnership</td>
<td>2</td>
</tr>
<tr>
<td>A limited company (Ltd)</td>
<td>3</td>
</tr>
<tr>
<td>A public limited company (Plc)</td>
<td>4</td>
</tr>
<tr>
<td>(Or, something else (SPECIFY))</td>
<td>5</td>
</tr>
<tr>
<td>(Don’t know)</td>
<td>6</td>
</tr>
</tbody>
</table>
SECTION B: Markets, Local Linkages & R&D Activity

ASK ALL
I would now like to ask you some questions about the markets in which you sell your goods and services.

ASK ALL
B1 So firstly, to which of the following markets or locations does (IF SINGLE SITE (CODES 1 OR 3 AT A2) your business/IF MULTI-SITE (CODE 2 AT A2) this site) sell to? Do you sell to...?

1. Customers within 30km of your site .................................................................
2. Customers elsewhere in (REGION) (excluding local) ........................................
3. Customers based elsewhere in the Republic of Ireland (excluding local and region)
4. Customers in Northern Ireland ...........................................................................
5. Customers based overseas ...................................................................................
6. (None of these/no sales) ....................................................................................
7. (Don’t know) ...................................................................................................
8. (Refused) ...........................................................................................................

B2 Please can you tell me the approximate percentage of (IF SINGLE SITE (CODES 1 OR 3 AT A2) your business’/IF MULTI-SITE (CODE 2 AT A2) this site’s) sales that each of these markets accounts for? Please just give me your best estimate and make sure that the total adds up to 100%. So firstly, what proportion of your sales go to...?

ADD AS NECESSARY I just need your best estimate
(a) Local, within 30km from your site  
(b) (REGION) (excluding local)  
(c) The Republic of Ireland (excluding local and regional)  
(d) Northern Ireland  
(e) Overseas countries  
   Write in %  
   (Refused)  
   (Don’t know) 

**ASK ALL**  
I’d now like you to think about all of your purchased inputs. By that I mean everything that you buy in to the company, so basically everything except labour costs.  

**ASK ALL**  
**B3a Are your purchased inputs sourced from …?**  
(IF CODE 2 AT A2) Other parts of your parent company  
--------------------------------  1  
Local suppliers, within 30km of your site  
--------------------------------  2  
Suppliers based elsewhere in (REGION) (excluding local)  
-----  3  
Suppliers based elsewhere in Ireland (excluding (REGION))  
--------  4  
Suppliers based in Northern Ireland  
-------------------------------------  5  
Suppliers based overseas  
-------------------------------------  6  
(Don’t know)  
-------------------------------------  7  
(Refused)  
-------------------------------------  8
B3b What percentage of your purchased inputs are sourced from …?

ADD AS NECESSARY I just need your best estimate

(a) Other parts of your parent company
(b) Local suppliers, within 30km from your site
(c) Suppliers based elsewhere in (REGION) (excluding local)
(d) Suppliers based elsewhere in the Republic of Ireland (excluding local and regional)
(e) Suppliers based in Northern Ireland
(f) Suppliers based overseas

Write in % (Refused)
(Don’t know)

ASK ALL
I would now like to ask you some questions about any new products or services that you may have introduced.

B4a Have you introduced any new products or services (A5 Codes 1 to 4 over the last four years / A5 codes 5 -10 since you began your business)?

Yes --------------------------------- 1
No --------------------------------- 2
(Don’t know)------------------------ 3
(Refused)------------------------- 4
**IF CODE1 AT B4a**

**B4b** And are these new products or services...?

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Just new to your business</td>
<td>1</td>
</tr>
<tr>
<td>New to your industry or sector</td>
<td>2</td>
</tr>
<tr>
<td>Completely new to the world</td>
<td>3</td>
</tr>
<tr>
<td>(Or are some just new to the business and some are completely new)</td>
<td>4</td>
</tr>
<tr>
<td>(Don’t know)</td>
<td>5</td>
</tr>
<tr>
<td>(Refused)</td>
<td>6</td>
</tr>
</tbody>
</table>

**ASK ALL**

**B5a** Does your firm conduct any in-house new product or service development activity or R&D activity?

ADD AS NECESSARY: By this I mean developing new products, services or processes or improving existing ones

ADD AS NECESSARY: By in-house I mean new product or service development conducted by your own staff rather than commissioning someone external to do it.

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
</tr>
<tr>
<td>(Don’t know)</td>
<td>3</td>
</tr>
<tr>
<td>(Refused)</td>
<td>4</td>
</tr>
</tbody>
</table>
B5b Approximately how many of your employees are engaged either wholly or partially in?

Zero .................................................................  1
One .................................................................  2
2-4 .................................................................  3
5-10 .................................................................  4
11-24 .................................................................  5
25-49 .................................................................  6
50-99 .................................................................  7
100-249 .............................................................  8
250+ .................................................................  9
(Don’t know) .....................................................  10
(Refused) .........................................................  11

ASK ALL

B6a And in the last year have you commissioned anyone external to your business to conduct any new product or service development activity for you?

Yes ---------------------------------- 1
No ----------------------------------- 2
(Don’t know) ------------------------ 3
SECTION C: Business Performance

ASK ALL
I would now like to focus on how your business at this site has developed over the last few years.

ASK ALL
C1a You mentioned earlier that (A4a/b) people are employed (IF SINGLE SITE (CODE 1 OR 3 AT A2) by your company, IF MULTI-SITE (CODE 2 AT A2) at this site).

Approximately how many people were employed (IF SINGLE SITE (CODE 1 OR 3 AT A2) by your company, IF MULTI-SITE (CODE 2 AT A2) at this site) in January 2008, so around this time two years ago?

IF DON’T KNOW/REFUSED AT A4a/b: Approximately how many people were employed (IF SINGLE SITE (CODE 1 OR 3 AT A2) by your company, IF MULTI-SITE (CODE 2 AT A2) at this site) in January 2008, so around this time two years ago?

Additional: Please give me the full time equivalent, so count part time employees according to the proportion of time that they work

REASSURE AS NECESSARY: I am just after your best estimate

WRITE IN TO NEAREST WHOLE NUMBER
(Refused)
(Don’t know)
(Site not in existence two years ago)
IF DON’T KNOW AT C1a

C1b  Were there more people employed (IF SINGLE SITE (IF CODE 1 OR 3 AT A2) by your company, IF MULTI-SITE (IF CODE 2 AT A2) at this site) around this time two years ago, less people employed, or about the same number?

More two years ago than now .................................  1
Less two years ago than now ..................................  2
About the same number ...........................................  3
(Don’t know).........................................................  4
(Refused)............................................................  5
(Site not in existence two years ago) .......................  6

ASK ALL

C2a  Moving on now to thinking about your annual turnover.

IF ESTABLISHED MORE THAN A YEAR AGO OR DON’T KNOW/REFUSED AT A5 What is the current annual turnover of your business (IF MULTI-SITE (CODE 2 AT A2) at this site)?

IF ESTABLISHED LESS THAN A YEAR AGO AT A5 What do you anticipate will be the turnover of your business (IF MULTI-SITE (CODE 2 AT A2) at this site) in the first year of trading?

ADD AS NECESSARY By turnover I mean your annual sales, income or receipts
REASSURE AS NECESSARY: I am just after your best estimate
ADD AS NECESSARY Please just answer for your Irish business, but include any export sales from Ireland

WRITE IN AMOUNT
(Refused)
(Don’t know) – PROMPT WITH RANGES
IF DON’T KNOW AT C2a

C2b If you had to estimate your annual turnover for your last financial year, into which of the following bands would you put it?

ADD AS NECESSARY Please just answer for your Irish business, but include any export sales from Ireland

- €100,000 or less
- €100,001 - €500,000
- €500,001 - €2 million
- €2 million - €10 million
- €10 million - €50 million
- €50 million +
- (Don’t know)
- (Refused)

ASK ALL WITH SOME FOREIGN OWNERSHIP (IF CODES 2-3 AT A1a)

C2c Approximately what proportion of these sales are to other group companies or sites?

REASSURE AS NECESSARY: I am just after your best estimate

WRITE IN PERCENTAGE

(Don’t know) - PROMPT WITH BANDS

(Refused)

IF DON’T KNOW AT C2c

C2d If you had to estimate this proportion, into which of the following bands would you place it?

- Zero/nothing
- Up to 10%
- 11-20%
- 21-30%
- More than 30%
- (Don’t know)
- (Refused)
ASK ALL

C3a  Approximately what proportion of your current turnover is accounted for by purchased inputs?

AS NECESSARY  By purchased inputs I mean everything that you buy in to the company, so basically everything except your labour costs.

REASSURE AS NECESSARY: I am just after your best estimate

WRITE IN PERCENTAGE
(Don’t know) - PROMPT WITH BANDS
(Refused)

IF DON’T KNOW AT C3a

C3b  If you had to estimate this proportion, into which of the following bands would you place it?

Zero/nothing................................................................. 1
Up to 10% ........................................................................ 2
11-20% ........................................................................... 3
21-30% ........................................................................... 4
More than 30% .............................................................. 5
(Don’t know)................................................................. 6
(Refused) ....................................................................... 7

ASK ALL EXCEPT NOT IN EXISTENCE TWO YEARS AGO AT A5 OR
(CODE 6 AT C1a/b) OR (CODE 6 AT C4b)
C4a  What was the annual turnover of your business (IF MULTI-SITE (CODE 2 AT A2) at this site) in January 2008, so around this time two years ago?

REASSURE AS NECESSARY: I am just after your best estimate

ADD AS NECESSARY By turnover I mean your annual sales, income or receipts

REASSURE AS NECESSARY: I am just after your best estimate

ADD AS NECESSARY Please just answer for your Irish business, but include any export sales from Ireland

WRITE IN AMOUNT
(Refused)
(Don’t know)

IF DON’T KNOW AT C4a

C4b  Would you say that the annual turnover of your business (IF MULTI-SITE (CODE 2 AT A2) at this site) was higher two years ago (in January 2008) than this year, lower, or about the same?

Higher two years ago than this year..................................... 1
Lower two years ago than this year ..................................... 2
About the same .................................................................... 3
(Don’t know)............................................................................. 4
(Refused)............................................................................... 5
(Site not in existence two years ago) ................................. 6

ASK ALL EXCEPT NOT IN EXISTENCE TWO YEARS AGO AT A5 OR (CODE 6 AT C1a/b) OR (CODE 6 AT C4b)

C5a  IF VALUE GIVEN AT E3: You mentioned earlier that around (% FROM C3a/b) of your current turnover is accounted for by purchased inputs. Has this proportion changed at all in the last two years (so since January 2008)?
IF DON’T KNOW/REFUSED AT C3a/b: Can I just check, has the proportion of your sales accounted for by purchased inputs changed at all in the last 2 years (so since January 2008)?

Yes .............................................................................................................. 1
No............................................................................................................. 2
(Don’t know)......................................................................................... 3
(Refused).............................................................................................. 4

IF YES AT C5a
C5b What was it in January 2008, so around two years ago?

AS NECESSARY The proportion of your sales accounted for by purchased inputs
REASSURE AS NECESSARY: I am just after your best estimate

WRITE IN PERCENTAGE
(Don’t know)
(Refused)

IF DON’T KNOW AT C5b
C5c Around January 2008, was the proportion of your sales accounted for by purchased inputs higher than it is now, lower, or about the same?

Higher in 2008 than now................................................................. 1
Lower in 2008 than now ................................................................. 2
About the same ............................................................................... 3
(Don’t know)......................................................................................... 4
(Refused).............................................................................................. 5
SECTION D: Main Partner/Managing Director

This is the final section and I just want to ask a few questions about the main partner/managing director of the business.

D1 Are you the main partner or managing director in this business?
NOTE: If respondent is an equal partner in the business code YES
Yes -------------------------------- 1
No --------------------------------- 2
(Don’t know) ---------------------- 3
(Refused) ------------------------ 4

TEXT IF NOT MAIN PARTNER/MD (CODE 2 at D1)
For the following questions I’d like you to answer, to the best of you knowledge, about the main partner or managing director. If you’re not sure of the answer just let me know and I’ll move on to the next question.

NOTE: IF MORE THAN ONE MAIN PARTNER OR MANAGING DIRECTOR ASK RESPONDENT TO ANSWER ABOUT THE ONE THEY KNOW BEST.

ASK IF IRISH OWNED SINGLE SITE ONLY (CODE 1 AT A1a AND (CODE 1 AT A2))
D2 (IF CODE 1 AT D1 ‘Do you’/IF CODE 2-4 AT D1: ‘Does the main partner or managing director) hold more than 20% of the equity in this firm?
Yes ----------------------------- 1
No ------------------------------ 2
Don’t know --------------------- 3
Refused ------------------------ 4
ASK IF IRISH OWNED SINGLE SITE ONLY (CODE 1 AT A1a AND (CODE 1
AT A2))

D3 **Is this the only business with which** (IF CODE 1 AT D1 **you are**/ IF CODE
2-4 AT D1: **they are**) currently involved in any capacity?

- Yes ------------------------ 1
- No ------------------------ 2
- Don’t know --------------- 3
- Refused ------------------- 4

D4 **What is the highest level of qualification** (IF CODE 1 AT D1: **that you hold**
/ IF CODE 2-4 AT D1) **that they holds**?

- PhD ------------------------------------------ 1
- Masters degree or other higher degree (MA, MSc, MBA)--- 2
- A degree (e.g. BA/BSc)--------------------------------- 3
- Diploma or Certificate -------------------------- 4
- Leaving Certificate (or equivalent, e.g. A-Level) ------- 5
- Junior Certificate (or equivalent) (Old Inter-Certificate, GCSE’s, CSE’s) 6
- Other (Specify) --------------------------------- 7
- None ------------------------------------------ 8
- (Don’t know) ----------------------------------- 9
- (Refused) ------------------------------------- 10

D5 **And which of the following age bands do** (IF CODE 1 AT D1: **you**/ IF
CODES 2-4 AT D1: **they**) **fall in to**?

- Under 25 ------------------------------- 1
- 25-34 ----------------------------------- 2
- 35-44 ----------------------------------- 3
- 45-54 ----------------------------------- 4
- 55-64 ----------------------------------- 5
- 65 and over ---------------------------- 6
- (Don’t know) ---------------------------- 7
- (Refused) ----------------------------- 8
D6a  Have (IF CODE 1 AT D1: you / IF CODES 2-4 AT D1: they) been involved in starting any other businesses apart from this one?

<table>
<thead>
<tr>
<th>Choice</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
</tr>
<tr>
<td>(Don’t know)</td>
<td>3</td>
</tr>
<tr>
<td>(Refused)</td>
<td>4</td>
</tr>
</tbody>
</table>

IF CODE 1 AT D6a

D6b  How many?

<table>
<thead>
<tr>
<th>Choice</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Just one other company</td>
<td>1</td>
</tr>
<tr>
<td>Two or three other companies</td>
<td>2</td>
</tr>
<tr>
<td>More than three other companies</td>
<td>3</td>
</tr>
<tr>
<td>(Don’t know)</td>
<td>4</td>
</tr>
<tr>
<td>(Refused)</td>
<td>5</td>
</tr>
</tbody>
</table>

ASK IF IRISH OWNED SINGLE SITE ONLY (CODE 1 AT A1a AND (CODE 1 AT A2))

D7  (IF CODE 1 AT D1 Would you / IF CODES 2-4 AT D1: To the best of your knowledge, would your main partner or managing director) be willing to issue equity and dilute (IF CODE 1 AT F1 your / IF CODES 2-4 AT F1: their) own ownership of the business to improve its long term business performance?

<table>
<thead>
<tr>
<th>Choice</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
</tr>
<tr>
<td>(Don’t know)</td>
<td>3</td>
</tr>
<tr>
<td>(Refused)</td>
<td>4</td>
</tr>
</tbody>
</table>
SECTION E: Wrap-Up

ASK ALL

That is the end of the interview, thank you very much for taking part. I just need to check a few things before you go.

ASK ALL

E1 Firstly would you be willing to take part in any future research on this topic?

Yes ----------------------------- 1
No ------------------------------ 2
(Don’t know) --------------------- 3

E2 And finally may I take note of your name?

Standard Thanks & Close
Appendix C: Outcome Growth Models: Turnover and Productivity

As outlined in the main body of this thesis (Section 7.5.1), OLS regressions were also run for turnover and productivity growth of the sample firms. Both models were not significant and so they were not reported in the main body. The results of the turnover and productivity growth models are however now presented in Tables A and B respectively\textsuperscript{50}. Firm growth in both models is estimated based on firm and MD characteristics, while a dichotomous variable of whether a firm is in a business network or not, is also included. Heckman two-step model could not be applied to these models, so in both of these models, the growth of the firms is estimated, while controlling for firm and MD characteristics. A brief discussion of the results are presented below; although, given that selection effects are not controlled for in either of these models, the results should be read with caution.

OLS regressions estimating the impact business networks have on turnover growth are presented in Table A. This table presents the results for both the full model and the backward stepwise regression results. Results of the productivity growth model are subsequently presented in Table B (full model and backward stepwise regression model).

As is evident from Table A, turnover growth is lower for those firms that produce goods or services that are new to their sector or that are completely new to the world. This result may again refer to the timeframe incorporated in the model. If producing a good or service that is new to the sector/world, then this may incur a timeframe longer than that allowed for in the model, and hence the result produced. Similar to the employment growth model, those firms who source their products regionally experience higher growth rates. The firm’s surrounding market, in terms of where they source their supplies from is shown to have a positive impact on the turnover growth of the firm. Hence, a firm being able to source the supplies they need in a timely manner, as well as having the resources they need close by, have a positive impact on firm growth.

\textsuperscript{50} The Heckman two-step model was not applied to either of these models because both models are statistically insignificant.
Table A: Estimating the impact of business networks on turnover growth

<table>
<thead>
<tr>
<th></th>
<th>Turnover</th>
<th>Backward Stepwise Regression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>15.517 (.138)***</td>
<td>15.498 (.078)***</td>
</tr>
<tr>
<td>Size</td>
<td>.050 (.039)</td>
<td></td>
</tr>
<tr>
<td>Age:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Established</td>
<td>-.163 (.154)</td>
<td></td>
</tr>
<tr>
<td>Well established</td>
<td>-.301 (.146)</td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>.210 (.153)</td>
<td></td>
</tr>
<tr>
<td>Manufacturing</td>
<td>.153 (.102)</td>
<td></td>
</tr>
<tr>
<td>Innovator:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td>-.075 (.074)</td>
<td></td>
</tr>
<tr>
<td>Outside business</td>
<td>-.181 (.108)*</td>
<td></td>
</tr>
<tr>
<td>Sell locally</td>
<td>.113 (.117)</td>
<td></td>
</tr>
<tr>
<td>Sell to others regionally</td>
<td>-.075 (.107)</td>
<td></td>
</tr>
<tr>
<td>Sell to others in Ireland</td>
<td>-.141 (.135)</td>
<td>-.160 (.082)*</td>
</tr>
<tr>
<td>Sells to others outside of Ireland</td>
<td>-.065 (.100)</td>
<td></td>
</tr>
<tr>
<td>Source locally</td>
<td>-.024 (.095)</td>
<td></td>
</tr>
<tr>
<td>Source regionally</td>
<td>.280 (.159)*</td>
<td>.201 (.089)**</td>
</tr>
<tr>
<td>Source nationally</td>
<td>-.127 (.104)</td>
<td></td>
</tr>
<tr>
<td>Source internationally</td>
<td>-.082 (.080)</td>
<td></td>
</tr>
<tr>
<td>MD Only Business</td>
<td>-.189 (.136)</td>
<td></td>
</tr>
<tr>
<td>MD Other Business</td>
<td>-.007 (.100)</td>
<td></td>
</tr>
<tr>
<td>Business Network</td>
<td>.198 (.275)</td>
<td></td>
</tr>
<tr>
<td>Number of observations</td>
<td>88</td>
<td>88</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.2538</td>
<td>.0769</td>
</tr>
<tr>
<td>F-test</td>
<td>3.814</td>
<td>2.75*</td>
</tr>
</tbody>
</table>

*significant at 0.10 level; ** significant at 0.05 level; *** significant at 0.01 level.

Note: Robust standard errors are given in the parentheses.
In terms of productivity growth, as presented in Table B below, the only statistically significant variable that impacts on firm productivity growth, relates to a firm sourcing their supplies from overseas. In other words, firms who source their supplies from international suppliers have higher productivity growth. Productivity here is a measure of turnover per employee. One possible explanation for why this relationship occurs relates to the price of the firm’s product. Firms who source their supplies abroad may be doing so because the supplies they require are cheaper on the international market. This reduction in production costs may then be reflected in the price the customers see on the market, hence an increase in turnover for the firms. It must be further reiterated however, that given the low levels of significance for both of the models here, and because selection effects are not controlled for, the results should be interpreted with caution.

**Table B: Estimating the impact of business networks on productivity growth**

<table>
<thead>
<tr>
<th>Productivity</th>
<th>Backward Stepwise Regression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>12.924 (.118)*** 12.959 (.058)***</td>
</tr>
<tr>
<td>Size</td>
<td>-.028 (.066)</td>
</tr>
<tr>
<td>Age:</td>
<td></td>
</tr>
<tr>
<td>Established</td>
<td>-.062 (.070)</td>
</tr>
<tr>
<td>Well established</td>
<td>.068 (.093)</td>
</tr>
<tr>
<td>Urban</td>
<td>-.028 (.066)</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>-.022 (.089)</td>
</tr>
<tr>
<td>Innovator:</td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td>.054 (.065)</td>
</tr>
<tr>
<td>Outside business</td>
<td>.113 (.073)</td>
</tr>
<tr>
<td>Sell locally</td>
<td>-.004 (.095)</td>
</tr>
<tr>
<td>Sell to others regionally</td>
<td>-.091 (.118)</td>
</tr>
<tr>
<td>Sell to others in Ireland</td>
<td>.064 (.095)</td>
</tr>
<tr>
<td>Sells to others outside of Ireland</td>
<td>-.004 (.043)</td>
</tr>
<tr>
<td>Source locally</td>
<td>-.036 (.051)</td>
</tr>
<tr>
<td>Source regionally</td>
<td>-.046 (.057)</td>
</tr>
<tr>
<td>Source nationally</td>
<td>.071 (.107)</td>
</tr>
<tr>
<td>Source internationally</td>
<td>.066 (.042)</td>
</tr>
<tr>
<td>MD Only Business</td>
<td>.131 (.096)</td>
</tr>
<tr>
<td>MD Other Business</td>
<td>-.048 (.072)</td>
</tr>
<tr>
<td>Business Network</td>
<td>-.047 (.082)</td>
</tr>
<tr>
<td>Number of observations</td>
<td>87 87</td>
</tr>
<tr>
<td>R²</td>
<td>.1606  .039</td>
</tr>
<tr>
<td>F-test</td>
<td>.400  3.32*</td>
</tr>
</tbody>
</table>

*significant at 0.10 level; ** significant at 0.05 level; *** significant at 0.01 level.

Note: Robust standard errors are given in the parentheses.