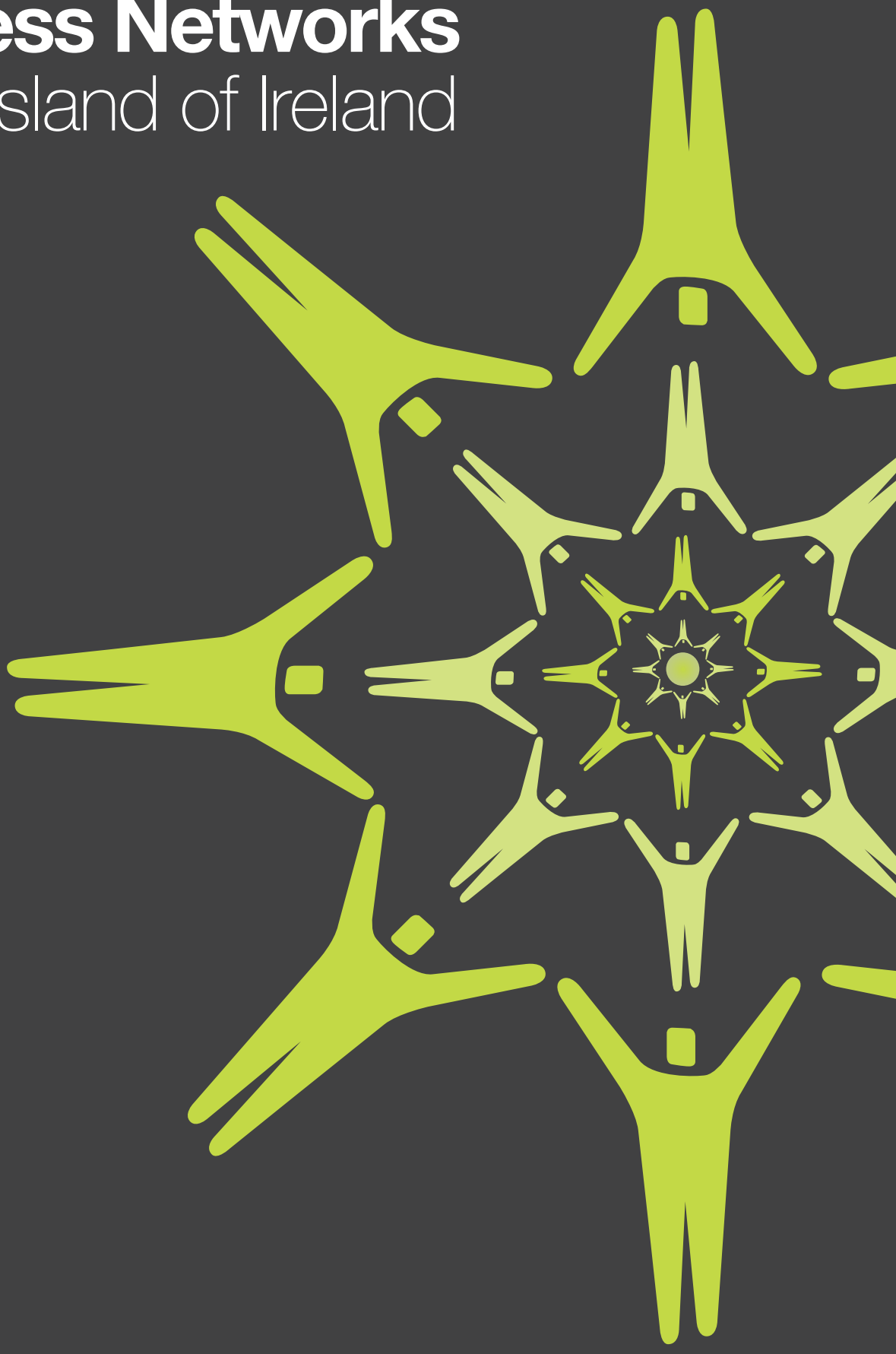
Business Networks
on the island of Ireland



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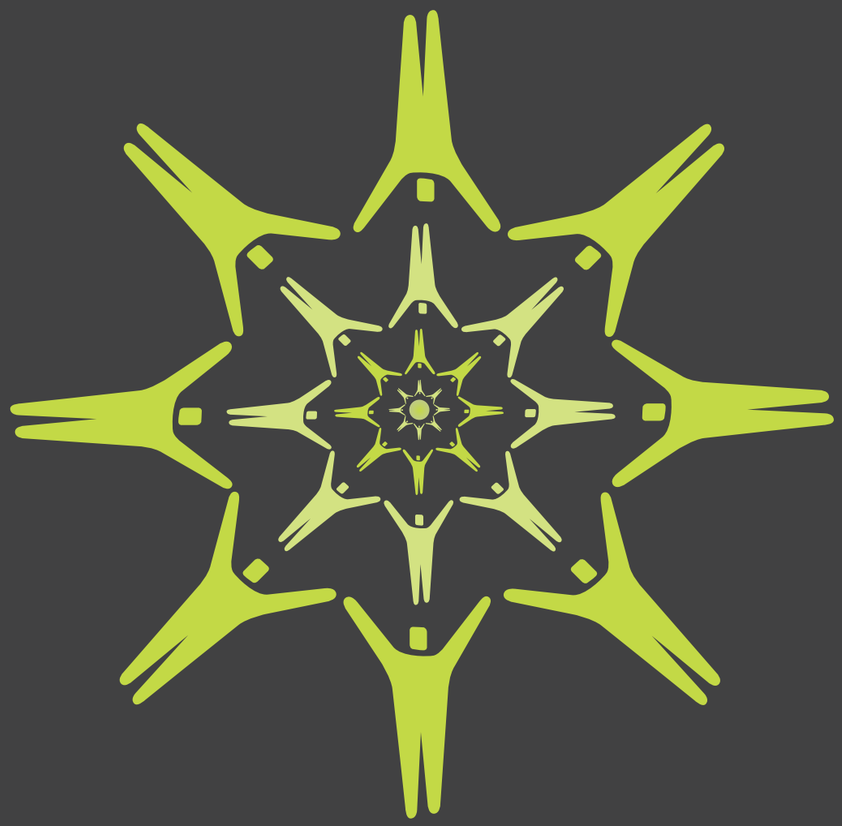


The views expressed in this report and in the annexes are those of the research team and do not necessarily represent the views of the Steering Group.When referring to either of the two jurisdictions (Ireland and Northern Ireland) their official names have been used. When referring to both jurisdictions, the 'island' or 'island of Ireland' has been used interchangeably.

Foreword

Business networks can be an important source of innovation and productivity growth. Inter-firm collaboration has become increasingly prominent in economic strategy documents and in the supports provided by development agencies. Business network activity has increased dramatically in recent years, not least as a result of this increased policy emphasis.

Against this backdrop, this report was commissioned to enhance understanding about the contribution business networks make to enterprise development, about the specific benefits they confer at the level of the firm and how their positive impacts can be optimised.

The research shows the benefits of business networks both to the companies involved and to the wider economy. Engagement with business networks changes firm behaviour including, for example, joint bidding on contracts, purchasing materials on a group basis and collaborative research and/or design activities. Through these and other network-related activities the members have benefited from increased sales, greater cost competitiveness and enhanced innovative endeavour. All of this presents a picture of alignment with wider policy goals in both jurisdictions.

The report illustrates that successful networks are those which are business-led with common goals and, critically, effective facilitation. It is important that supports for business networks and collaborative cross-sectoral approaches are geared towards delivering export market opportunities, enhancing productivity and innovation and developing strategically important sectors.

This report is intended to inform future discussion about how to make the optimal use of all resources in encouraging the further growth of business networks. The agencies involved in this report look forward to continued engagement with businesses in to develop future networks within the two jurisdictions and on an all-island basis.

Key findings

The research and analysis carried out for this study demonstrates that:

- There has been an increase in the number and scope of business networks across the island of Ireland since 2005 (more than doubling from 110 to 240). The profile, in terms of geography and types of networks, has not changed with cross-border structures still accounting for less than one in ten business networks. The increase in activity reflects a greater emphasis on the role of collaboration with economic development policies in Ireland, Northern Ireland and elsewhere in the past five years.

- Business networks play a strong and increasing role in supporting enterprise development on the island of Ireland. They are leading to positive and demonstrable economic outcomes across a number of areas including increased exports, enhanced skills and increased R&D collaborations. On a less tangible level, there is also qualitative evidence that networks are facilitating the transfer of tacit knowledge between member firms as well as higher education institutions (HEIs). This process of 'networked learning' is now seen as one of the most valuable outputs for firms that participate in networks, allowing them to develop or enhance a range of competencies in a flexible manner.

- There are a number of key characteristics/ factors which support effective networks namely:
  – Clear and agreed objectives and strategic direction;
  – A strong facilitator who has the capacity to foster trust and cooperation between the members and who has the support of the member companies; and
  – Committed membership (supported by established processes and procedures for membership).

- There is a role for the State in supporting networks. The nature and scope of this varies depending on wider policy objectives and the specific aims of the individual networks. This support can take a number of forms, including:
  – Enterprise policy that is supportive of networks and that seeks to develop an environment conducive to collaborative engagement, including greater use of networks as a mode of delivery for certain enterprise supports where a collaborative approach may achieve more effective outcomes;
  – Direct provision of funding - tied to specific economic objectives and over a specified duration - which is particularly important in the early stages of network scoping and formation;
  – Promotion of existing and potential networks - through the enterprise development agencies, inclusion in enterprise promotion material and trade missions; and
  – Provision of training supports for facilitators and/or sourcing appropriately skilled facilitators for networks.

Executive Summary

What do we mean by business networks?

It is recognised that the concept of networks is not straightforward, and there is no consistently applied definition available to conceptualise the term. However, a network can be said to be a group of companies with restricted membership who have agreed to co-operate in some way to achieve specific business objectives that are likely to result in enhanced competitive advantage and/or mutual financial gain.

There are three primary categories of business networks:

- **Type 1 - Business networks:** These involve firms collaborating for specific purposes where the results of the activity will have some identifiable and measureable impact on their business (for example, Global Wind Alliance).
- **Type 2 - Development networks:** These are the most basic form of networks consisting of firms associating with other firms where the activity may often be confined to networking, the exchange of information, or shared services (for example, All-Island Software Network).
- **Type 3 - Regional business networks:** These are geographically concentrated groups of interconnected companies, educational institutions, local authorities, local economic development agencies, national government agencies and related institutions that arise out of linkages or externalities across sectors. Regional business networks share a common regional location, where 'region' is defined as a geographic area, labour market, or other functional economic unit (for example IT@Cork).

Table 1: Characteristics of network types

	Business Network	Development Network	Regional Business Network
Group of firms	✔	✔	✔
Restricted membership	✔	✔	✔
Agreed to co-operate in some way	✔	✔	✔
Objectives linked to mutual competitive advantage or financial gain	✔		
Geographically concentrated			✔

Business networks are differentiated from development networks and regional business clusters as members of business networks must have agreed to cooperate in some way to achieve specific business objectives that are likely to result in enhanced competitive advantage and/or mutual financial gain. Development networks on the other hand are usually more informal and unstructured. While they may meet the first three characteristics in Table 1, they will typically not have a purpose linked directly to financial gain or competitive advantage for the members. Although regional business networks will often result in gain for companies, they are not always solely established with that in mind and are often motivated by broader goals that have to do with regional and national economic development for the greater public good.

A policy focus towards collaboration

The past twenty years has seen policy makers in economies across the world invest large amounts of public resources on cluster development policies, the foundation of science parks, business networks and other forms of geographically clustered business activities in order to stimulate regional innovation.

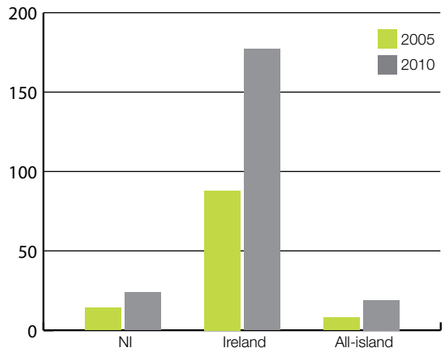
Although there has never been an explicit policy on the island of Ireland geared towards networking, collaboration or business clusters, the two economies have recognised the value of a cluster-type approach for some time. In the 1990s strategy and policy documents on both sides of the border recommended that it would be advantageous for industrial policy to include an element of building strong groupings of connected companies or industries. More recently economic development agencies across the island have developed programmes to encourage collaboration between firms on a 'network' basis. These are typically focussed on achieving hard research and commercial outcomes. Networks and inter-firm collaboration have become increasingly prominent in economic strategy documents across the island including the Strategy for Science, Technology and Innovation (2006), Innovation in Ireland (2008) and the First report of MATRIX: The NI Science panel (2008).

The profile of business networks across the island

There has traditionally been very little information on business networks on the island, partly due to the difficulties involved in tracking networking activity. Networks are dynamic organisations that are constantly evolving. They can form, cease or go into suspension. Therefore any profile of networking activity represents a snapshot in time.

The most recent previous research into networking activity on the island was conducted in 2005. The mapping exercise conducted as part of this research has identified that the number of business networks has effectively doubled since 2005 from 110 to 240 (Figure 1).

Figure 1. Network activity on the island of Ireland



Source: Oxford Economics

Most networks are located in Ireland, accounting for around four-fifths of networks on the island. Networks in Northern Ireland accounted for one-tenth of all networks on the island, with a smaller number of all-island networks. The overall profile of networks is broadly similar to that recorded in 2005 (Table 2).

The majority of networks fall within the 'business networks' category. This type of network accounts for around two-thirds of all networks on the island. Newly introduced Government initiatives across the island have encouraged the formation of new business networks including Invest NI's Collaborative Networks Programme and Enterprise Ireland's Industry Led Research Partnerships Initiative. These types of programmes encourage the formation of more 'goal-orientated' networks with hard commercial and research targets. Training networks funded under the Skillnets programme also account for a significant number of business networks.

Development networks account for almost one-fifth of networks on the island. This has increased slightly since 2005 largely accounted for by an increase in activity from the County Enterprise Boards in Ireland. Regional Business Networks account for just over one-tenth of networks, a similar proportion to 2005's 'Regional Business Clusters'.

The majority of networks on the island are relatively young, with most having been established in the past five years. While the profile of networks remains relatively young, it has shifted slightly with a greater proportion of older networks within the 'development network' and 'regional business cluster' categories, while the vast majority of networks established within the past two years fall within the 'business network' category. This is reflective of the change in policy focus across the island, where networks that are more commercially focussed with specific research and commercial objectives are being actively supported by both Governments.

The profile of network membership is significantly weighted towards smaller firms, with the vast majority of network members having less than 50 employees. Networks on the island are largely comprised of membership across sectors as firms seek to collaborate with other companies in different sectors with expertise in other areas to maximise the benefits of interconnections with other industries. However, there are an increasing number of networks in strategically important sectors such as 'health life sciences' and 'information and communications technology' (ICT).

Table 2: Change in the profile of networks on the island (2005-10)

		2005	2010
Geography	Northern Ireland	13%	10%
	Ireland	80%	83%
	All-island	7%	7%
	Total	**100%**	**100%**
Type	Business Network	67%	67%
	Development Network	16%	19%
	Regional Business Network	16%	15%
	Total	**100%**	**100%**

The economic benefits of networks

The economic returns from networking are based on better access to skilled labour, opportunities to share inputs and a faster flow of new ideas generating external economies of scale and mutual interdependence. Most obviously, business networks may provide member firms access to resources which would otherwise be beyond the scope of a single firm. Individual firms can face a number of limitations when trying to compete in global markets such as scale, expertise etc. Through collaboration firms can complement each other and specialise in different areas to overcome such barriers to achieve collective efficiency and compete in markets beyond their individual reach. This is the main rationale for government intervention to encourage the development of business networks as a policy tool to facilitate economic development.

On a less tangible level networks and clusters facilitate the transfer of tacit knowledge between firms. This process of 'networked learning' is now seen as one of the most valuable outputs for firms that participate in networks, allowing them to develop or enhance a range of competencies in a flexible manner.

The all-island economy is largely comprised of small to medium sized enterprises. Therefore many businesses on the island have the potential to benefit from being part of a business network and adopting a collaborative approach to succeed in new markets and to help overcome problems of scale.

The primary research carried out for this study has provided significant evidence that network membership can influence business behaviour in a positive manner.[1]

Before turning to quantifiable impacts it is important to firstly consider how network membership can change business behaviour. Figure 2 (over) summarises some of the key changes in business behaviour resulting from network membership, which can in turn lead to economic impacts.

[1] Metrics indicating network effectiveness included growth in new firms, employment, turnover, costs, competitiveness, innovation and skills.

Behavioural Aspects

Members of a network are generally more likely than other firms to engage in activities to share information and learn from other businesses, to work together on cost reduction measures to maximise competitiveness, and to collaborate on commercial ventures such as development of new products or penetration of new markets.

Figure 2: Behavioural aspects of networks

Information Sharing	• 56% of firms conduct visits to other companies (40% did this before network membership) • 36% of firms share technical capabilities with other companies (10% did this before network membership)
Cost Reduction	• 16% of firms purchase materials on a group basis (3% did this prior to network membership) • 20% of firms prepare joint marketing materials or share the cost of trade shows with other companies (5% did this prior to network membership)
Commercial Collaboration	• 25% of companies bid on contracts with other firms (6% of firms did this before prior to network membership) • 32% of companies co-operate with companies in meeting procurement design or quality requirements (9% did this prior to network membership) • 32% cooperate with other companies in collaborative research, development or design (5% did this prior to network membership)

Table 3: Economic outcomes resulting from network membership

	Total	ROI	NI
% firms whose turnover has gone up	42%	43%	40%
% of firms increasing / safeguarding employment	23%	21%	29%
% of firms increasing R&D expenditure	8%	8%	8%
% of firms increasing off-island export sales	13%	13%	13%
% of firms experiencing a reduction in costs	21%	23%	17%
% of firms increasing the proportion of their workforce receiving training	25%	26%	23%

Economic Outcomes

Through their engagement in these activities, members of business networks have benefited from sales increases, greater competitiveness and enhanced innovative activities as a direct result of their membership of a network (Table 3). Increases on sales and employment have a direct impact within the economy. This research has found that many companies experienced an increase in turnover as a direct result of network membership, and on average, increased net sales by approximately 17%. Almost one quarter (23%) of business network members have either created or safeguarded employment as a direct result of network membership. On average, those companies have created / safeguarded six full time equivalent (FTE) jobs.

While these are extremely positive results there remain a number of business network members who have stated that they did not achieve increased turnover or an increase in employment as a direct result of network membership. This is a reminder that network effectiveness is not always assured and that a number of key factors must be in place to drive successful outcomes.

Determinants of Effectiveness

This research shows that there are a number of key determinants which support effective networks (many of which are well documented in the literature):

- **Industry Led** - It is important that networks are industry led which works to ensure that the network is focused on enterprise relevant outcomes. On the island, firms themselves are the main drivers in the establishment of networks, but state agencies and, to a lesser extent, educational institutions are playing an important role in the establishment of business networks. It is important that networks continue to be industry led, with Government agencies supporting only where appropriate.

- **A common mission** - Ensuring a defined strategic direction supported by a set of clear and agreed business objectives is an essential component of a successful network[2]. Network facilitators have identified having a common purpose to meet business needs as the single most important factor for enabling network effectiveness. A scoping study to research market opportunities and establish who the appropriate companies are to form a network is a good model to follow.

- **Effective leadership** - Network structures differ considerably from traditional organisational structures in that no one single person/organisation is in charge and all members have equal rights. Realising the synergies that can be created within networks requires different forms of leadership that rely on facilitation capabilities. The right type of facilitation skills are required to effectively manage networks, to build trust and encourage network members to work together.

[2] Such as sales targets, or activity targets such as number of sales leads, number of patents or publications etc.

- **Effective membership and governance structures** - the consultations and network case studies highlighted that effective governance structures are key to creating the right conditions for network success. They help to promote the development of trust, the transfer of information and knowledge and joint problem solving across the membership. How a network is structured determines its strength and how member firms perceive the value of the network and how they behave within it.

- **The 'right membership' mix** - A network structure is typified by a broad mission and joint, strategically interdependent action. There is a strong commitment to overriding goals, and members agree to commit resources over a longer period of time. The crucial factor in ensuring that a network functions effectively towards a common goal is 'ensuring the "right membership". To ensure the optimum consortia of members it is important to have limited membership and formal criteria and processes for network entry and exit. Membership on a cross-border and international basis can be of benefit to boost trade links and help to provide market access in export markets.

A good membership mix can also involve firms of differing sizes. For example, SMEs can benefit from having access to larger companies and can provide opportunities for new markets and customers that smaller companies might not have had access to on their own - particularly in the case of export markets. Equally, SMEs can develop opportunities by collaborating with similar sized firms to jointly bid on large scale tenders that they would not have been able to compete for in isolation.

Barriers to Effectiveness

The main barriers to network effectiveness relate to a lack of commitment of member firms, a lack of members time and funding.

- **Commitment** - Both network facilitators and members identified the lack of commitment by member firms as an important barrier to the business network working well. In the case studies which show success stories the benefits to collaboration appear to be very clear to members, leaving little doubt about incentives to collaborate.

- **Time** - A lack of members' time was the most regularly cited barrier to effectiveness (by 73% of members and 88% of facilitators). The lack of time is likely to be related to the relative importance placed on the network's activities by its members.

- **Funding** - This research has found that networks are highly dependent upon public funding, although there is some evidence of deadweight. Networks identified limited scope for alternative sources of finance.

In the context of constrained resources, networks will have to look for alternative methods of finance to secure their long term sustainability. One potential approach is that the level of funding is digressive. If the network is delivering real benefits for the member companies it should be possible to finance the network through its membership once the public funding period expires.

Conclusions

This research has identified a number of interesting conclusions with respect to business networks and collaboration on the island. In some cases this provides confirmation of known trends. In other cases it identifies new challenges and issues. The main conclusions arising from the research can be summarised as follows:

- **A shift in policy focus** - Since 2005 there has been a growing recognition of the importance of collaboration, and policy has developed to be supportive of this. Numerous recent policy documents make reference to encouraging collaboration. The approach taken now encourages collaboration on a 'network basis', and represents an important strategic shift from the top-down approach adopted in the 1990s.

- **Rapid growth in network activity** - The number of networks has grown substantially over the past five years, the growth patterns are broadly reflective of how policy has developed in recent years. Most networks comprise a variety of sectors, although there is evidence of an increasing incidence of networking in growth sectors such as health and life sciences and ICT. Most network members are SMEs, although a small proportion of large firms also participate, a mix of company sizes, which is reflective of the structure of the economies in both jurisdictions.

- **Networks can positively impact on company balance sheets** - There is evidence of direct economic outcomes for businesses that are members of networks. The evidence indicates some quantifiable impacts such as increases in sales, employment, R&D expenditure, exports etc. There is also evidence of unquantifiable benefits including a large proportion of firms developing new sales through the network, and supply chain benefits. Our survey also indicates that companies are more likely to jointly bid for contracts or collaborate on R&D projects if they are members of a network.

- **There is an active role for the public sector to support networks and collaboration** - Due to market failures and the dependence of networks on public funding, particularly in the early stages of scoping and network formation there is an active public sector role in encouraging the development of networks, and collaboration can play a key role in economic policy now more than ever. To overcome the challenges presented by the current recession businesses across the island need to be innovative and develop new markets abroad. This report has shown that in some instances networks can contribute positively to both export sales and research and development activity.

Public sector support can take a number of forms, including broader enterprise policy, direct funding supports, and promotional activities. The nature and scope of this support varies depending on wider policy objectives and the specific aims of the individual networks. There are a number of key characteristics/factors which support effective networks (many of which are well documented in the literature), namely:

- **Clear and agreed business objectives supported by a defined strategic direction are central to effective networks** - The development of new networks should always be linked to market opportunities; this helps to ensure that they are industry led. Having a scoping study to research market opportunities and establish who the appropriate companies are to form a network is a good model to follow.

- **Effective leadership through facilitation can drive network performance** - The role and skills of the facilitator is an important factor for network success. The right type of leadership skills are required to effectively manage networks, to build trust and encourage network members to work together.

- **Effective network structures are crucial to encourage effective collaboration** - The membership structure and governance arrangements are key to creating the right conditions for network success. How a network is structured determines its strength and how member firms perceive the value of the network and how they behave within it.

- **To function effectively networks need to ensure the 'right membership' mix** – To ensure the optimum consortia of members it is important to have limited membership and formal criteria and processes for network entry and exit. Membership on a cross-border and international basis can be of benefit to boost trade links and help to provide market access in export markets. A good membership mix can also involve firms of differing sizes. For example, SMEs can benefit from having access to larger companies and can provide opportunities for new markets and customers that smaller companies might not have had access to on their own – particularly in the case of export markets. Equally, SMEs can develop opportunities by collaborating with similar sized firms to jointly bid on large scale tenders that they would not have been able to compete for in isolation. Therefore, the 'right membership' can take many forms and is dependent upon the objectives of each individual network.The main barriers to network effectiveness relate to a lack of commitment of member firms, a lack of members time and financing.

1. Introduction and background

1.1 Introduction

Oxford Economics were commissioned by the steering group[3] to undertake a study to assess the effectiveness of business networks on the island of Ireland. The terms of reference set out by the steering group required that this study update a 2005 InterTradeIreland report, *Business Networks on the Island of Ireland*, and inform the implementation of appropriate network development policies on the island. The specific objectives for the study are:

- To provide an updated baseline of business network activity and the impact of this on economic development on the island of Ireland; and
- To identify optimal use of resources in programmes to support business networks on the island of Ireland.

More specifically, the study was required to cover the following:

- The purpose and objectives of business networks and why they were formed;
- The number and nature of participants in the networks by size of firm, sector, age, ownership, and the scope of other external partners in the network;
- The interaction of network participants within the network;
- The role of industry and trade associations, and public agencies in facilitating such networks; and
- The key success factors involved in establishing and operating different types of business networks.

1.2 Approach to assessing effectiveness

It is recognised that the concept of business networks is not straightforward, and there is no consistently applied definition available to conceptualise the term. This is evidenced by the myriad of ways that the concept has been articulated in the literature. For example, academics have considered network performance in terms of innovation (Audretsch, 1995), rates of technology transfer (Audretsch and Feldman, 1996), employment growth (Piore and Sabel, 1984), and local wage growth (Porter, 2003).

In this report network effectiveness is conceptualised as the growth in new firms, jobs, turnover, costs, skills and innovation. We believe that this conceptualisation captures the key economic benefits of networking which underpin the high levels of interest in the concept. However, in considering the effectiveness of business networks we have also taken account of the wider economic benefits associated with networks that are non-quantifiable (e.g. the impact on the skills of the workforce).

There are a number of difficulties that make the evaluation of business networks difficult, including:

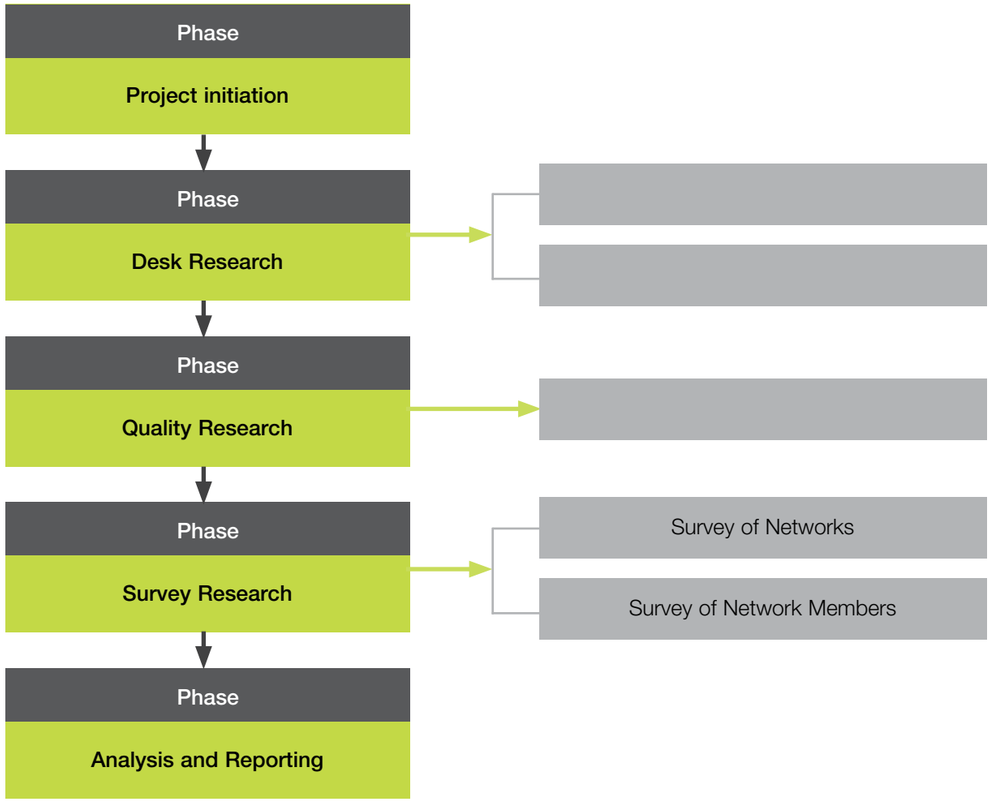
- Traditional performance measures do not always apply to all types of networks;
- Not all networks are alike, and have different processes and different types of goals. They are complex with regard to their purpose, structural arrangements and underpinning relationships; and
- They function on a number of levels or layers of operation and do not always follow similar patterns of development.

[3] The steering group for this study included InterTradeIreland, Invest Northern Ireland, Enterprise Ireland, Forfás and the Department of Enterprise, Trade and Innovation.

As a consequence of difficulties involved in assessing the effectiveness of business networks, most researchers have adopted a case-study method where observations are limited to in-depth analyses of a sample of networks (e.g., Piore and Sabel, 1984), or comparisons made between two networks (e.g., Saxenian, 1994). There have been preliminary attempts to draw from a larger sample of networks (e.g., Markusen, 1996) although these are rare. Indeed, in casting the net to a broader selection of clusters, these studies have necessarily traded off the empirical richness of the case-study method. Our study attempts to navigate between these two approaches.

Figure 1.1 presents an overview of the methodology used in this study. Developing the database of networking activity through sampling research entailed updating the initial information collected as part of the 2005 study. As networks are dynamic organisations that are constantly evolving, much of the information contained in the 2005 report was outdated. The information contained in the 2005 report was updated by obtaining information from the main support agencies across the island, in addition to further research to identify any new networks that had not been funded through any of the public sector institutions involved in supporting networks.

Figure 1.1: Overview of our methodology



1.3 Report structure

The main primary research methods used in this research included:

- **Qualitative interviews:** We conducted consultations with key individuals in a selection of networks to accurately gauge their views on complex issues such as support services, development and promotion of networks, funding arrangements, barriers to development and public policy options to help facilitate the development and effectiveness of networks. We have consulted with a range of different types of networks operating in Northern Ireland, Ireland and on an all-island basis. This has allowed us to develop a number of case studies that we have used in this report for illustrative purposes.

- **Two quantitative surveys:** We conducted two quantitative surveys, one with network facilitators and one with businesses that are members of a network. The survey of network facilitators allowed us to gather views from individuals actually facilitating the activities of their network, and who were well placed to provide advice on network effectiveness in addition to barriers and success factors. The survey of business network members allowed us to gather quantitative data from grass roots network membership. Both surveys provided us with the data to make an assessment of the impact and effectiveness of business networks on the island through the development of an economic impact modelling framework. The data collected through these surveys was utilised in our economic impact model which allowed us to make an objective assessment of the impact and effectiveness of business networks on the island.

The remainder of this report is structured as follows:

- **Section 2 - What are business networks and why are they important:** In this section we discuss the definition of networks that we will be using for this research, and some of the benefits associated with networks.

- **Section 3 - Network policy context:** We provide an overview of the development of policy towards networks on the island, and provide some examples from elsewhere to illustrate different policy approaches in other economies.

- **Section 4 - Mapping networking activity:** We provide an illustrative picture of the degree of networking activity across the island through the use of data and providing, where possible, comparisons to the 2005 study.

- **Section 5 - The pillars of effectiveness:** We discuss network formation, creating the correct operating mechanisms through designing effective network structures and financing arrangements.

- **Section 6 - Network performance:** We investigate the views of network facilitators and business that are members of a network on the role of networks, and how they are performing against different network functions.

- **Section 7 - Economic benefits:** We discuss the views of network facilitators on the benefits that networks can have in developing the economy. We present the views of businesses that are members of a network, and discuss the impacts that being part of a network has had on their business. We also present the findings from our economic impact model, designed to provide some indicative quantitative evidence of the economic returns on investment in business networks.

- **Section 8 - Key Success factors and barriers to effectiveness:** We present the factors that help to make a network effective. We also discuss the areas in which network facilitators and members identified barriers to network effectiveness.

- **Section 9 - Summary and policy remarks:** We conclude by summarising the results of our programme of research, identifying areas for policy consideration where relevant.

2. What are business networks and why are they important?

2.1 Defining business networks

The definition of business networks is often a source of ambiguity. Different researchers use the idea in different ways to suit their own purposes; the result is conceptual and empirical confusion.

The terms “cluster” and “business network” are often used interchangeably, but the two are very different. Networks are collaborative business activities carried out by discrete, usually small groups of firms in order to generate sales or and profits through, for example, joint exporting, production, R&D, product development or problem solving. Clusters are based on interdependence and making a contribution to the functioning of the system (Martin and Sunley, 2003).

The past twenty years have seen policy makers in economies across the world spend large amounts of public resources on cluster development policies, the foundation of science parks and other forms of geographically clustered business activities in order to stimulate regional innovation. This is demonstrated by the fact that almost every US and EU State has a cluster development strategy as part of its economic development plan (St. John & Pounder, 2006). Underlying the relationship between innovation and clusters is the assumption that co-located firms engaged in innovative activities benefit from knowledge that diffuses locally (Phlippen & van der Knapp, 2007). However, in order to access this knowledge firms are required to form formal relations with co-located firms (i.e. a network). While there are examples of highly innovative regions where firms exchange knowledge and collaborate intensively (e.g. Silicon Valley and the Emilia-Romagna region in Italy), many regional clusters are mere co-locations of firms, without the presence of effective business networks.

The first stage of the previous InterTradeIreland research into business networks was to clarify and categorise business networks. While we recognise the different definitions of business networks that exist in the literature, in this research we have retained the definitions used in the previous InterTradeIreland report to provide comparable results. There is however considerable overlap between this definition and definitions found in the literature. Some of the other widely used definitions are included in Annex B of this report. The definition of business networks used in this study is summarised in Box 2.1[4].

[4] We also recognise the existence of Business Support Networks (e.g. organisations undertaking collaborative initiatives for the ultimate, though not direct, benefit of businesses) and business organizations (e.g. Trade Associations and Chambers of Commerce). To meet the objectives of the study these categories of network have been excluded from our analysis.

Box 2.1: Business networks defined

A business network is a group of companies with restricted membership who have agreed to co-operate in some way to achieve specific business objectives that are likely to result in enhanced competitive advantage and/or mutual financial gain.

There are three primary categories of business networks:

- **Type 1** - Business networks: These involve firms collaborating for specific purposes where the results of the activity will have some identifiable and measureable impact on their business. Specifically a business network is (a) a group of firms, (b) with restricted membership, (c) who have agreed to co-operate in some way, (d) to achieve specific business objectives that are likely to result in enhanced competitive advantage and/or mutual financial gain (for example, Global Wind Alliance).

- **Type 2** - Development networks: These are the most basic form of networks 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 a Type 1 business network but typically will not have a purpose linked directly to financial gain or competitive advantage for the members (for example, All-island Software Network).

- **Type 3** - Regional business networks: These are geographically concentrated groups of interconnected companies, educational institutions, local authorities, local economic development agencies, national government agencies and related institutions that arise out of linkages or externalities across sectors. Clusters share a common regional location, where 'region' is defined as a geographic area, labour market, or other functional economic unit. Though they often result in gain for companies, these networks 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 (for example IT@Cork).

2.2 Why are they important?

The economics of networking is based on better access to skilled labour, opportunities to share inputs and a faster flow of new ideas generating external economies of scale and mutual interdependence. Most obviously, business networks may provide member firms access to resources which would otherwise be beyond the scope of a single firm (Portes & Sensebrenner, 1993). Ffowes-Williams (2000) also argues that firms, through complementing each other and specialising in order to overcome common problems, are in turn able to achieve collective efficiency and conquer markets beyond their individual reach. This could take the form of pooling resources to undertake collaborative research and development or product development, or designing collective solutions to shared problems (e.g. joint trade missions to promote exporting).

These resources may be tangible, but it is the transfer of knowledge and other intangible resources, many of which are embedded in processes, that arguably provide the greatest added value to firms that are members of networks (Grant, 1996). This could take the form of an exchange of information (e.g. sharing best practice) or through networked learning (e.g. contact between managers and staff enhances learning, increases knowledge and opens new channels for information and opportunities).

The theory of endogenous growth and the geography and growth synthesis both consider that local growth and spatial concentration of economic activities arise from localised knowledge spillovers (Lucas 1988; Martin and Ottaviano 1999). For this reason the benefits of regional business clusters are slightly different from those of traditional business networks. They are underpinned by:

- **Economic efficiencies they confer on constituent firms**, including increased specialisation, reduced transaction costs and enhanced reputation. From this perspective, spatial proximity allows firms to take advantage of scale and positive externalities such as an abundance of highly skilled labour, specialized subcontractors and rapid flows of information (Aharonson et al., 2007; Hirschman, 1958; Kaldor, 1972; Krugman, 1991; Marshall, 1920; Rosenthal and Strange, 2003). Moreover, proximity is thought to facilitate the profitable de-integration of value chains by allowing greater specialisation of inputs and outputs, leading to improved efficiency and greater speed to market (Feldman, 2000; Herrigel, 1993; Storper, 1997).

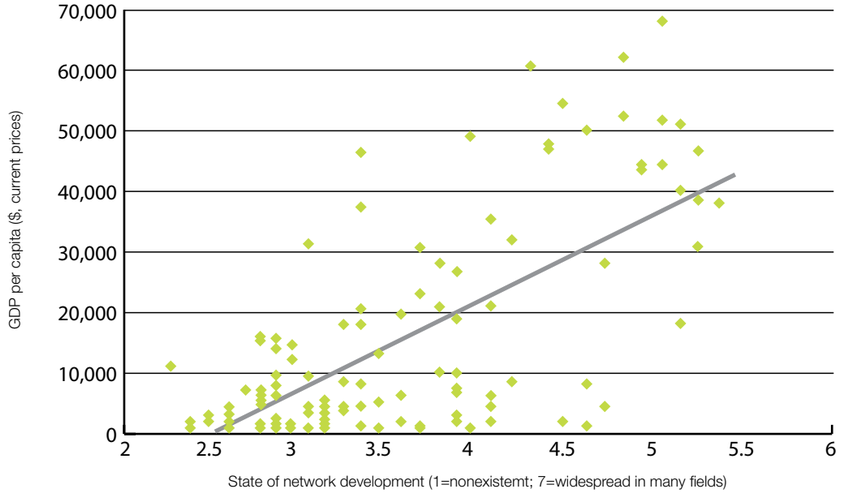
- **The distinctive dynamics of knowledge transfer among co-located firms** (Bathelt et al., 2004; Tallman et al., 2004; Tallman and Phene, 2007). The key advantages of spatial proximity are to be found in processes of knowledge creation and learning within geographical regions. Specifically, through shared conditions and experiences, and with speed and ease find, access and transfer valuable knowledge that is difficult to codify. Because of its 'stickiness' (Nelson and Winter, 1982) tacit knowledge may be exchanged more effectively through frequent interpersonal contacts that are facilitated by proximity (Lawson and Lorenz, 1999).

The benefits of networks as articulated in the literature can have an impact on an economy's competitiveness and ultimately impact upon economic prosperity. There is a positive correlation between the extent of network development and GDP per capita across the global economy (Figure 2.1).

Without participating in networks (and clusters), many firms act in isolation hindering their capacity to achieve the critical mass and economies of scale to compete in more competitive markets. It is this market failure that is the main rationale for using "network policy" as a tool for economic development.

The two economies of Ireland are characterised by a large number of small to medium sized companies. Networks and clusters could therefore play a key role in helping SMEs overcome problems of scale and help improve competitiveness. In the following section we provide an overview of the development of businesses networks and network policy on the island of Ireland and internationally.

Figure 2.1: GDP per capita vs the state of cluster development



Source: IMF, World Economic

3. Network Policy Context

- For some time, both economies on the island have recognised the benefits of collaboration, and the advantages of building strong groupings of connected companies.
- In more recent years, there has been a notable policy shift away from the 'top-down' cluster based approach promoted in the 1990's, towards collaboration between firms on a 'network basis'.
- Collaborative approaches promoted by economic development agencies on the island currently are focussed on achieving demonstrable research and commercial outcomes and have become increasingly integrated into mainstream economic policy.

The most high profile and influential exponent of business networks is Michael Porter. He has not only promoted the idea as an analytical concept, but also as a key policy tool. From the OECD and the World Bank, to national Governments (such as the UK, France, Germany, the Netherlands, Portugal and New Zealand) to regional agencies (such as the Regional Development Agencies in the UK), policy makers at all levels have been eager to promote business networks. The OECD sees networks as a mechanism for driving growth, and as a key policy tool for boosting national competitiveness (OECD, 2001) as does the European Union which has developed policy papers on clusters. The EU Competitiveness Council has also adopted Council Conclusions on clusters as part of its broad competitiveness and innovation strategy for Europe and the importance of innovative clusters to Europe's future growth performance is recognised in the EU Commission's "Innovation Union" flagship under the new Europe 2020 Strategy.

3.1 A rationale for policy intervention on the island - market failure

The island of Ireland differs from many other parts of Europe in that the network concept has not, until recently, fully been embraced as a mainstream economic policy tool (Crone, 2009). While networks have always been acknowledged within economic development strategies across the island, there has never been a formal network policy similar to that adopted in a number of other economies. Moreover, regional interventions have traditionally been dominated by firm-level interventions.

While there are a number of benefits associated with networks that we touched upon in section two, a clear rationale for public intervention in promoting and supporting networks exists. Back in 1996 the National Economic and Social Council of Ireland concluded that:

"It is simply incorrect to suggest that, wherever co-operative behaviour would be beneficial, it will automatically emerge. Consequently it is appropriate for public policy to devote some resources to encouraging the formation of business networks. Governments and private sector bodies need to play an active role in preparing the ground for inter-firm partnerships through, among other measures, raising awareness of the potential benefits from such partnerships and providing local firms with access to information as well as the right mix of financial and technical support where needed. Measures should also include access to independent advice at various stages of a partnership, for example during initial negotiations or when consolidating a partnership." (NESC, 1996)

3.2 Public sector stakeholders across the island

There are a number of agencies involved in the formation of policy in relation to networks across the island.

- **In Ireland** the formulation of enterprise development policies (including business networks) in Ireland is the responsibility of the Department of Enterprise, Trade and Innovation (DETI). The Department draws upon the advice of Forfás, the national policy advisory board for enterprise and science, in the design of new policies. There are a number of agencies under the aegis of the Department which are responsible for policy implementation including IDA Ireland, Enterprise Ireland, Science Foundation Ireland, FÁS and Shannon Development. The network of County and City Enterprise Boards and Skillnets[5] also play a key role in the delivery of business networks in Ireland.

- **In Northern Ireland** economic policy (which business networks are a part of) is developed by the Department for Enterprise, Trade and Investment (DETI(NI)). Invest NI's role is to provide government support by delivering the Executive's economic strategy. Local councils and enterprise agencies in Northern Ireland also play a role in encouraging the development of business networks.

- InterTradeIreland works across both economies, and business networks are essential to its work as it seeks to build **cross-border** relationships that will help individual companies and the two economies to become more competitive in an increasingly global marketplace.

3.3 The evolution of network policy across the island

Crone (2009) argues that the island of Ireland differs from many other parts of Europe in that collaboration has never been fully embraced as a mainstream economic policy tool and the recognition of the potential value of collaboration has developed only recently. However, if we include official and public studies we could argue that the value of the network and cluster concept was recognised at a relatively early stage. Only two years after Michael Porter published his seminal book on competitive advantage of nations, the Culliton Report, a major review of Irish industrial policy, recommended that policy should aim to develop groups of related industries, building on sources of national competitive advantage (IPRG, 1992).

In order to explore further the implications of this issue for Ireland, the National Economic and Social Council subsequently commissioned a study to examine the importance of industrial clusters, and the relevance of Porter's diamond model, in the Irish context. The related reports concluded that it would commonly be advantageous for Irish industrial policy to include an explicit element of building strong groupings of connected companies or industries, although these could differ in some respect from Porter's concept (Clancy et al, 1997; O'Connell and Van Egeraat, 1997; Clancy & Twomey, 1997, O'Gorman and O'Malley, 1997; Clancy et al., 2000; Van Egeraat and O'Malley, 1999; O'Malley and van Egeraat, 2001).

In the early 2000's, a subsequent public review document by the Enterprise Strategy Group (2004) - "Ahead of the Curve" - again included strong cluster and network related recommendations. Notably, the report recommended the support of enterprise-led networks to foster collaboration in defined areas of activity. The Strategy of Science, Technology and Innovation 2006-2013, refers to groupings of research performing organisations and firms and emphasises the importance of industry-led networks (Martin, 2007).

In Northern Ireland the 'NI Growth Challenge' (NIGC) was established in 1995, which was heavily influenced by Porter. This was a private sector initiative by the CBI, working in close collaboration with the Department of Economic Development (DED). The NIGC largely follows a top-down industry targeting vision based on a cluster approach. The sectors targeted by the NIGC were engineering, food processing, health technologies, software, textiles and apparel, tourism and leisure, tradable services and contracting.

Although the benefits of collaboration have been recognised, until recently it was not enthusiastically embraced in all policy circles (Doyle, 2000). The concept was not truly integrated in the enterprise development policies, which for a long time remained pre-occupied with strengthening individual enterprises. The network related concepts never led to an "explicit cluster or network policy" and, until recently, the policy documents and studies found relatively little resonance in concrete collaborative programmes and initiatives (although some initiatives were developed).

Commentators (Martin, 2007; Doyle, 2000, O'Malley and Van Egeraat, 2001) have suggested a number of factors driving the initial lack of enthusiasm but the main reason appears to be rooted in concerns about financial accountability. Historically, enterprise support programmes in the two economies of Ireland have been provided by the relevant development agencies to individual legally incorporated enterprises. This tradition of providing grants to individual companies has provided the development agencies with a basis for ensuring accountability of any monies provided. Such accountability would be harder to verify in situations where funding was provided to a network or cluster of companies.

3.4 Recent policy developments

Most studies perceive a change in attention to network policy since the mid-2000s (Crone, 2009; Martin, 2007). In Ireland the themes of knowledge innovation and connectedness are now firmly at the heart of the Governments strategy to position Ireland as a leading knowledge economy. The Government's overarching vision is that *"by 2013 Ireland will be internationally renowned for the excellence of its research, and will be to the forefront in generating and using new knowledge for economic and social progress within an innovation driven culture".*

In Ireland the state agencies are operating a number of network initiatives following recent documents which highlight the importance of their role. In 2008 the Department of Enterprise, Trade and Employment issued a document entitled "Knowledge and Enterprise Clusters in Ireland" in which it specifically endorses the value of networks and related initiatives. The Government's *"Building the Smart Economy"* (Department of the Taoiseach, 2008) – also proposes an important role for networks, notably in stimulating innovative action and building the 'ideas economy.' The importance of networks and collaboration is further reiterated in Forfás' enterprise policy report, *"Making it Happen - Growing Enterprise for Ireland"* (2010).

In Northern Ireland business networks are now also seen as key instruments to help stimulate innovation. The "Regional Economic Strategy for Northern Ireland" stated that one approach to help improve innovation would be to promote *"cross-sectoral business networks and clusters for firms of all sizes through which to transfer and disseminate knowledge, experience and best practice"*.

[5] Skillnets support and fund networks of enterprises to engage in training. These networks, now referred to as 'Skillnets', are led and managed by the enterprises themselves to design, manage and deliver specific training programmes across a broad range of industry and service sectors nationwide. Skillnets is funded through the DETI from the National Training Fund (NTF).

3.5 Network programmes on the island

The major change in policy in Northern Ireland has come since the publication of the "First Report of MATRIX: The NI Science Panel" (2008). The overarching MATRIX recommendation is its call for cross-sectoral and cross disciplinary Industry-led Innovation Communities (IICs). These communities, which aim to exploit clearly identified emerging market opportunities, have been the main focus on which Government has concentrated its thinking and the main area on which its implementation efforts will be targeted. In its response to the MATRIX recommendations the Northern Ireland Government remarked that *"a modern economic strategy for a region like ours needs to increasingly build upon collaborative business-led activities and networks, actively supported by Government and Academia"*.

This has represented an important strategic shift in Northern Ireland's approach, and recognises that the Northern Ireland economy needs to take steps to move towards an economic model which routinely encourages and rewards companies, universities, FE colleges and other institutions for working together in more sustained and lasting partnership agreements. As a result of this change in approach new collaborative business opportunities are now being developed in areas such as sustainable energy; smart grid technologies; composite technologies; digital technologies and connected health.

The recognition of the importance of networks in economic development has led to the development of a number of key programmes to support their development. In Ireland the main programmes in operation are:

- **Industry-Led Research Programme:** The Industry-Led Research programme, run by Enterprise Ireland, provides funding to support industry-led networks undertaking collaborative projects that contribute in some way to national economic objectives.

- **Enterprise Innovation Networks:** The Enterprise Innovation Network Initiative was launched in July 2009. This initiative was devised by Enterprise Ireland to give industry groups the resources to enable them to play a role in delivering on the aims of the Smart Economy through the promotion of innovation and R&D in industry.

- **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. Funding is provided by the Department of Enterprise, Trade and Innovation.

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

- **Centres for Science, Engineering and Technology:** Administered by SFI, the CSETS programme funds the establishment of a number of Centres for Science, Engineering and Technology with the aim of significantly advancing knowledge and exploiting opportunities for discovery and innovation. These Centres involve research partnerships between Irish universities and leading multinational companies.

- **Innovation Partnerships:** These support joint R&D projects involving companies and higher education institutes (HEIs), where the bulk of the R&D is carried out within a third level institute or a public research organisation. Funding is provided to the research performing body, which also receives support from the collaborating company.

- **Competence Centres:** Collaborative entities established and led by industry to carry out market focussed strategic R&D. The Competence Centre programme is a joint initiative between Enterprise Ireland and IDA Ireland allowing Irish companies and multinationals to work together on research projects in collaboration with research institutions.

In Northern Ireland the increased focus on collaboration in recent years has led to the creation of a Collaborative Networks programme. This is the main vehicle through which IICs are currently developed in NI:

- **Collaborative Networks Programme:** The Invest NI Collaborative Networks Programme (CNP) was set up in 2007 to support business-led collaborative networks and stimulate economic development within Northern Ireland. The objective of the programme is to develop the capability and capacity of regional clusters/networks by attracting private sector companies, investors, researchers and academia to maximise collaborative opportunities in the development of new products, processes or services. Under the programme, a collaborative network seeking funding to appoint a lead facilitator must have a minimum of four NI private sector companies, but may have other partners from both within Northern Ireland and abroad. The network may also have a mix of companies and other stakeholders such as academia, research institutes, trade bodies etc. Networks can be supported in two phases through the programme. The first stage is to establish both the viability of the project proposed and the make-up of the network. Networks may then be awarded further support through a second phase. The purpose of this facilitator is to both project manage the network and provide horizon-scanning tools on a market and technology basis.

Like many network programmes, many of the aspects of the collaborative networks programme can be traced back to the Danish Networks Programme (Box 3.1). In particular, the programme was one of the first examples to demonstrate the importance of the facilitator, and how the promotion of networks can help to promote a culture of networking that can have real economic impacts. Many economies have developed their network policy upon the Denmark experience, notably in Norway and Australia.

Box 3.1: The Danish Networks Programme

According to a government funded report by McKinsey & Company, prospects for the Danish economy were bleak in the late 1980's. The Danish economy consisted of a large number of small firms that were too small and too diversified to compete in an increasingly global market. In 1989 the Danish Ministry of Trade and Industry announced its "Strategy 92" which included a network plan aimed at creating business networks among small enterprises.

The programme was run through the Danish Technological Institute, a privatised branch of the Ministry of Industry. Networking was seen by the Danish Government as a fast-track system to mobilise firms to face international competition. The problem was the lack of a cultural tradition of networking among firms. It was also clear that firms, acting on their own initiative, were unlikely to adopt new co-operative strategies. The Danish programme focused on encouraging the creation of networks of small firms that can successfully compete with the best of large companies in terms of both scale and quality on an international basis. The network programme was aimed at initiating and developing new business opportunities, new products, new markets, etc.

The programme was composed of three elements for encouraging inter-firm co-operation

- **Information campaign:** Leaflets, promotions brochures, handbooks on how to establish inter-firm co-operation in networks were distributed to encourage enterprises to establish networks.
- **Training of network brokers:** The role of network brokers was to assist the enterprises in developing and implementing the network both in terms of preparing a business plan and in guiding the enterprises through the process of establishing co-operation between independent enterprises.
- **Grant schemes towards the establishment of a network:** Grant aided coverage of expenses for establishing and running a network as well as the costs of developing the networks new possibilities for exports.

The enterprises had to fulfil the following conditions for receiving grants:

- The cooperation had to be long-lasting for a group of enterprises and aimed at developing and establishing new strategic business activities.
- The cooperation had to be binding, based on a contract defining the conditions for the operation of the network, including the establishment of common functions and activities - a common firm.
- The cooperation had to be based on and reflect a considerable mutual interest in a common group of customers.

By 1993, 300 networks had been established (involving 1,500 firms) in which 42% of firms had increased turnover by 4% per annum or more, and one in five by 10% or more. One of the key success factors has been identified as the combination of trained intermediaries and financial support. This has helped to overcome the scepticism of forms towards bureaucracy, on one hand, and management consultancy, on the other.

The role of state authorities has been praised as they decided that a fundamental success factor of the programme was that the benefits of networking should be presented clearly so that a culture of networking becomes the natural option for SMEs.

In addition to the collaborative networks programme, there are a number of programmes in Northern Ireland that can be seen to actively encourage collaboration, these include:

- **Competence Centres:** Industry led R&D, operating in the longer term research area. The aim of the initiative is to achieve competitive advantage for industry in Northern Ireland by accessing the innovative capacity of the research community.

- **Grant for R&D:** The scheme assists all sizes of firms (in collaboration or in isolation) to carry out R&D projects falling under the categories of technical feasibility, industrial research and/or experimental development. The objective of the initiative is to stimulate manufacturing businesses to develop innovative and high technology products and processes within a strategic business framework that improves their national and international competitiveness.

- **R&D Collaboration and Support Service:** This initiative proactively provides and delivers targeted information and advice to Northern Ireland companies on collaborative R&D funding opportunities from the EU Framework Programme and Technology Strategy Board.

- **Innovation Vouchers initiative:** To assist Small Enterprises with R&D&I work to solve a 'knowledge question'. An objective of the initiative is to increase the interaction between Small Enterprises and publically funded research bodies (universities, colleges, etc).

- **National Industrial Symbiosis Programme (NISP):** This is a competitiveness programme which helps businesses to create sustainable commercial opportunities through the trading of resources including materials, energy and water, and the sharing of assets, logistics and expertise.

- **Enterprise Europe Network (EEN):** The EEN is the largest network of contact points providing information and advice to EU companies on EU matters, in particular SMEs. The EEN provides practical answers to specific questions in specific languages.

- **Benchmarking Club:** Cycle of six-seven half day meetings between June and September. Meetings are usually held in Belfast, but may include site visits within and outside Northern Ireland and seminars or presentations by invited expert speakers. It provides businesses with the opportunity to benchmark performance including sharing up to date information and best practice, network with other businesses.

- **Best Practice Clubs:** Cycle of lunch time meetings in seven locations across NI, usually seven meetings in each location. Each meeting comprises presentation on a specific topic by an invited speaker, Q&A, networking opportunities, signposting to other support programmes, information sources etc.

The 2007 study of the all-island economy (BIIGC, 2007) stated that the creation of all-island business networks should be one of the high level goals for the two Governments on the island. The study stated that *"Co-operation between North and South in developing cross-border business networks has the potential to enhance knowledge transfer and business links, essential in stimulating business growth in the region"*. The National Development Plan (2007-2013) also recognised the importance of networks as an enterprise promotion policy tool, particularly on an all-island basis. The plan notes that: *"Developing all-island business networks can help stimulate greater innovation. Opening up such networks, such as training networks, can help, linking businesses and academics throughout the island"*. The recent ***"Independent Review of Economic Policy in Northern Ireland"*** (DETI [NI], 2010) noted that *"on an all-island basis,*

there is potential for further clustering and that this should be encouraged on a sectoral basis".

At an all-island level InterTradeIreland supports the development of business networks on a cross-border basis. In addition to supporting the development of such networks through their general activities, the organisation administers two key programmes to support the development of business collaboration:

- **Fusion:** Fusion is an ongoing all-island 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.

- **INNOVA:** This is an all-island collaborative R&D initiative that stimulates, promotes and supports R&D co-operation between companies, North and South.

The closer integration of the two economies on the island is demonstrated by the development of an increasing number of mutually beneficial collaborative business networks. Networks are emerging that have the potential for significant cross-border activity between both parts of Ireland such as software, health/biotechnology, polymer and plastics sectors. These are being developed with the support of InterTradeIreland, and enterprise agencies in Ireland and Northern Ireland.

3.6 The policy approach on the island of Ireland compared to other economies

In order to compare network policy approaches on the island of Ireland with those of other countries, it is informative to distil a number of specific characteristics of network policy on the island. Some of these will be found in a small number of other countries as well, but these countries are different, depending on the characteristic under consideration.

- The two economies of Ireland do not have a specific network policy. Instead network and cluster policy has been an integral part of other economic strategy documents. It could be argued that this has caused network and cluster policy to receive only limited focus and consideration within the economic development sphere within Government departments. By having its own policy, networks could be considered alongside existing economic strategy / plans. There is some evidence to suggest that by planning networks and cluster development around existing economic development and infrastructure plans, significant economic benefits can be realised (Box 3.2).

Box 3.2: Medicon Valley Network (Denmark and Sweden) - an example of a successful cross-border network in a growth sector

The Øresund is a narrow strait between the Copenhagen area of Denmark and the southern Skåne area of Sweden. In 2000 the Øresund Bridge was completed, carrying road and rail traffic across the straight and making the area the most densely populated region in Scandinavia. In addition, the accession of the Baltic States to the EU have also given the region a new strategic importance in trading and commercial terms.

Medicon Valley encompasses more than 400 companies from the health and life sciences sector, creates, as an annual average, a dozen start-ups, and brings together 10 universities, 5000 biomedical researchers, 5 science parks and 33 hospitals. After capitalising on existing links between the area's universities and biomedical sector, **the region is now one of the leading biomedical regions in Europe and today accounts for 60% of all Scandinavian life science exports.** It is now one of the top 10 European regions for biotechnology and applied microbiology, immunology and oncology.

Although much of the area's economy was resolutely low-tech, a biomedical science industry had been slowly growing for many decades. Many research-intensive pharmaceutical firms have been in operation on both sides of the border since around the First World War. These businesses had long-established links with the region's 14 universities. In the mid 1990s, with the prospect of the Øresund bridge in sight, the Universities of Lund and Copenhagen set about extending and deepening those links across national borders.

In 1997, business and research communities on both sides of the border came together to form the Medicon Valley Alliance (MVA). MVA is a regional Danish/Swedish member financed network organisation within the biotech and life science area. MVA has more than 400 members within biotech and medtech companies, pharma companies, all relevant university faculties and hospitals, as well as service providers and public organisations located in the Medicon Valley region. Its aim to improve links between biomedical firms, business services and financial companies.

The MVA also promotes the Øresund Science Region (ØSR). Established in 2001, the ØSR is "owned" by a partnership of 14 local universities designed to promote research and educational cooperation. Its activities include matchmaking, benchmarking, technology transfer and marketing. Since the arrival of the ØSR other equivalent networking organisations - known as platform alliances – have been created to cover IT, food, logistics and the environment. The commitment of its members was demonstrated in 2007 when regional authorities attempted to take over ownership of ØSR. The situation was only resolved when the Danish Confederation of Industry, with support from its Swedish counterpart, stated that if the regional authorities took over the ØSR, industrialists would withdraw from the network, such was their commitment to and belief in the ØSR and MVA.

The network demonstrates how important wider economic and infrastructure developments can be in developing successful networks. This case also demonstrates the important role that universities can play. In this case universities were able to facilitate and host business networks thanks to a combination of their in-depth knowledge and neutrality.

- Networking policy on the island is characterised by a strong cross-border element. This development is partly facilitated by the existence of historical, cultural/economic links, which the Belfast Agreement in 1998 has developed through greater cross-border cooperation. InterTradeIreland was given the responsibility to stimulate greater cooperation on economic issues. Towards this goal, the organisation has been particularly active in the development of all-island business and innovation networks. Other countries with similar levels of common interests leading to cross-border cluster and business networking policies can be found in the Baltic Sea Region (Commission TWCCEU, 2008).

- Ireland and Northern Ireland are characterised by the involvement of a relatively high number of agencies involved in the implementation of business network activities. According to a recent policy mapping exercise (Oxford Research, 2008), Ireland, with eight agencies, has a relatively similar number of agencies to Finland, a country that is often referred to as a leader in network policy.

Box 3.3: The development of an ICT cluster in Portland, Oregon

In Portland, Oregon (US), an ICT cluster has been developed from two large high-tech companies (Intel and Tektronix). More than half of the 300 high-tech start-ups in the region since 1970 were founded by individuals closely connected to one or two of the 'anchor' firms. A number of factors have influenced this pattern of growth. Firstly, the area is situated less than 100 miles from Seattle, a city with a considerable high-tech presence, and Portland was therefore well-positioned to attract ICT workers / researchers and businesses that were looking for the combination of a high quality of life and access to relatively inexpensive labour.

Secondly, Tektronix and Intel both have a long standing presence in Portland, with operations dating back to 1946 and 1976 respectively. Thirdly, the anchor firms are in the electronics / computing sectors which are particularly conducive to the development of clusters given the intensity of R&D expenditure and the relatively low barriers to entry in the spin-off software industry. Finally, the area offers a particularly fertile environment for entrepreneurship, offering excellent communications links, tax breaks on capital investments and a sizeable venture capital market which provides the necessary networks and finance for entrepreneurs.

- Network policy in the two jurisdictions is characterised by a prominent role for foreign direct investment and overseas companies. This can be explained by the recent industrial development history that has strongly and successfully relied on the attraction of overseas investment. Other countries, with similar industrial structures and policies include Wales, Scotland, and some of the New Member States in Eastern Europe, including Estonia. In order to reap the full benefits from FDI, successful countries / regions have made a concerted effort to embed major investors into the local economy, both to retain them for the longer term, and also to capture the positive spillover impacts for indigenous companies and the local economy (Box 3.3).

- Network policy on the island is focussed on a relatively small number of (potential) growth sectors. Attention for "low tech" sectors is limited. The report by the Enterprise Strategy Group (2004), "Ahead of the Curve", identifies internationally traded services; pharmaceutical/ biotechnology; food and drink; ICT; medical technologies; engineering and consumer goods. The "Knowledge and Enterprise Clusters in Ireland" document published by the Department of Trade and Employment (DETE, 2008) specifically promotes the bio/ pharma, ICT and internationally traded services clusters. In Northern Ireland most support is given through Invest NI's collaborative networks programme, and the organisation has a number of target sectors similar to the sectors mentioned above that have the most significant growth potential. This focus is partly driven by the fact that these are (or have the potential to be) significant industries, as a result of foreign direct investment or an indigenous growth base, and partly driven by the market opportunity, existing company capability and a perception that these are the employment and wealth generating sectors of the future. The potential to generate spill-over effects for local firms on the island by building on the success of multinational firms could perhaps be exploited better as has been the case in other countries such as Finland (Box 3.4).

Box 3.4: Cluster development around a successful firm in Finland

Finland has built R&D capacity around Nokia as an anchor and successfully developed R&D and innovation capabilities. Finland's ICT cluster now consists of around 6,000 firms focused heavily on Nokia and its suppliers. Even though the Finnish ICT cluster comprises of a number of successful global companies, the role of Nokia as the primus motor is incontestable. It is an evolving cluster around a successful company.

Nokia have been recipients of large amounts of R&D funding, and have worked with VTT (Technical Research Centre of Finland is a globally networked contract research organisation) on joint R&D projects in the telecoms sector. In the recession of the early 1990s, the Government again supported Nokia with R&D subsidies of up to 40% of their total spend, which is credited with helping the company retain its competitive position. This continued long-term support has enabled the company to become more embedded in the local economy through developing closer working relationships with universities and other economic development organisations. In addition, rather than supporting Nokia in isolation, Finland has focused on building a telecommunications industry around the firm. Since the 1990s, long-term partnerships with local suppliers have been developed to provide parts, components and, in some cases, entire processes for Nokia products. Nokia has engaged the majority of the Finnish electronics industry – directly or indirectly - in the production process, and it is constantly looking for suitable new candidates to be attached to its network. The number of first-tier subcontractors is estimated to total some 300 companies. It is estimated that the effect of Nokia on the employment of these firms is some 14,000 employees.

More recently, Nokia has begun sub-contracting R&D and co-operating on R&D activities with its network of suppliers. These networks have enabled other local companies to share in Nokia's success, with four out of five estimated to have grown faster than 20% each year. As a result of high levels of co-operation, Finland is now ranked 11th in the world in business cluster development by the World Economic Forum (Figure 2.1).

Nokia, and Finnish ICT more generally, have been an almost classic example of the functional clusters originally described by Michael Porter:

- In Porter's model, sophisticated suppliers and customers work together to produce product and process innovations. The state supports this development through provision of specialised services, importantly including specialised education and training courses.

- In Porters' description there was often more than one dominant local producer to give an edge to competition. In Finland Nokia has completely dominated the ICT sector but has managed to generate high competitiveness through intense external competition.

4. Mapping networking activity on the island of Ireland

- There has traditionally been very little information on business networks on the island, partly due to the difficulties involved in tracking networking activity

- The number of networks on the island has effectively doubled from 110 to 240 since 2005.

- The majority of networks fall within the 'business networks' category, accounting for around two-thirds of networks on the island. Newly introduced government initiatives across the island have encouraged the formation of new business networks including Invest NI Collaborative Networks Programme and Enterprise Ireland's Industry Led Research Partnerships Initiative.

- The profile of networks is significantly weighted towards small firms, with the vast majority of network members having less than 50 employees. Networks on the island are largely comprised of membership across sectors as firms seek to collaborate with other companies in different sectors with expertise in other areas to maximise the benefits of interconnections with other industries.

- The majority of networks on the island are relatively young, with the majority being established in the past 5 years. The vast majority of networks established within the past two years fall within the 'business networks' category. This is reflective of a change in focus across the island, where networks that are more commercially focussed with specific research and commercial objectives are actively being supported by Governments on both sides of the island.

4.1 Source of mapping information

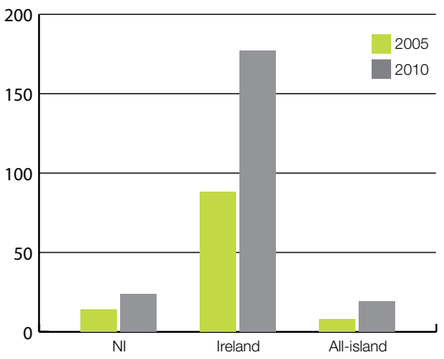
This chapter presents an analysis of the total number of networks identified during the study period. It is important to note that this section represents a snapshot in time. Networks are dynamic organisations that are constantly evolving. They can form, cease or go into suspension. Consequently, in the period between data collection and publication of this report some networks may have ceased operating and other will have come into existence.

The database of networking activity was developed through a research process that entailed updating the initial information collected as part of the 2005 study. We updated the information contained in the 2005 report and obtained funding information from the main support agencies in Ireland and Northern Ireland to identify networks currently being supported through public funding. In addition, we conducted further research to identify any new networks that had not been funded through any of the public sector institutions involved in supporting networks.

4.2 Number of networks on the island

There has traditionally been very little information available on business networks in either Ireland or Northern Ireland, partly due to the difficulties involved in tracking networking activity outlined above. InterTradeIreland led an all-agency study, commissioned in 2005, to establish the scope, range and extent of networks and clusters on the island of Ireland. The research identified that there were then 110 networks operating, while our mapping exercise has identified that there are now approximately 240 networks operating on the island, therefore the number of business networks has effectively doubled over the past five years.[6]

Figure 4.1: Network activity on the island of Ireland



Source: Oxford Economics

Most networks are located in Ireland, which accounts for 83% of business networks on the island (compared to 84% in the 2005 study). All-island business networks accounted for 7% (unchanged from 2005) and Northern Ireland-based networks accounted 10% of all networks on the island (compared to 8% in the 2005 study).[7]

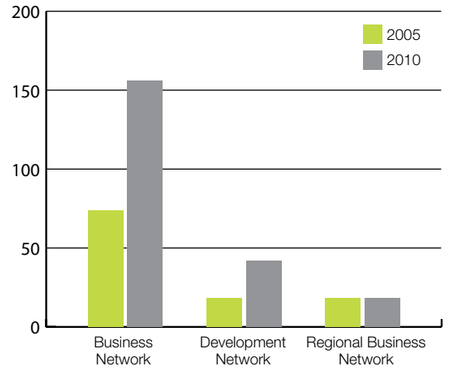
The majority of networks fall within the business category, which accounts for 68% of all networks on the island (compared to 67% in the 2005 study). The high proportion of business networks is accounted for partly by a large number of networks supported under the Skillnets programme in Ireland. Newly introduced government initiatives have also led to the formation of business networks including the Collaborative Networks Programme and Industry Led Research Partnerships programme. These types of programmes encourage the formation of more focussed 'goal orientated networks, as discussed in chapter 3.

Development networks account for approximately 19% of business networks on the island (compared to 16% in 2005), with the increase in the number of networks largely accounted for by an increase in activity from the City and County Enterprise Boards in Ireland. Regional business networks account for approximately 13% of all business networks (compared to 16% in 2005).

[6] Both this study and the 2005 study faced similar methodological issues, both sets of data represent a snapshot in time. Therefore, it would be sensible to approach this data as indicative only.

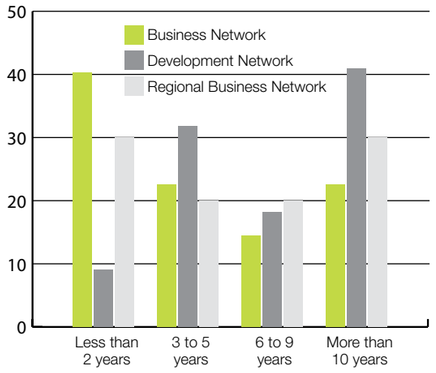
[7] Figures quoted for the 2005 study do not sum to 100% due to rounding

Figure 4.2 Business Network types



Source: Oxford Economics, PIMR

Figure 4.3 Length of time established by network types



Source: Oxford Economics, PIMR

4.3 Length of time established

The majority of networks on the island of Ireland are relatively young, with the majority being established in the past five years. Over half (56%) of networks and clusters surveyed had been established within that time period, which was a significant fall from four-fifths (81%) having been established within the past five years in 2005.

While the overall profile of networks remains relatively young, it has shifted slightly. There are now a greater proportion of older networks on the island; a number of which had been relatively youthful at the time of the 2005 study and have matured to become sustainable. There are a greater proportion of older networks within the development network and regional business cluster categories, while the vast majority of networks established within the past two years fall within the business network category. This is reflective of the change in policy focus on the island, where networks that are more commercially focussed with specific research goals and targets are being actively supported by Governments in both Ireland and Northern Ireland.

4.4 Number of participating member firms[8]

It is estimated that approximately 46,000 firms[9] are participating in networks across the island (see Table 4.1 over). There has been a significant increase in the number of firms participating in networks since their establishment, where membership has almost quadrupled in number. The largest number of firms is found in 'business networks', which account for 82% of firms (compared to 92% in 2005). Business networks (type 1) have seen the largest increase in membership of firms by 30,000, which is reflected in the changing profile of business networks over the past five years illustrated in Figure 4.2.

[8] These figures have been 'grossed-up' to be representative of all networks on the island based upon 94 survey responses. Therefore figures should be treated as indicative only.

[9] The term 'firm' includes sole traders.

4.5 Size of firms in networks

The optimum size of business networks has received some attention in the literature. Until the mid-1990s, most network studies established a simple causal relation between the size of the network and the success of the members (Aldrich & Zimmer, 1986; Larson & Starr, 1993). Recently, however, more and more qualifications are being brought forward that indicate that the relation is not that simple, nor does it necessarily have to be positive. Steier & Greenwood (2000), for instance, introduced the term 'network overload'. At a certain size the network no longer has a positive impact on the success of the companies, and may even be negative. The positive effect of a number of relations is cancelled by the amount of extra time needed to maintain new relations.

The vast majority of network members are small firms with less than 50 employees, which is in line with the theory of the firm (Marshall, 1920). This states that regional collaborations take place between small firms that are specialised in different parts of the production process of similar products. The smallness of the firms is perceived to be essential in order to provide mutual independence and trust (Markusen, 1996; Simmie & Sennet, 1999). However, there is some evidence from successful networks that having a mix of different sized firms can be the optimum (Box 4.1).

Table 4.1: Number of participating member firms by type[10]

	At start of Network	In 2005	In 2010	Increase (2005 - 2010)	% Increase
Business Network	7,500	7,900	38,000	30,100	401%
Development Network	1,500	1,000	6,100	5,100	340%
Regional Business Network	600	900	2,200	1,300	217%
Total	9,600	9,800	46,300	36,500	380%

Source: Perceptive Insight Market Research (PIMR)

[10] As many of the networks on the island are cross sectoral, and within some sectors multiple networks of different types exist, an adjustment has been made to the survey data to account for multiple membership of networks by some firms.

Box 4.1: MINALOGIC – Grenoble, France

Grenoble is located in the French region of the Rhônes-Alpes. Its strengths lie in R&D - the CEA (Commisariat à l'Energie Atomique) has been based in Grenoble since 1956.

The area has successfully diversified from nuclear physics into the more applied areas of electronics, micro and nanotechnologies, new energy technology and biotechnology, with a strong focus in applied research and technology transfer. In 2004, the French government issued a national call for proposals for PDCs (Pôle de Compétitivité – essentially partnerships of firms, training centres and public research bodies organised around a recognised science and technology market), to improve innovation and economic competitiveness.

The MINALOGIC cluster was established in 2006, following a successful bid for PDC status. MINALOGIC established a community of private and public organisations to foster research-led innovation in intelligent miniaturised products for industry.

It is governed by a board of six members. The members are key decision-makers in their own institutions (often with international experience and reputation), and can ensure a generally supportive 'climate'. Firms, education and research organisations pay a fee to be part of MINALOGIC, but are entitled to tax exemptions. They put forward collaborative micro nanotechnology or software projects for funding assessment. The proposals are analysed and evaluated and successful proposers may apply for central government approval and research funding. MINALOGIC has been designated a 'world-class' PDC, and is given priority for funding.

The importance of having large companies leading R&D activities is well recognised but MINALOGIC has put a lot of emphasis into developing tools for SMEs (including clear intellectual property agreements) so they can also participate and benefit. To encourage and support researchers to work across boundaries and disciplines, MINALOGIC has also developed new education and training programmes. In 2006, the MINALOGIC partnership comprised 52 firms, local and regional economic organisations, universities and research centres. This has grown to 161 members today. Since 2006, 122 projects had been given an 'approval label' by MINALOGIC's board, for total funding of €398.7 million, with a total R&D budget of around €1.3 billion.

Local and regional companies are being given opportunities to compete internationally through the MINALOGIC partnership. Being part of a network with larger international companies has provided them with market access. Major challenges have included involving local SMEs, who were particularly anxious about sharing resources and information with other partners. MINALOGIC has created a full-time post, to look after this sector.

Other challenges include the lapse of time between the approval of a research project, and the receipt of the money, with SMEs often unable to advance large sums of money to cover the initial costs. To address this issue, the representative of the local authorities on the MINALOGIC board agreed to provide between 30-50% of the grant amount requested to SMEs at the start of the project.

There are a higher proportion of larger firms in business networks relative to other types of networks on the island (Table 4.2), but the profile of membership in business networks still remains significantly weighted towards small firms. The profile has not changed significantly over the past five years with the exception of regional business networks, in which the membership profile has moved slightly towards smaller companies.

There is empirical evidence stating that some localised networks (in particular science based networks) have formed as part of university spin-off's, where founders stay physically close to the university because of dual occupations (Saxenian, 1991). This indicates that networks with a relatively large number of start-up firms have a higher probability of local collaboration. However, the other side of this argument would be that when too many collaborating organisations are co-located, the information that is exchanged becomes redundant, and there are therefore decreasing returns over a networks life cycle.

Table 4.2: Share of participating member firms by type[11]

	Less than 50		51 - 250		More than 251	
	2005	2010	2005	2010	2005	2010
Business Network	93%	89%	6%	7%	1%	4%
Development Network	96%	93%	3%	5%	1%	2%
Regional Business Network	83%	92%	14%	6%	1%	2%

Source: InterTradeIreland, Oxford Economics/PIMR

[11] Profile is based up 94 survey responses. Therefore figures should be treated as indicative only.

4.6 Distribution by sector

Individual networks on the island are largely comprised of a membership across sectors (Table 4.3 over). This is largely as expected, and is similar to the results from the 2005 study. For developing joint products, collaborating on research projects or developing supply chain linkages, it is much more likely that a company will need the assistance of a firm in another sector with expertise in another area, rather than collaborating with competitor firms in the same sector and similar expertise. Indeed, equating a network with a single industry misses the crucial interconnections with other industries and institutions that strongly affect competitiveness (Porter. 1989).

Table 4.3: Sectoral distribution of Networks

Sector	Number
Mixed	110
ICT	31
General Services	24
Health & Life Services	22
Food & drink / Agriculture	8
Manufacturing (Other)	7
Energy	6
Construction	6
Finance	5
Engineering	5
Retail	5
Tourism	4
Healthcare	3
Education	2
Legal	1
Transport	1

Diversity is a crucial condition for learning and innovation. Diversity is associated with the number of agents (people, firms) who are involved in a process of learning or innovation by interaction.

Next to the number of agents involved, a second dimension of diversity is the degree to which their knowledge and skills are different (Nooteboom & Gisling, 2004). There is evidence that networks are evolving to embrace a diverse membership. Indicators on publications, patents or partnerships show that these networks are becoming more inter-sectoral, more inter-organisational (linking university and industry for instance) and more international (Wagner and Leydesdorff 2005; Roijakkers and Hagedoorn 2006).

It should be noted that networks confined to a single industry can also yield positive results however, especially where capacity issues exist within a sector. For example, one of the most successful clusters is the network of businesses that formed in the Emilia-Romanga region in Italy (Box 4.2).

On the island, the sectors with the most networks are ICT and health life sciences. As key growth sectors for the future, it is encouraging that there is already evidence of significant collaborative activities within these sectors.

Box 4.2: Competitors embracing collaboration in the Italian Districts

The region in Italy of Emilia-Romanga is referred to as the birthplace of modern day networking and the 60 to 100 networks operating in the region are considered to be the most advanced networks in the world (Holmes 1995).

The Italian networks formed naturally because they were closely clustered geographically in an area with a strong artisan tradition. They collaborated so that individually they could supply large organisations that would have otherwise been outside their capabilities and resources. Consequently, they were not hard networks but were highly based on trust (Holmes 1995). Later, their government assisted them and many others with technical and marketing information (Buttery 1992). The assistance and encouragement was provided via a service centre rather than through a personalised facilitator. The result was that the Emilia-Romanga Region went from one of the poorest of Italy's 21 regions in 1970 to the second wealthiest region by 1985.

5. The pillars of effectiveness

- The firms themselves are the main drivers in the establishment of business networks, but Government agencies and, to a lesser extent, educational institutions are playing an important role in the establishment of networks.
- It is important that networks continue to be industry-led, with Government agencies supporting only where appropriate.
- To ensure the optimum consortia of members it is important to have limited membership and formal criteria and processes for network entry and exit.
- Membership on a cross-border and international basis can be of benefit to boost trade links and help to provide market access in export markets.
- Ensuring a common mission is an essential component of a successful network. Having effective structures in place is essential to build strong and sustainable networks that are capable of delivering real value added.
- Strong leadership is required to encourage synergies between member firms. While network membership may offer potential resource advantages for participating firms, it is the quality of the relationship between member firms that enables full realisation of the potential mutual benefits of collaboration.
- A large proportion of networks on the island receive assistance from public funding sources. There are a core set of networks that are heavily reliant on public money to fund their activities. There is also evidence of deadweight in some networks that have received assistance. Within the current tight fiscal environment public funding should be prioritised for networks that can demonstrate the potential to make significant economic impacts.

The way in which networks are set up is an important determinant of effectiveness. How a network is structured determines its strength and how member firms perceive the value of the network and how they behave within the network. Indeed, the level of connectedness amongst members is often the key challenge facing business networks (Saxenian, 1994), and network structure is a key determinant of connectedness. Despite the important role of networks, to date there has been limited attention paid to understanding the implementation process on network operation (Keast & Mandell, 2009).

In particular there has been limited attention directed to the overall frameworks or systems for network implementation (Blair, 2002) or the inter-relationship between implementation layers and their drivers.

In this chapter three key pillars of effectiveness are considered as they relate to networks on the island of Ireland; network formation, network structures and financing mechanisms.

Figure 5.1: The three pillars of effectiveness

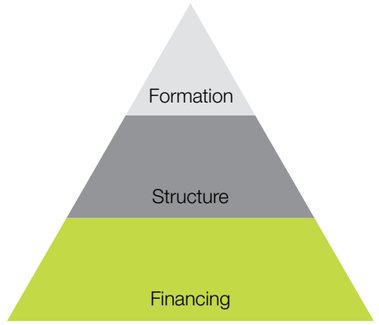
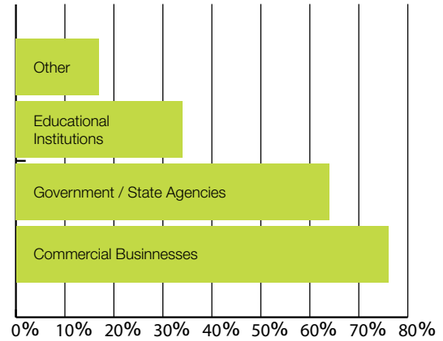


Figure 5.2: Drivers in establishment of networks and clusters



NOTE: The percentages show the number of networks and clusters that indicated involvement by all or any of these partners in the establishment of the networks and clusters.

Table 5.1: Drivers in establishment of networks and clusters

	Commercial Businesses		Government / State Agencies		Educational Institutions	
	2005	2010	2005	2010	2005	2010
Business Network	95%	84%	14%	55%	6%	42%
Development Network	39%	50%	78%	82%	6%	9%
Regional Business Clusters	89%	80%	39%	80%	6%	40%

NOTE: Figures do not sum to 100% as respondents would identify multiple stakeholders involved in the establishment of their network

5.1 Network formation

The firms themselves are the main drivers in the establishment of business networks (Figure 5.2), but Government agencies and, to a lesser extent, educational institutions are playing an important role in the establishment of networks. The formation of a network structure driven by firms to address a common objective/s means that at least some of the members recognise that their purposes cannot be achieved independently, and thus all action is interdependent.

In terms of network structure, there are some interesting differences when compared to the 2005 study (Table 5.1):

- Government agency involvement in the establishment phase has increased from 14% of business networks to 55%. This is reflective of the recent policy focus on encouraging productive collaboration between firms.
- Educational institutions are also playing an increasing role in the establishment of business networks and regional business networks, reflecting current economic policy in trying to establish links between academia and industry and promoting joint R&D projects.

Ensuring that networks are 'industry-led' is a crucial factor in the success of networks. If networks are led by business, they will be geared towards commercial outcomes. It is important in collaborations involving academia that industry leads on the research agenda. This approach is more likely to lead to a commercialisation of research outcomes, for example, new product development and sometimes the formation of new start-up companies (Box 5.1 below).

Box 5.1: Case Study – Power Electronics Industry Group

In 2004 - following a key recommendation in the Enterprise Strategy Group report, advising stakeholders in Ireland to collaborate to improve competitiveness - most of the companies involved in power electronics created an industry association, the Power Electronics Industry Group (PEIG).

The PEIG is comprised of 15 indigenous companies, 20 multi-national companies and 7 university research groups. The membership composition has had a number of advantages for Irish companies. Working alongside international companies increased awareness and knowledge of markets and the technological capacity of indigenous firms.

A key output of PEIG was a shared view on the research challenges facing members. These challenges were outlined to the research community, who were invited to propose solutions. Enterprise Ireland then evaluated the research proposals, and this resulted in the formation of seven research projects and approval for funding over a three year period. The total investment across these projects is expected to be just over €3 million. The projects are managed within Enterprise Ireland by the Power Electronics Industry Led Research Programme (ILRP).

Research-industry interaction has been useful is in enabling a start-up company, Powervation, to identify and secure a world-class CEO. A group of researchers from the University of Limerick (UL) were seriously evaluating starting up a company to provide innovative solutions in the area of digital power control, but lacked a CEO. The ILRP brought them together with Antoin Russell, formally vice-president in a multinational company to form Powervation.

Under the Power Electronics ILRP, the Stokes Institute at UL has been conducting research on energy efficient thermal management. The team at Stokes has developed novel air- and liquid-cooling solutions for high-end microprocessors. The team are actively engaged in commercialising their thermal management technology to equipment providers in data communications, data storage and telecoms sectors.

The increasingly important role of educational institutions over the past five years is reflective of policymaker's efforts to maximise the potential of regional economic infrastructure, of which third level education institutions form a key part. In many regions, universities are portrayed as core knowledge-producing entities that can play an enhanced role in driving innovation and development processes (Cooke, 2004; Fritsch, 2002), acting as key elements of innovation systems, and providing knowledge for business and industry (Kitagawa, 2004; Thanki, 1999; Garlick, 1998; Foray and Lundvall, 1996). The transfer and commercialisation of university-generated knowledge is also taking a stronger role within government policies at a number of levels (Lambert, 2003).

Increasingly, it is not just the knowledge possessed or created by a firm internally but knowledge from external sources that is regarded as one of the key factors in the innovation process. This practice has been labelled 'open innovation' (Chesbrough, 2003) and is regarded as the hallmark of the most innovative firms. Smaller firms in a region may benefit from spillovers of university knowledge as they have fewer resources with which to generate their own knowledge (Acs, et al., 1994). Also, regional high-technology firms tend to benefit from university knowledge (Audretsch, et al., 2005). Research partnerships between firms and universities are one of the modes of engagement that have the highest impact (Perkmann and Walsh, 2007).

In order to harness the benefits of this type of collaboration, many firms and universities in the US have formed industry–university cooperative research centres (IUCRCs), which involve formal collaboration between the two. Involvement in an IUCRC has been found to increase industrial patenting activity by 4% (Adams, et al., 2001). The IUCRC's are similar to Competence Centres, industry-academic collaborative agreements and Centres for Science, Engineering & Technology (CSETs) which operate on the island. Box 5.2 overleaf provides a summary of how a CSET operates.

Box 5.2: Case Study – Digital Enterprise Research Institute (DERI)

SFI's Centres for Science, Engineering & Technology (CSETs) help link scientists and engineers in partnerships across academia and industry to address crucial research questions, foster the development of new and existing Irish-based technology companies, attract industry that could make an important contribution to Ireland and its economy, and expand educational and career opportunities in Ireland in science and engineering. DERI is one of these CSETS, established in 2003.

After more than five years of operation DERI has become an internationally recognised institute in semantic web research, education and technology transfer which directly contributes to the Irish Government's plan of transforming Ireland into a competitive knowledge economy. There are numerous diverse research projects currently underway at DERI which span financial, e-learning, health and data management systems to name just a few.

As a CSET, DERI brings together academic and industrial partners to boost innovation in science and technology, with its research focused on the Semantic Web. In the past five years DERI has developed into an internationally leading research centre, as documented by its large number of high-quality publications in core conferences, outnumbering any other research organisation world-wide in its field of research. Overall, DERI has published over 200 conference papers and more than 55 journal articles. In terms of funding, DERI has been awarded €27M by SFI since 2003. DERI has also been involved in over 20 EU projects past and present, 12 Enterprise Ireland projects, other smaller SFI funded projects and has received direct industry funding.

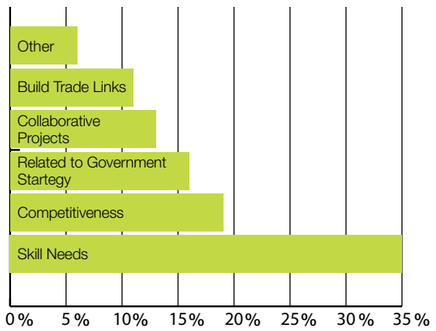
DERI has attracted companies to set up subsidiaries in Galway, for example, Cyntelix, which provides the seed for the Silicon Valley inspired "DERI Land", an eco-system of companies and research partners composed around DERI know-how and technologies, which intends to transform the region into a technological powerhouse. DERI's success over the last five years has also attracted further multi-national and local companies which expand its range of core industrial partners from Hewlett Packard to include Nortel, Cisco, Ericsson, IBM, Storm, and CelTrak.

Reasons for establishment of networks

Addressing skills and training needs is the main reason driving establishment of networks, with approximately one third of networks forming for this reason (Figure 5.3).

This has led to a significant number of training networks operating on the island, which play an important role in up-skilling, and in providing the skills that companies need to run their businesses more efficiently (Box 5.3).

Figure 5.3: Reasons for the establishment of networks



Box 5.3: Case Study – Irish Medical Devices Association (IMDA) Skillnet

IMDA is one of the Skillnets networks that aims to provide training for the medical devices sector. Funding for the network runs in two-year cycles – they have just applied for the fourth cycle.

In response to the Expert Group on Future Skills Needs (EFGSN) analysis of the medicl devices sector, and the recommendation for the up-skilling and certification of the operators in the sector, the IMDA submitted an application to establish the IMDA Skillnet.

The industry is heavily regulated, and the Irish Medicines Board and the Food and Drinks Agency (FDA) require that people are technically competent. Through the IMDA Skillnet training programme, skills of the labour force are certified and a paper trail is in place to verify this. The network is overseen by a steering committee, comprised of 12 members of the network, and it has a chair who is chief executive of one of the companies. The IMDA manage the network and are responsible for the finances. They employ a manager to operate it on a day to day basis. The manager is answerable to the steering committee.

A range of benefits accrued above training including information sharing, business contacts, direct cost reduction and best practice benchmarking. Member companies identified that the fact that it was industry led is a critical success factor.

Other key success factors included the ability to offer be flexible, and to provide training at a low cost. On-site training was run at flexible hours and has now been transferred onto an online platform. Public funding has enabled the cost to remain particularly low. If the costs were not as low as they have been the companies would not have participated as they would not have funded it by themselves entirely. However, a key future challenge is to continue to meet the training needs of member companies within an environment with less public sector funding.

Almost a fifth of networks stated their formation was to help improve competitiveness including increasing exports, overcoming issues of scale, efficient marketing techniques and developing supply chain linkages. In addition, a number of networks were formed through a direct linkage to a government strategy (16%). For example, as part of entrepreneurship policy in Ireland the City and Country Enterprise Boards have become much more involved in the establishment of Owner Manager Networks and Women's Enterprise Networks.

A slightly smaller proportion (13%) were formed to directly encourage collaborative projects, some to exploit market opportunities and some to facilitate joint research and development projects. Just over a tenth (11%) of networks were formed primarily for general networking purposes to help encourage trade links.

Almost half of Type 1 business networks were formed to address skill needs; this is due to the large number of networks funded under the Skillnets initiative in this category (Table 5.2 over). Most development networks were established through a direct link to government strategy such as the City and County Enterprise Boards initiatives highlighted above.

Table 5.2: Reasons for the establishment of networks by type

The majority of networks have maintained the same objective/purpose since formation (74%). Alternatively, some networks have changed their purpose (24%) demonstrating a flexibility to adapt to changing circumstances amongst some networks (Box 5.4).

Box 5.4: Quotations from network facilitators on the changing role of their network

"The network has become more specifically focused on business driven networks and a focus on inter company collaborations and developing partnerships between regional ICT organisations."

"It now has an equal emphasis on lifelong learning entrepreneurship and research/innovation."

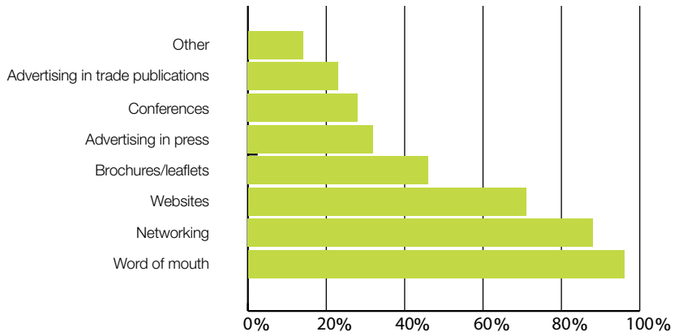
"Now includes opportunities for mentoring and even investment."

"It has become less of a general forum, and more of a seminar and Q&A sessions followed by opportunity for one to one networking."

Attracting membership:

The main methods used by networks to attract new members were through word of mouth (96%) and through general networking (88%). The use of websites (71%) for promotional purposes was also popular. Other methods used to attract new network members included brochures/leaflets (46%), advertising in the press (32%), conferences (28%) and advertising in trade publications (23%).

Figure 5.4: Mechanisms used to attrect new network members



5.2 Designing effective network structures

A network structure is typified by a broad mission and joint, strategically interdependent action. There is a strong commitment to overriding goals, and members agree to commit resources over a specified period of time. Members will have their own organisational goals therefore one of the key challenges facing business networks is dealing with the conflicts that emerge between the individual members' goals and the need to commit to joint overriding goals (Mandell 1994). As a result there is an element of risk involved.

Network structures are distinguished from traditional organisational structures in that no single person/organisation is in charge. All members have equal rights, although in practice in some networks dominant firms can emerge. This means that new forms of leadership that rely on a network facilitator are needed (Davis and Rhodes 2000; Considine 2001; Perri et al. 2002; Mandell 1994).

To understand the realities of what can be expected through network structures we must focus on the three main characteristics of network structures:

- A common mission;
- Members are interdependent; and
- A unique structural arrangement.

Table 5.3 below outlines how each of these characteristics requires new behaviours and thinking that will result in changes in expected outcomes.

Table 5.3: Characteristics and outcomes of Network structures

Characteristics of network structures	Requires	Expected outcomes
Common Mission	• Seeing the whole picture • New values and attitudes	• Each member sees themselves as one piece of a total issue • Synergies develop • Doing more with less • Developing meaningful business solutions • Increasing power by collectively speaking through one voice • Seeing points of convergence rather than contention
Members are interdependent	• Changing perceptions • Understanding the strengths of other network members	• Building relationships is primary, tasks are secondary • Building trust between members • Developing relationships requires resource input • Bringing together different areas of expertise • Recognising the expertise of others • Resolving potential conflicts
Unique structural agreement	• Members need to represent their own organisations and the network structure	• Risk taking • Flexible innovative ideas emerge

Taking each of these characteristics of network structures in turn:

- **A Common Mission:** Key to ensuring that a network functions with a common mission is strong leadership from the network facilitator and ensuring the 'right membership'. It is key that the individuals involved in a network are committed to aims and objectives of the network. It is important to remember that although members in a network may be representatives of their organisations; this does not necessarily mean that those organisations are fully supportive of the network. Therefore, to ensure that the correct membership is in place it is important to have formal criteria and processes for entry and exit of the network.

- **Members are interdependent:** In a collaborative network the participants are interdependent. This means that although participants may represent independent organisations, members know they are dependent on each other in such a way that for the actions of one to be effective they must rely on the actions of another. There is an understanding that 'they cannot meet their interests working alone and that they share with others a common problem' (Innes & Booher, 2000). This goes beyond just resource dependence, common clients or geographic issues, although these may be involved. It involves a need to make a collective commitment to change the way in which they are operating (Mandell, 1994).

- **Unique structural agreement:** At the organisational level a number of structural characteristics have been identified in the literature as impacting on networks. They include: coordinating mechanisms; levels of cooperation; type of cooperation; number of entities; and duration of agreements (Provan et al. 1980; Powell 1990; Kickert et al. 1997; Keast et al. 2004). Network structures must have the ability to build mutual goodwill and commitment among the participants. Network structures must be based upon a common goal and encourage members to recognise their interdependence in order to build this goodwill and commitment. At this level therefore the effectiveness of the network is determined by the degree to which the structural characteristics allow for the development of a common vision and commitment to the whole, the extent to which all stakeholders are included in the process and that the interdependence of the participants is recognised.

Network effectiveness is therefore determined by the extent to which participants have developed not only a better understanding of each other, but whether they have developed a shared language and culture, effective ways of communicating and the ability to find common ground. An example of a relatively young network is summarised in Box 5.5 overleaf, which has carefully considered its network structure in its formation.[12]

[12] An interesting point from the case study is that the network is international, as opposed to a localised network. There is evidence of a greater role being played by non-localised networks (Huggins and Izushi, 2007). For example, in the high-technology setting of Cambridge in the UK many actors report global networks to be of greater significance to their operations (Athreye, 2004; Garnsey and Heffernan, 2005). Also, in Canada's high-technology city of Ottawa, sometimes referred to as Silicon Valley North, it is found that while local networks continue to provide mechanisms for transferring knowledge and stimulating innovation within the network, for Ottawa's high-tech community global knowledge networks are the most important sources of knowledge and innovation (Doloreux, 2004).

Box 5.5: Case Study – The Global Wind Alliance

The Global Wind Alliance (GWA) was officially launched in May 2009 with the support of Invest NI, and is a collaboration of member companies who bring together over two decades of operational and maintenance expertise in wind power.

Following a scoping study which looked at market opportunities within the wind energy sector, the GWAwas created and brings together companies from all areas of expertise, to provide one single point of access.

Unlike most collaborative networks, membership is spread across many countries including Northern Ireland, Ireland, Great Britain, Germany and Holland. The inclusion of large global firms within the membership has helped to create market entry opportunities for firms based in Northern Ireland.

The GWA has in place a sound structure for managing the collaborative network. If a new company shows an interest in joining the Alliance, a period of dialogue is entered into, during which the prospective new member can find out more about the GWA, and enabling the GWA to explore with this new company whether becoming a member is truly the correct path for them.

One of the important aspects of joining the Alliance is the ability of the new member company to possess significant potential for growth. Once it has been established that the company could realistically become part of the Alliance, the details are shared with all of the existing members, who vote to reach a majority decision on the new company joining the network. In the instance where this potential new member could be a competitor to an already existing member, this pre existing member is granted the first vote. These mechanisms ensure that the membership is strong, effective and has a degree of control in it's own membership.

The GWA also has in place operational processes to safeguard the interdependence of all the member companies, one of which is a system of managing sales enquiries. It is a requirement that each member brings one enquiry to the quarterly meetings. This is shared between all the members who then discuss and propose a collaborative solution for the client making the enquiry. Importantly, a key aim of the GWA is to develop a network which will be self-sustaining beyond 2011. The Alliance has already identified sources of private funding which are intended to become sources of revenue in the future and will secure the long-term future of the GWA, including membership fees and the application of a service charge to sales generated through the Alliance.

One of the key factors for the success of the GWA is that it has a common purpose firmly in place with its strong commercial focus. The goals of the network are articulated in the form of a business plan setting out the strategic and operational goals. The Alliance is essentially a virtual corporation, focused on business development, and this common purpose alongside strict entry, exit and governance structures serve to act as a powerful model.

From the research literature and the empirical evidence available it is clear that having robust and strategic structures in place is essential to build strong and sustainable networks that are capable of delivering real value added outcomes. Network strength is associated with a number of important benefits. For example, through repeated interactions, constituent firms are able to better assess their partners' resources and capabilities, making complementarities more visible and helping firms to organise transactions in ways that maximize the synergies between them (Bell et al., 2009; Gulati, 1995; Gulati and Gargiulo, 1999; McFadyen and Cennalla, 2004).

Strong networks expose actors' mutual dependencies and obligations, leading them to resist opportunistic behaviour because of the costly sanctions that are likely to arise (Kenis and Knoke, 2002). Not only does the increased trust associated with strong networks augment firms' willingness to exchange knowledge and other resources, it also improves their capacity to do so (Eisingerich et al., 2009; Mesquita, 2007). This is because partners require co-ordination and problem solving skills in order to capitalize upon the benefits of network membership. Indeed Uzzi (1996) argued that "coordinated adaptation" is crucial if the economic advantages of networks are to be realised. For example, Saxenian (1994) argued that the success of Silicon Valley was rooted in strong regional networks that allowed constituent firms to 'discuss common problems, debate solutions, and define the shared identities that enable an industrial community to transcend the interests of independent firms'. Thus while network membership may offer potential resource advantages for participating firms, 'it is the quality of the relationship between network members that enables true and full realisation of this potential' (Kale et al., 2000, p. 233).

5.3 Financing networks

The 2005 InterTradeIreland led research on networks on the island attempted to establish in broad terms where the funding for networks and clusters is coming from. The results indicated that a large proportion of networks charge membership fees and also receive some form of assistance from EU or State Grants (Table 5.4).

The situation has changed slightly in the five years since the initial study. There is some evidence of increase of public sector funding in the case of business networks and development networks. It should be noted that the percentage changes recorded for Regional Business Networks may be exaggerated due to the small base for this category of network.

Table 5.4: Charging of fees and State funding of networks

	Charge fees		Public / Government funding		No fees or funding	
	2005	2010	2005	2010	2005	2010
Business Network	85%	66%	78%	90%	7%	3%
Development Network	50%	55%	44%	77%	33%	5%
Regional Business Networks	22%	50%	72%	60%	11%	20%

On average, networks receive over half of their funding from public/government funding sources (Figure 5.5). Around a quarter of network funding comes from charging membership fees. Networks do also receive funding from some other sources including in kind contributions, sponsorship and other funding such as charging members for access to a specific programme or training course.

The evidence of additionality is mixed. Of those businesses in receipt of public funding almost two fifths of networks stated that none of their network activity was dependent upon public funding (Figure 5.5). In other words, there is some evidence of deadweight. On the other hand, over a quarter of networks stated that more than 40% of their network's activities were dependent upon public funding.

Network facilitators identified a number of areas where public sector assistance was used including, among other things, funding the cost of the network facilitator, contributing towards training costs. A selection of quotations from our survey of network facilitators is provided in Box 5.6 (over)to demonstrate how public funds are used.

When asked what change in public policy regarding networks could would help to make their network more effective, network facilitators pointed to an increase in the level of public funding available. However, some facilitators highlighted a more efficient use of existing funds by prioritising funding for strong networks that can demonstrate the potential to make significant economic impacts (Box 5.7 over).

A relatively large proportion of networks were broadly satisfied with both the ease of being able to find the correct source of funding and the amount of public funding available to support networks with over 40 percent satisfied with both (Figure 5.7 over). However, a significant number (over a third of networks) were dissatisfied with the level of public sector funding available and a similar number were dissatisfied with the ease of being able to find the correct source of funding.

Figure 5.5: Distribution of funding of networks

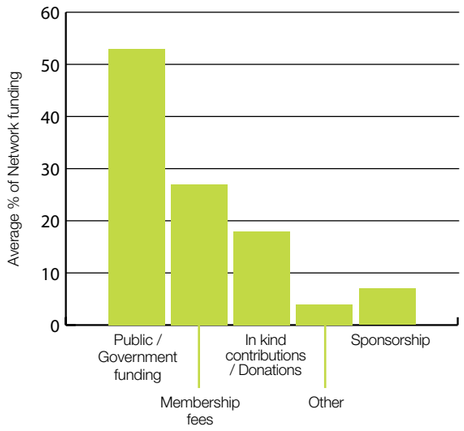
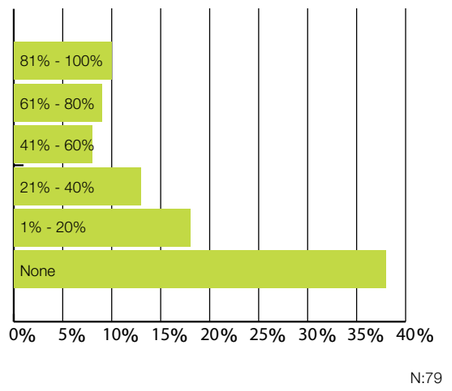


Figure 5.6: Proportion of activity dependent on public funding (for networks receiving public funding)



Box 5.6: Selected quotations from survey of network facilitators on the use of public funding

"It contributes towards the cost of some trade missions."

"Co-ordination, networking meetings, training, communications."

"Meeting the shortfall between member subscriptions and cost of running events, attracting speakers, advertising etc."

"Employment of network facilitator, research and development, project scoping and proof of concept."

"Training, event costs, network facilitator salary."

"Full time network facilitation which is used to develop business networks, partnerships and collaborations to help companies grow both in revenues and size."

"Sourcing, developing and providing high quality training courses at competitive prices."

"Almost all activities, primarily training and product development. Without the funding we wouldn't be able to employ a network manager. Realistically the network would only continue in the form of some small clusters networking regularly."

"Facilitation and coordination of the network; development of branding; some promotional activity."

Box 5.7: Selected quotations from survey of network facilitators – suggestions for changes in public funding policy

"Consistent public funding support - memberships alone will not sustain networks."

"Maintain Enterprise Boards' support for small networks."

"Reduce the complexity of the funding process and the uncertainties that exist for the future."

"Prioritise and support the effective and real value networks. Create the conditions for growth."

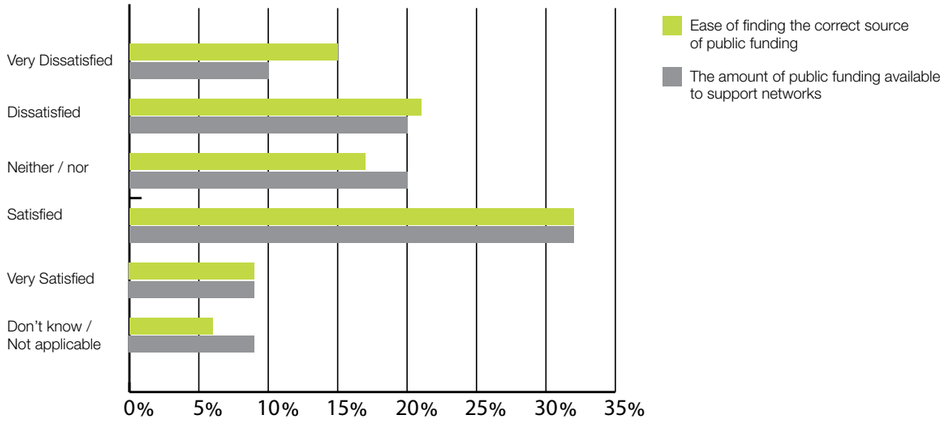
"Introduce an initiative to help companies through the patent process."

"Change funding to stronger support networks."

"Fund access to collaborative/innovation thinking mentors to train networks into becoming more creative and effective in problem solving together - move network from just an introduction service to a sustainable learning network."

"Provide some real incentive for owner managers to take networking seriously. Public campaign on the benefits of networking."

Figure 5.7: Satisfaction with the current arrangements for public funding of networks



Network facilitators were asked to provide reasons for their answer if they stated they were dissatisfied with public funding arrangements for networks. Box 5.8 summarises some of their responses.

Box 5.8: Selected quotations from survey of network facilitators on reasons for dissatisfaction with public funding arrangements for networks

"It is not easy to source as you are pushed and passed around the different agencies as none of them want to give up budget."

"Matters have become so unclear surrounding funding availability. It takes lots of energy and the use of scarce resources to try and locate additional resources. It can be a very distracting activity and takes from what we should be doing."

"Too many funding agencies, difficult to understand / contact the right agency."

"There is no one central point of contact to find out the full picture on what is available. You have to approach all sources to see what might be available."

"Because little funding is available, it questions whether the application process is worth the funding."

"Appalling lack of support for facilitation of networks (management) and marketing."

"It is too long and drawn out. Also you have to apply every year which means planning ahead is not possible."

"I don't think that business networks should be publicly funded. If a network is to be a genuine network, the membership needs to recognise its worth and value and pay accordingly."

There are a core set of networks that are heavily reliant upon public money to fund their activities. In the current economic climate with a scarcity of resources it is important that networks look to other methods of finance to ensure sustainability.

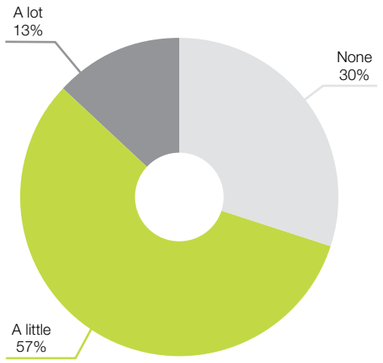
Network facilitators have identified some, albeit limited, potential for alternative sources of finance for networks. Circa 70% of networks stated that there was 'a lot' or 'a little' potential for increased funding from private sponsorship (Figure 5.8). However, almost two-fifths stated that there was no potential for increased funding through membership fees with a mere 4% stating that there was a lot of potential for additional revenue through increased membership fees.

This finding may demonstrate some networks undervaluing the impact that paying fees can have on the network, not only as a form of funding but also as a mechanism to change behaviours and attitudes amongst members while ultimately impact upon effectiveness.

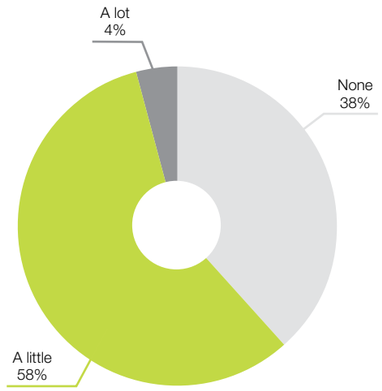
Our qualitative interviews have identified that paying fees can have an important impact on ensuring sustainability and suitably motivating members. Some quotations from our interviews are summarised in Box 5.9.

There are some differences between the views of network facilitators by geography, with networks in Northern Ireland being less optimistic on their options for developing alternative sources of finance (Figure 5.9).

Figure 5.8: Potential for alternative sources of finance



Private Sector Sponsorship



Membership Fees

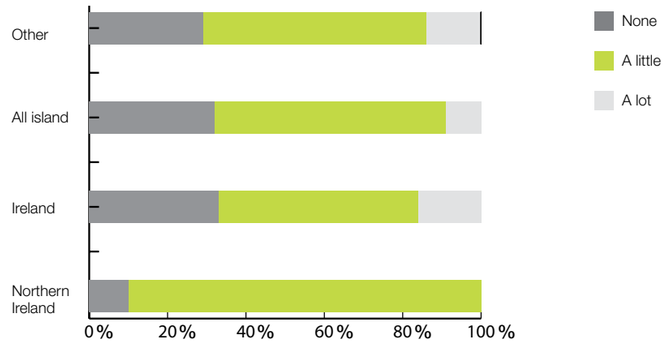
Box 5.9: selected quotations from qualitative interviews on paying membership fees

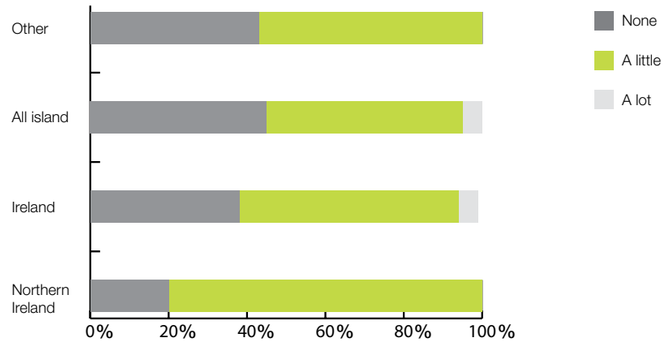
"We have designed our financing mechanisms with sustainability in mind so that the network is still functioning in 10 years time."

"Paying fees is an important determinant of a company's attitude towards network membership. If you get something for free you will treat it as a very low value added proposition."

"If you have to pay to become a member you are going to work hard to get your money's worth."

Figure 5.9: Potential for alternative sources of finance





6. Network Performance

- Views on the importance of network functions for facilitators and network members are broadly in alignment.
- Both network facilitators and network members view information sharing, establishing and maintaining business contacts and, to a lesser extent, developing skills as the most important functions to the role of networks.
- Network members considered performance gaps to be greatest in information sharing, establishing business contacts and in achieving direct cost reductions.
- Technology is an important channel of communication that can be used to encourage interaction between network members.
- Networks can play an advisory role to education providers to help design programmes and courses that will help to meet the skill needs of the future.

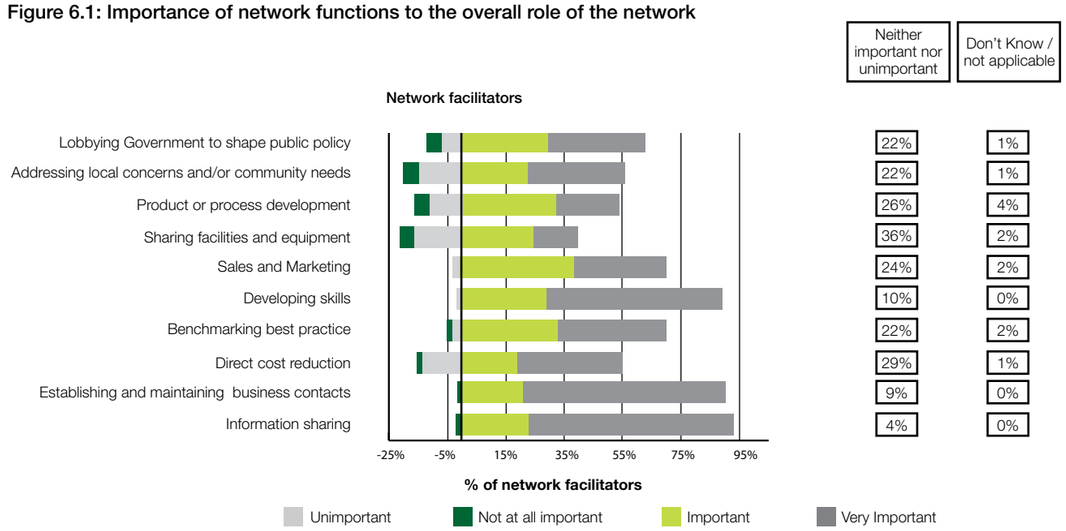
6.1 Key network functions

If networks are to be effective it is essential that network facilitators and members perceptions of the role of the network are aligned. A network will not be effective if it does not effectively meet the business need of its membership. In our survey of facilitators and network members we asked how important each stakeholder felt a number of network functions were to the role of the network. The results are illustrated in figure 6.1 overleaf.

Two features are striking from this analysis. Firstly, views on the importance of network functions for facilitators and network members are broadly in alignment. This is an important criterion for network success, as facilitators can provide leadership within a network and run networks in a manner that prioritises areas that are important network members. Both facilitators and networks view information sharing, establishing and maintaining business contacts and, to a lesser extent, developing skills as the most important functions of the network. The least important functions were sharing facilities and equipment and direct cost reductions. Secondly, although the survey results for both network facilitators and network members follow a similar distribution across network functions, the responses of network facilitators are relatively more positive than the responses of the network members across all network functions.

Establishing and maintaining business contacts and information sharing were the areas in which networks were viewed to be most effective when taking a holistic view across all stakeholders (see Figure 6.2 on page 57).

Figure 6.1: Importance of network functions to the overall role of the network



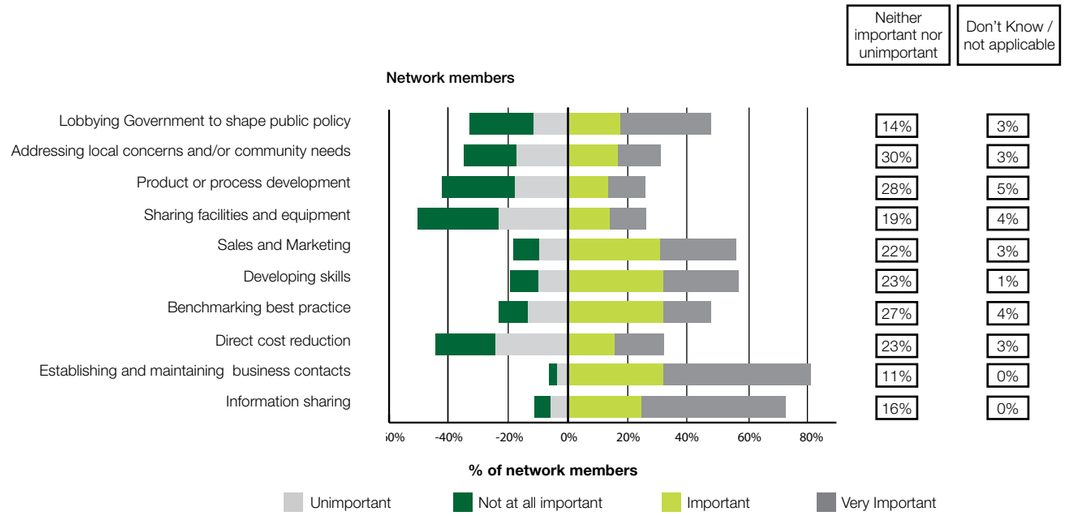
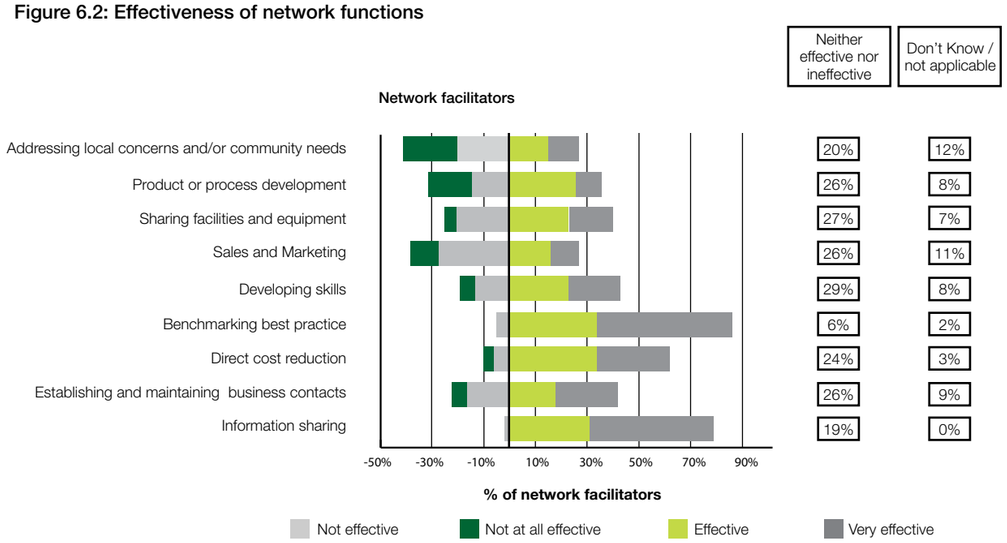
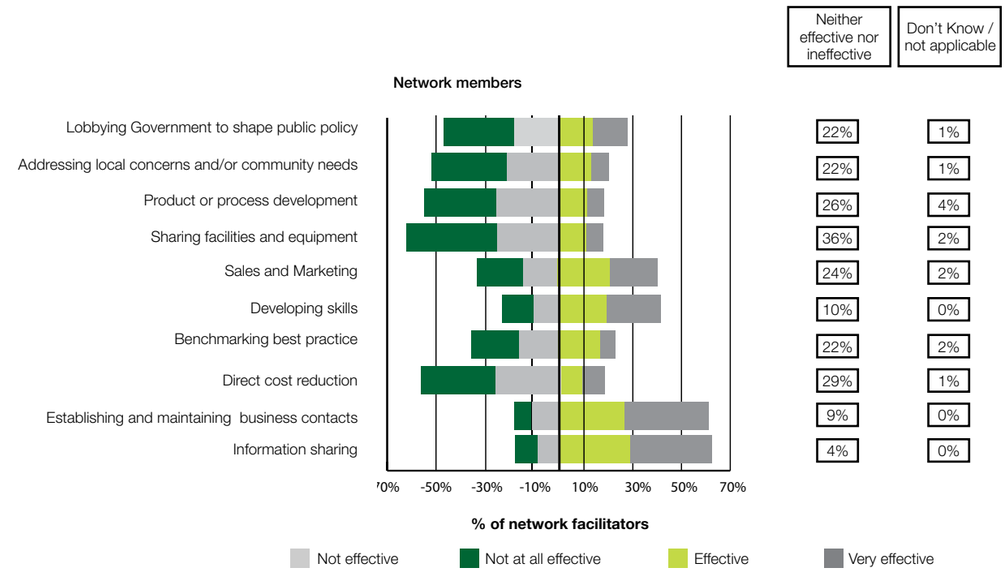


Figure 6.2: Effectiveness of network functions





Network facilitation

When facilitators were asked to provide examples of how they had been effective in establishing and maintaining business contacts and information sharing it was clear that hosting events and the use of social network based virtual communities is important. A summary of some of the reasons, cited by the 79% of facilitators who believed their network was effective, are summarised in Box 6.1 below.

Channels of communication

A virtual community is a large internet-based site offering a range of online services, including access to social environments, community services, municipal information, and e-commerce to its infohabitants (Ferguson et al., 2004), and is an environment of learning and innovation (Komninos, 2002). Some networks make much more use of this technology than others, and some networks that use this technology make it a key element of their communication with members. Box 6.2 over provides an example of a network that has used social media as a key part of organising it's communication with members.

Box 6.1: Selected quotations from network facilitator survey – examples of effectiveness in encouraging and maintaining business contacts

"Holding events that bring similar people together."

"We have a directory of members (also on our website) and members meet at monthly meetings as well as organising more local meetings themselves. We also use LinkedIn and Facebook to keep in touch with both members and non-members."

"As part of the process at each meeting one or two businesses kick off the meeting with presentations on their business and seek input from the other businesses on the current issues and development plans that they have. This allows for the development of strong business contacts."

"Constant communication with members and trainers either through email, phone, or website."
"We run a private members social network for those not comfortable with social media. Otherwise we help and educate members in other network opportunities and online opportunities via LinkedIn and Twitter."

"A specially designed web portal."

"Members receive listing at each meeting of attendees at that meeting."

Box 6.2: Case study - The Digital Circle

The network was formed as a result of a sectoral strategy, and was formed following the publication of the digital content strategy for Northern Ireland with the support of Invest NI. The key objective of the network is to facilitate local digital content businesses to actively engage in meaningful collaborations that will result in business growth. Specifically, the network focuses on digital animation, mobile content, web content and e-learning/serious gaming. These are the priority areas identified in the digital content strategy.

Membership to the network is open to anyone who has some link with the sector. The membership comprises a mix of people, from employees in large corporations to sole traders. Everyone is accessible through the social network. Twitter has been key to the success of the network. It has made communicating with a large number of people very easy and cost effective.

There has been some input into developing the skill needs for the sector, with the network engaged with education institutions. Engagement with the education institutions has contributed towards the development of a course in a higher education institution directly related to the skill needs of member companies of the network.

The network has 140 registered companies, but over 300 individuals. One of the main aims of the network is to increase innovation through the development of new products. Specifically, the network has a target to generate sales of £400,000 for its member companies within its first two years. To achieve its aim the network organises workshops via Twitter with members to develop new products. Workshops are run with small numbers of people and are driven by the members themselves to ensure that only the relevant individuals attend, and avoid having generic meetings.

The network has had some success in product development as a direct result of the network workshops, particularly in developing i-phone applications. The network has generated approximately £3.5m in sales for its membership and raised over £250,000 in private finance. This represents an extremely positive return on investment relative to the £235,000 that the network has received through public funding to date.

Developing the skills of member companies

As noted above, developing the skills of member companies was considered to be one of the areas that appear to have been most effective. This is unsurprising as many of the networks have received funding under the Skillnets programme. Commercially orientated networks focussed on sales and product development can also play a role in skills development (Box 6.2, above). Indeed, learning is one of the main benefits associated with even the general process of networking that should in turn ultimately impact upon skills. An essential aspect of learning within networks is the interaction between members (Knight, 2002). Not only does learning provide gains for network members – individually and to their organisations, but also to the network itself in terms of broader collective or transformational learning. Trust and reciprocity are key factors in how learning occurs. It leads to embedded sharing of views and interpretations.

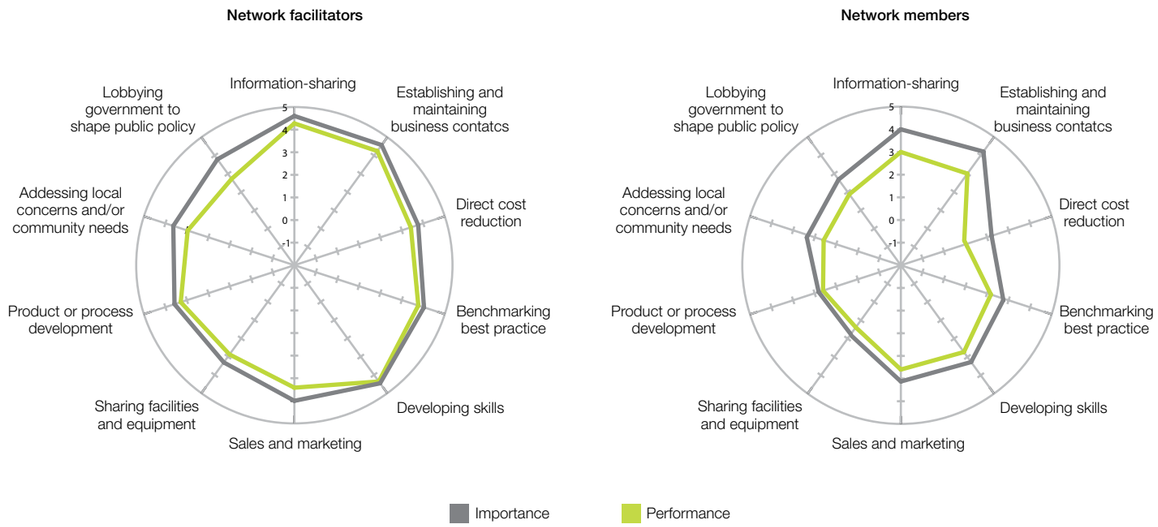
6.2 Performance Gaps

The gap analysis technique has been used to assess the extent to which expectations are being met by measuring the variance between how important stakeholders consider an activity to be and how well they perceive performance in that area. The gap analysis chart (Figure 6.3) shows the importance of each activity area plotted against perceived performance in each of the areas and the resulting "performance gap" between importance and performance.

Network facilitators viewed the smallest performance gaps to be in developing skills, benchmarking best practice and product or process development (Figure 6.3). The largest performance gaps were identified in the areas of lobbying and addressing local / community issues. This is likely to be attributable to the fact that this is only important for businesses if there is a need to change legislation or a public policy issue. Network members considered the performance gaps to be greatest in information sharing, establishing business contacts and direct cost reduction. It is important that these gaps are addressed as they are in the areas that network members identified as being most important to the role of their network.

The smallest performance gap was viewed to be in product or process development. Part of the reason for this finding was that collaborating on product and process development was not considered as important as some other areas of network activity. This is because, as we outlined earlier, not all networks are collaborative, some are more focussed on sharing information and contacts rather than collaborating together on commercial ventures. Only a limited number of networks are truly collaborative and those that are view performance to be effective in this area.

Figure 6.3: Network performance across network functions – Gap Analysis



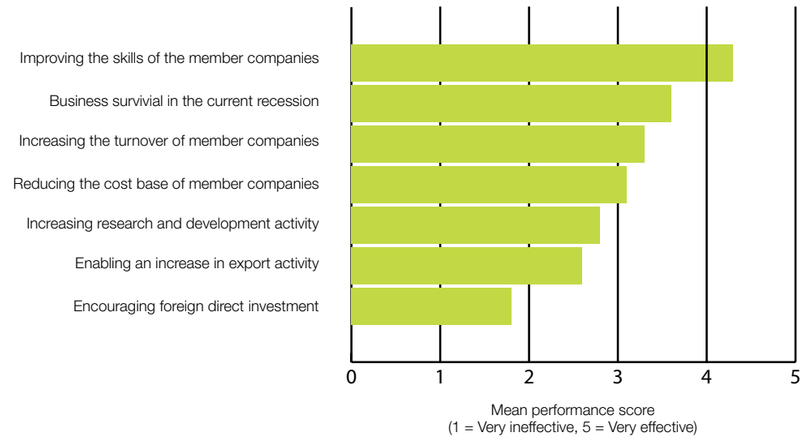
7. The economic benefits of networks

- Members of a network are more likely than other firms to engage in activities to share information to learn from other businesses, to work together on cost reduction measures to maximise competitiveness and to collaborate on commercial ventures such as the development of new products or penetration of new markets.
- Over two-fifths of network members increased sales on the island, and more than one in ten increased off-island sales as a direct result of their membership of a network.
- Over quarter of network members developed a new product or service, and almost one-fifth established a new company or business venture as a direct result of their membership of a network.
- Companies that experienced an increase in sales as a direct result of network membership, on average, increased net sales by approximately 17%.
- Almost a quarter (23%) of business network members have either created or safeguarded employment as a direct result of network membership. On average, those companies that have created / safeguarded 6 full time equivalent jobs.

7.1 Wider economic impacts of networks

With regard to economic impacts, network facilitators highlighted improving the skills of member companies as the area where networks are most effective and have the greatest economic impacts, while the importance of networks for business survival in the recession, increasing turnover and reducing costs also figure strongly (Figure 7.1).

Figure 7.1: Perceptions of economic impacts of networks



The close links between networking and learning have been outlined throughout this report, and ultimately the impact this can have on skills. Where network facilitators identified that their network had been effective in encouraging the development of skills they were asked to provide an example to demonstrate their effectiveness (Box 7.1). Their responses highlighted that skills are largely supported through network training programmes, helping companies to develop internal training programmes, signposting and sharing knowledge.

Box 7.1: Selected quotations from network facilitator survey on effectiveness in developing skills

"It has provided managers in member companies with opportunities to learn different skills from network partners, helping them grow in confidence, breadth and depth of experiences, and function outside their personal comfort zone in a more risky environment."

"We have developed our own industry qualifications."

"Some companies have developed in-house training resources as a result of their participation on our courses."

"Efficiency improvements from skills development and implementation of best practice which when applied or shared led to increased product quality and time to market for new products."

"Bringing in small companies to get assistance dealing with large customers."

One of the areas that network facilitators had identified their network as having relatively less impact is in encouraging exports. Facilitators identified that their main activities in encouraging exports has been in assisting with product launches, trade missions, R&D activities and enabling the right skills for exporting through training (Box 7.2 over). It should also be remembered from our earlier case studies that networks with an open membership that includes global companies can help to provide market entry for firms into global markets.

Box 7.2: Selected quotations from network facilitator survey on effectiveness in enabling an increase in export sales

"Seminars & workshops to encourage export & growth have been delivered."

"A lot of companies were export orientated, helped them work better at achieving their own goals."

"Providing the right skills and training companies to take a global view."

"Through business network development & individual business recruitment to development of network support programmes which allows businesses to develop new markets through their partners or through new product launches to GB, Europe and other international regions."

"Identifying and progressing new R&D projects which open new export markets for the members."

Encouraging investment in research and development activities is becoming increasingly important for business networks in today's knowledge and innovation driven economy. Network facilitators perceived performance in this area to be marginally better than in the area of encouraging exports. Some examples of activities identified by network facilitators which networks have undertaken as part of encouraging research and development are summarised in Box 7.3 below.

Box 7.3: Selected quotations from network facilitator survey on effectiveness in encouraging R&D activity

"It has involved universities and industry and customers working together on real life projects."

"Introducing companies to 3rd level institutions, to work together on research and product development."

"Contributing to the knowledge economy and providing skilled business coaches to help companies change, develop and expand."

"Through promotion and recruitment of support programmes such INNOVA, Grant for R&D, Innovation Vouchers and by individual partner identification which has led to independent privately funded R&D between companies."

"The network is based on collaborative R&D."

"We have developed a collaborative research strategy on research and innovation. We will use this strategy to concentrate our efforts on key areas of activity."

The area where network facilitators considered networks had least impact is in encouraging foreign direct investment to the island. It is unsurprising that this area of economic activity was considered relatively low relative to other impacts as it is only relevant for some networks (Box 7.4).

Box 7.4: Selected quotations from network facilitator survey on network effectiveness in encouraging foreign direct investment (FDI)

Note: Only 6% of network facilitators considered their network to be effective in encouraging (FDI.)

"We have successfully brought FDI into Northern Ireland."

"Because of the network, the area looks very attractive to foreign investors as a technology hub."

"The network facilitated improvement at a local level, which increased the chances of corporate investment."

"The training provided keeps companies current, and highly skilled."

"One of the network members is involved in helping drive FDI investment and I have been involved in preparing submissions for the FDI."

There is evidence in the literature that business networks and clusters can be a pull-factor in attracting FDI. A number of studies (Porter 1998; Enright 1999; Peters and Hood 2000; Romano et al, 2001; Felsenstein and Taylor 2001; Rosenberg 2002) have concluded that the geographical implication of clusters has an effect on the development of local wealth, not only attracting foreign investors, but also generating global networking and helping in the export and internationalisation process of companies as part of 'regional clusters'.

Network facilitators identified improving profitability through increasing turnover and decreasing cost bases as areas in which they made a contribution to the economy, ranking as the third and fourth most effective area in which their network has had an economic impact (Figure 7.1). Network facilitators identified introducing companies to potential customers, encouraging effective supply management as key areas in which their network had contributed to the profitability of their members (Box 7.5 over).

Box 7.5: Selected quotations from network facilitator survey on network effectiveness in improving profitability

"Helping companies achieve global sales and even local awareness has directly resulted in increased turnover and prevented similar jobs going abroad."

"A survey of our members was conducted in 2009 and the statistics revealed that membership of our network had lead to an increase in sales for a number of the businesses."

"Increasing the number of member companies has meant that members have more networking opportunities, and more external resources that they can benefit from."

"By reducing the costs by professional procurement and efficient and effective supply management."

"As a result of reducing the cost of training, and improving productivity."

"Members will often gain from discounting from other members or members contacts, they can sometimes pool resources and group buy at a discount."

A sample of businesses who were members of a business network were asked if they had experienced any changes to their business as a direct result of network membership that would in turn have an impact on the wider economy (e.g. an increase in turnover, a change in research and development expenditure etc). Only a small proportion of network members stated that they had experienced any change in most of these activities (Table 7.1). Although this is unsurprising, as we noted earlier there are different types of networks each with different goals. In other words, some networks are more commercial and focussed on profits, others are focussed on product and process innovation and some are used mainly as a vehicle for the exchange of information. Therefore we would not expect all networks to have experienced a change in their business across all of these business performance metrics.

Some key outcomes identified were that:

- Over two-fifths (42%) stated that they had experienced an increase in business turnover as a direct result of network membership. Over one-tenth (13%) stated that they had experienced an increase in off-island export sales attributable to network membership;
- A quarter (25%) stated that an increased proportion of their employees had participated in training;
- Over a fifth (21%) had experienced a direct cost reduction;
- Almost a quarter (23%) of network members had either created or safeguarded employment as a direct result of network membership; and
- Just under a tenth (8%) of network members stated that they had increased their R&D expenditure.

Table 7.1: Economic outcomes of networks

	Total	Ireland	NI
% firms whose turnover has gone up	42%	43%	40%
% of firms increasing / safeguarding employment	23%	21%	29%
% of firms increasing R&D expenditure	8%	8%	8%
% of firms increasing off-island export sales	13%	13%	13%
% of firms experiencing a reduction in costs	21%	23%	17%
% of firms increasing the proportion of their workforce receiving training	25%	26%	23%

Approximately 16% of networks stated that activity resulting from network membership had directly safeguarded employment. This complements our earlier finding that networks perceived themselves to be relatively effective in helping businesses to survive through the current recession (Figure 7.1). The work of Pennings et al (1998) had also concluded that firms engaged in networking have a higher probability of survival relative to other firms. Network facilitators highlighted that, despite the challenging economic conditions, network activities had helped to generate considerable levels of business and 48% believed that network membership had helped companies weather recession (Box 7.6).

Box 7.6: Selected quotations from network facilitator survey

"Reducing costs, better qualified staff, helping members be more competitive, helping staff retention and maintaining standards."

"Introducing members to sources of finance."

"A focus on the elimination of waste and the development of innovation has assisted companies to reduce costs and maintain competitiveness."

"Through training on debt management, business law & employment law and by updating members IT skills so they can be more effective in their jobs."

"We help members to look at creative and resourceful ways to generate business through word of mouth marketing and networking, this has focused many businesses to collaborate, create new products and services and work together with other local businesses to generate considerable levels of business despite economic conditions."

"By equipping our sector with training and skills which will enable them to diversify their practice specialisation and consequently secure work in sustainable and growth practice areas."

7.2 Quantifying net economic impact

As we noted earlier in this report, networks are diverse with varied purposes, aims and objectives making them difficult to evaluate as a whole. This is particularly the case with quantifying economic impacts. For example, some networks may be commercially focussed on business development and therefore sales and employment are appropriate metrics upon which to make an assessment of that network. Other networks are more focussed on other areas such as skills, research, information exchange etc. Therefore, some of the wider benefits and outcomes may be more appropriate metrics upon which to assess networks.

In our survey of business members we asked businesses to quantify the scale of the impact of network membership on their business. The results of this are summarised in Table 7.2 below.

Table 7.2: Economic impacts of networks[13]

	Total	Ireland	NI
% increase in turnover	17%	17%	15%
Number of jobs created / safeguarded per company	6	7	3
% increase in R&D expenditure	10%	10%	12%
% increase in off-island exports	8%	9%	6%
% reduction in costs	8%	9%	5%

Companies experiencing an increase in turnover as a direct result of network membership, on average, increased net sales by 17%.
On average, those companies that have created or safeguarded employment as a direct result of network membership have created 6 full time equivalent jobs. While at first glance a 10% increase in R&D expenditure may appear to be relatively small, when considered within the context of low R&D expenditure in indigenous companies on the island, a 10% increase in R&D spend would make a significant potential to the economy. Similarly, an 8% increase in off-island sales would make a significant contribution to export growth.

[13] It had originally been the intention that this research would provide an economic estimate of the economic impact of networks across the island in monetary terms. This has not been possible for two main reasons because the scale of grossing up required is much greater than originally anticipated due to a much larger incidence of network membership than recorded in 2005. Grossing up to this extent based on a relatively small scale survey would not produce statistically significant results. In addition, there appears to be significant overlap between networks, with many firms being members of multiple networks. If a gross up approach were to be adopted, this would have caused greater uncertainty. For reason we have chosen to present the results of the survey in percentage terms, providing some indicative findings on the impact that businesses network membership has had on the sample of business that we have surveyed.

7.3 Assessing economic outcomes

While the number of businesses experiencing a change in the business outcomes highlighted above (Table 7.1) may appear to be low, our survey of business members does provide evidence of value adding activity that businesses did not previously participate in (Table 7.3).

Table 7.3: Business network members – participation profile

	Did before network	Currently does	Plans to do	None of these	Not applicable
					3.0%
Participate in network training activities	6.0%	79.0%	10.0%	13.0%	1.0%
					20.0%
Prepare joint marketing materials or share the cost of trade shows with other companies	5.0%	20.0%	10.0%	59.0%	9.0%
					10.0%
Co-operate with other companies in meeting the procurement, design or quality requirements	9.0%	32.0%	7.0%	48.0%	11.0%
					8.0%
Co-operate with other companies in collaborative research, development or design	5.0%	32.0%	5.0%	51.0%	12.0%

There is clear evidence that companies that are members of business networks participate in collaborative, coordinative and co-operative activities that they would not have done prior to network membership.

- **Collaborative activities:** Only 5% of network members engaged in collaborative research, development or design prior to network membership. This has increased to 32% of network members engaging in this activity upon membership of the network, with a further 5% of companies planning to participate in the future. Similarly, 9% of network members co-operated with other companies in meeting procurement, design or quality requirements. After network membership 32% of network members have began to participate in this activity, with a further 7% planning to do so in the future.
- **Co-coordination of activities:** A quarter of network members currently bid on contracts with other companies with a further 7% planning to do so in the future, compared to only 6% of companies prior to network membership. Similarly, before network membership only 5% of companies prepared joint marketing materials or shared the cost of trade shows with other companies. This increased to 20% upon network membership with a further 10% of network members planning to do so in the future. Only 3% of network members would have purchased raw materials on a group basis prior to network membership, this increased to 16% upon network membership.
- **Cooperative activities:** A tenth (10%) of network members would have shared technical capabilities with other companies when not attached to a network, this increased to 36% upon network membership with a further 6% planning to share technical information in the future. A relatively high proportion of business network members would have visited other companies when unattached to a network (40%), this increased further upon network membership (56%).

Clearly network membership has encouraged participation in collaborative business activities that are likely to lead to economic benefits. Networks can play a role encouraging companies to collaborate by addressing market failures that exist and encouraging key stakeholders to come together to form joint solutions that would not otherwise have done so. Box 7.7 provides an example of a network with which we consulted that has helped to overcome a market failure in their sector.

Box 7.7: Case Study – ABC Collaborations

ABC Collaborations is a Life Sciences and Health Technologies network in Northern Ireland. The network was formed on the back of a scoping study which involved a survey to determine what was needed in the market. Innovation in the sector requires participation from:

- Academia;
- Business; and
- Clinicians.

The primary purpose of the ABC network is to facilitate collaborative opportunities for academia, business and clinicians in Northern Ireland. The network has run two key projects involving brokering research links and facilitating collaborative projects to develop medical devices products. Rather than having a direct sales and marketing role, the network sees its role as more of a signposting organisation - putting members in contact with the right people for them to access support.

An element of best practice identified by the network has been its ability to get all the key stakeholders to meet at an early stage. In the past, products in the sector have failed as they have not received endorsement from clinicians. This is a key issue in the sector that needed to be overcome. The network facilitates meetings and discussions between business, academia and clinicians to build a relationship, get early clinical endorsement and subsequently get the products to market.

The network is an example of successfully developing a collaborative network using a bottom-up approach. Collaborative networks work best with a lead company with a product idea that is missing pieces, then taking forward the idea with other firms in the network that can fill the missing pieces required to take a product to market. Initial outputs indicate a positive return on investment. The network has received £148,000 in government assistance and has generated £3.5 million in revenue.

The network also has close links with other network organisations in Ireland including the Irish Medical Devices Association and the Irish Biomedical Association. They are currently developing an all-island network (ABC Ireland), demonstrating recognition of the benefits that cross-border collaboration can bring.

Our survey of network members identified that by participating in network activities almost half of member companies (48%) had found new customers inside their network and over half (55%) had found new customers outside the network (Table 7.2). This has helped over two-fifths (42%) of companies that are members of business networks to increase sales on the island (including cross-border trade), while almost a quarter (23%) of network member companies had either experienced or expected to experience an increase in off-island sales. Network membership has also enabled over a quarter (26%) of network members to develop a new product or service.

Table 7.4: Business network members – profile of economic outcomes

	Experienced	Expect to experience	Neither	Not applicable
				2.0%
Found new customers outside the network	55.0%	9.0%	35.0%	2.0%
				7.0%
Found new suppliers outside the network	38.0%	9.0%	47.0%	6.0%
				7.0%
Reduced costs by group purchasing, marketing or equipment sharing	14.0%	8.0%	68.0%	10.0%
				3.0%
Increased sales off-island sales	13.0%	10.0%	65.0%	11.0%
Established a new company or business venture	17.0%	7.0%	72.0%	4.0%

Similarly, network membership has enabled companies to find new suppliers both inside (40%) and outside (38%) the network. Therefore network membership clearly encourages strong supply chain linkages where cost savings can be achieved. In addition, 14% of companies that are members of business networks have experienced reduced costs by group purchasing, marketing or equipment sharing.

Interestingly, 17% of network members identified that as a result of network membership they have established a new company or business venture. Networks have been quite successful in this area as they contribute to the entrepreneurial process in three ways:

- **The ability to discover opportunities:** an important source of new ideas and lucrative opportunities may be the networks, in which the entrepreneur is actively participating. Hills, Lumpkin and Singh (1997) found that about 50% of entrepreneurs identified ideas for new ventures through network membership.
- **The ability to secure resources:** providing access to resources is an important contribution of networks to the venturing process. Entrepreneurs rarely possess all the resources required to seize an opportunity. One of the crucial tasks in a new venture is to access, mobilize and deploy resources.
- **The ability to gain legitimacy:** a network is useful to start-up companies as it opens possibilities to gain legitimacy. Gaining legitimacy is imperative in starting something that is considered innovative (DiMaggio, 1992). Start-ups face higher risks of failure than established companies. Network ties may result in getting associated with respected players in the field.

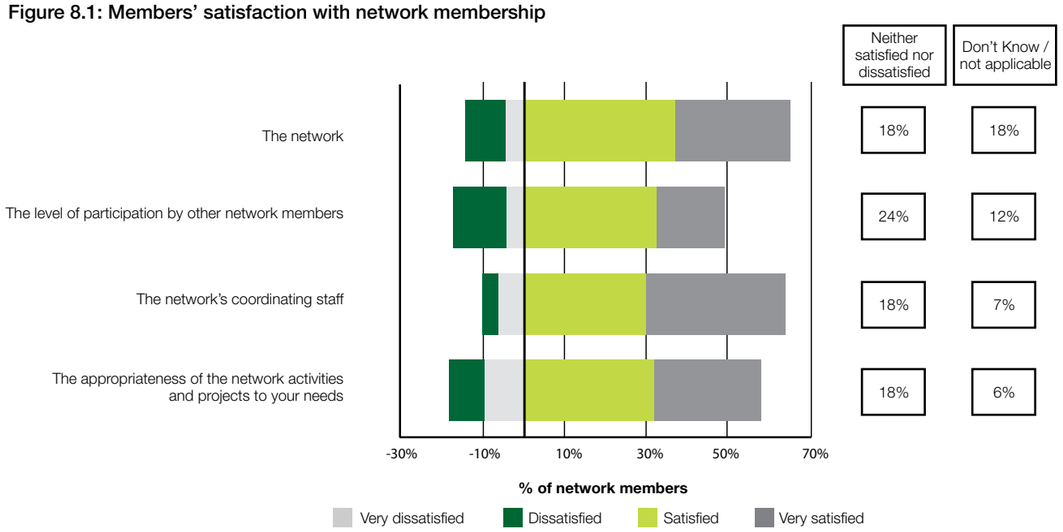
8. Key success factors and barriers to effectiveness

- Network facilitation, business leadership and having a common purpose were all identified by facilitators as being important enablers of effectiveness.
- These are all linked to having the right type of leadership to help steer network processes. One of the unique features of networks is the synergies that can be created through the diverse membership represented in them. Synergy will not occur without the right type of leadership in place that is able to build relationships, identify and capitalise on the opportunities that arise from the pooling of resources. Therefore effective facilitation is key to network success.
- Network facilitators identified the greatest barriers to network effectiveness to be access to finance, a lack of commitment of other member firms and a lack of members time. Network members also highlighted a lack of commitment and a lack of time to be significant barriers.
- Trust is also an important determinant of success, and it takes time to build relationships that lead to trust between businesses.

8.1 Members views of networks

Overall, businesses that were members of a network were broadly satisfied with their network. Almost two-thirds (65%) of network member stated that they were either very satisfied or satisfied with their network. Members in Northern Ireland were slightly more positive with regard to their overall satisfaction, 75% stated that they were either very satisfied or satisfied with their network compared to 61% of members in Ireland.

Figure 8.1: Members' satisfaction with network membership



Members were less satisfied with the level of participation by other network members, less than half (49%) of network members stating that they were satisfied with other members participation levels. Members of Type 1 business networks (22%) were slightly more dissatisfied than members of Type 2 development networks (9%); this is likely to be attributable to the fact that the success of business networks is more dependent upon member commitment than development networks.

Network members were satisfied with the co-ordinating staff at their network, with 64% either very satisfied or satisfied. Companies in Northern Ireland were slightly more satisfied (77%) than companies in Ireland (61%). Companies were also broadly satisfied that the activity of their network was meeting their needs, with over half (58%) stating that they were either satisfied or very satisfied.

Box 8.1 below summarises some quotations from network members when they were asked to identify some of the aspects of their networks which has worked well for their business.

Box 8.1 below summarises some quotations from network members when they were asked to identify some of the aspects of their networks which has worked well for their business.

"Networking, combining companies, mix of companies is good, putting the right people together on courses, relevant mix of staff."

"Turnover for last year was up 40% & expect turnover for this year to be up around 200% due to what the network has provided."

"Marketing evenings, and specific business support in specialist areas, such as tax planning etc. Very good having specialists teach us."

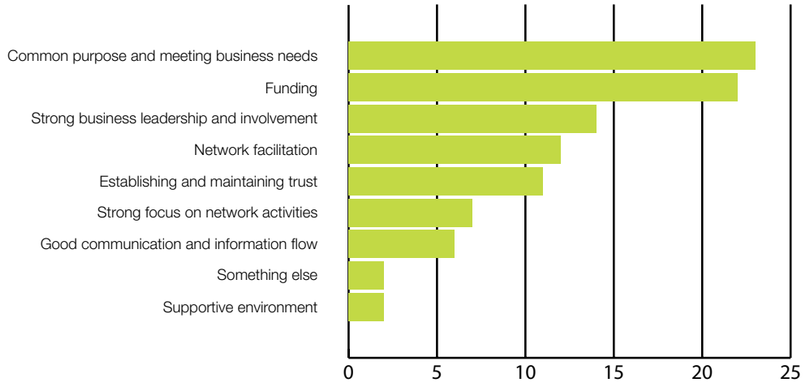
"Helping me to get my name out there & meeting new contacts."

"Holding events where experienced people can talk with others easily."

"Importance of cooperation, and benefits of cross-border relations."

8.2 Network success factors

Figure 8.2: Network facilitators' views on the single most important factor for network effectiveness.



The quality of network facilitation, business leadership and involvement and having a common purpose were all identified by network facilitators as being important enablers of network effectiveness (Figure 8.2). These factors are all linked to having the right type of leadership to help to steer network processes.

One of the unique features of networks is the synergy that can be created by the diverse membership represented in them (Lasker, Weiss and Millier, 2001). But synergy will not occur without the type of leadership that is able to build relationships, identify and capitalise on the opportunities that arise from the pooling of resources and the merging of human capital. Leaders need to leverage the particular mix of properties inherent in networks that allow the synergies to be created.

Since collaborative networks are characterised by a more complex, dynamic process the leadership function shifts from the attributes of the leaders to focus on the interactions and processes that are required to build strong and ongoing relationships capable of breaking through existing mechanisms and creating new systems and innovative responses. The term "process catalyst" (Mandell and Keast, 2009) helps to denote this new type of leadership. A process catalyst type of leadership calls for a style that is able to make connections, to bridge diverse cultures, and is able to get participants to be comfortable sharing ideas, resources and power.

There are a number of elements involved in this type of leadership. For one thing, leadership in collaborative networks involves an emphasis on establishing new terms of engagement by getting participants to listen to each other and to recognise each other's worth. The key is to not only begin to understand and respect each other, but to be able to capitalise on these relationships for further efforts. Second, rather than an emphasis on the individual organisations represented in networks, there needs to be a shift toward a collective, shared vision that includes all participants. The key is not on reaching agreement among members, per se, but rather recognising the overriding need to be committed to the program as a whole.

Leadership in collaborative networks is about building a new whole through developing collective goals. Within this role the emphasis is on the need to learn new ways of behaving and dealing with each other. This requires a high level of trust among participants which takes significant time and effort to develop.

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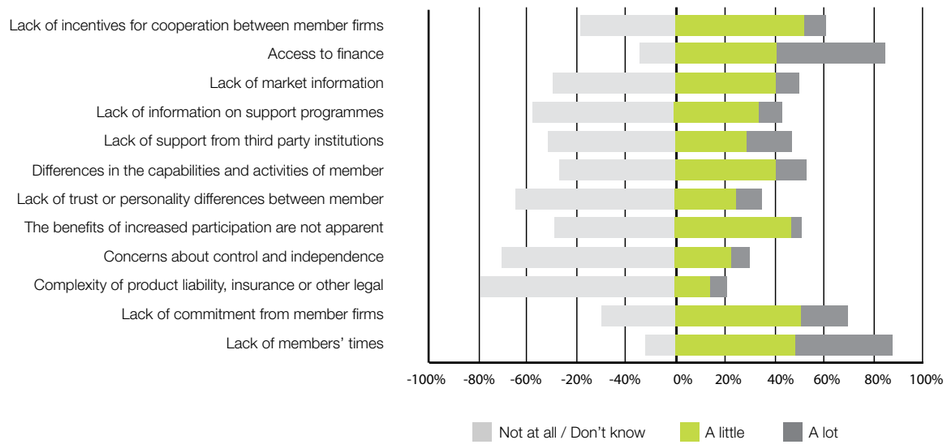
8.3 Barriers to effectiveness

Network facilitators identified the greatest barriers to network effectiveness to be access to finance, a lack of commitment of member firms and a lack of members time (Figure 8.3). Over 40% also identified that a lack of incentives for cooperation between member firms and that the benefits of increased participation not being clear were barriers to network effectiveness.

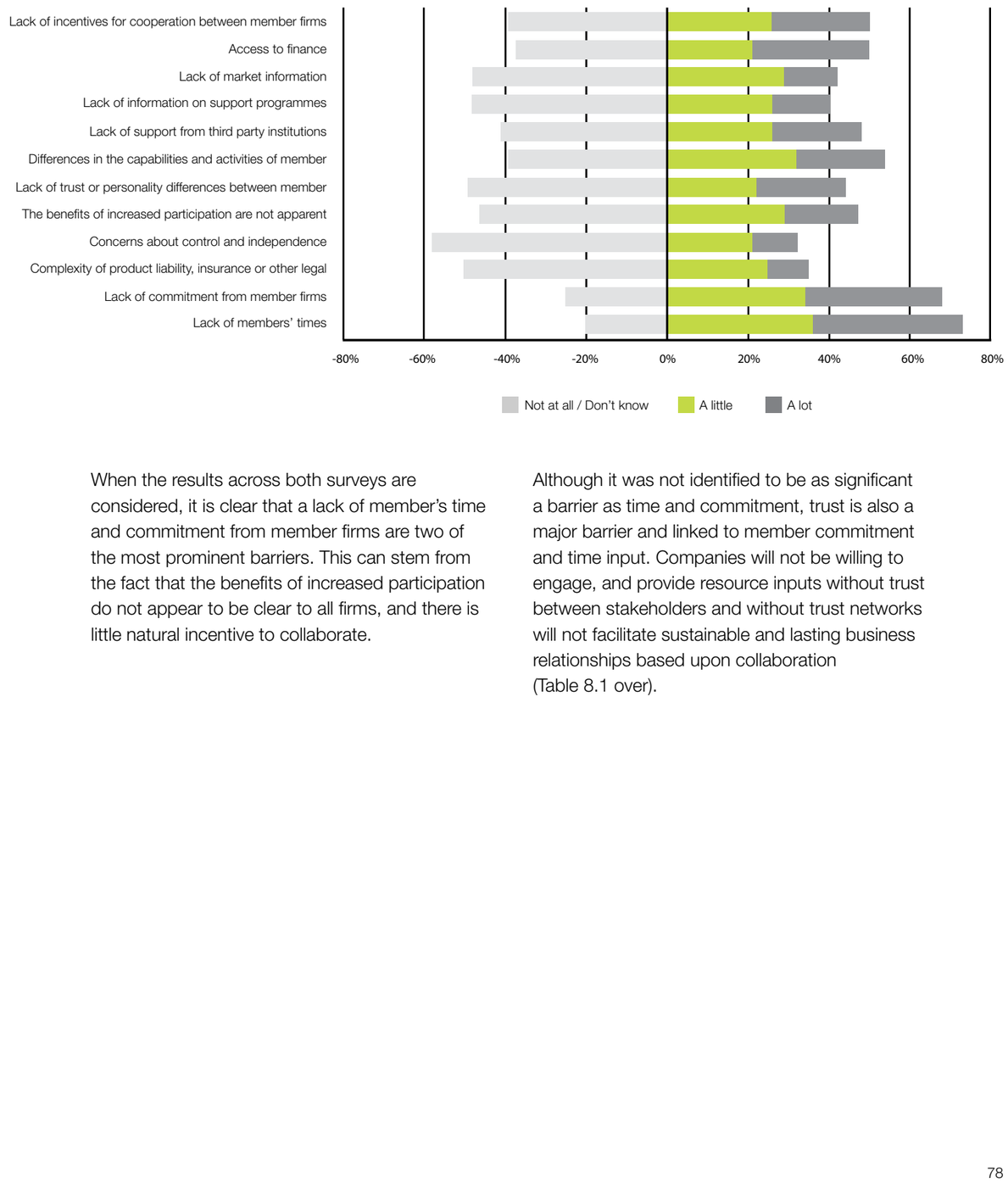
Figure 8.3: Network facilitators' views on barriers to effectiveness



Network members also highlighted a lack of commitment and a lack of time to be significant barriers. Network members also identified that a lack of incentives for cooperation between member firms and the benefits of increased participation not being clear as barriers to network effectiveness (Figure 8.4).

The overall profile of how facilitators and members perceive barriers to effectiveness is relatively similar (with the exception of access to finance), but network members consider the extent of the barriers to be smaller in scale that had been identified by facilitators.

Figure 8.4: Network members' views on barriers to effectiveness



When the results across both surveys are considered, it is clear that a lack of member's time and commitment from member firms are two of the most prominent barriers. This can stem from the fact that the benefits of increased participation do not appear to be clear to all firms, and there is little natural incentive to collaborate.

Although it was not identified to be as significant a barrier as time and commitment, trust is also a major barrier and linked to member commitment and time input. Companies will not be willing to engage, and provide resource inputs without trust between stakeholders and without trust networks will not facilitate sustainable and lasting business relationships based upon collaboration (Table 8.1 over).

Table 8.1: Network behaviours in different network types

Network Types		
Cooperative ←	**Coordinative**	→ **Collaborative**
Low trust - unstable relations	Medium trust - based on prior relations	High trust - stable relations
Infrequent communication flows	Structured communication flows	Thick communication flows
Known information sharing	'Project' related and directed information sharing	Tactic information sharing
Adjusting actions	Joint projects, joint funding, joint policy	Systems change
Independent/autonomous goals	Semi-independent goals	Dense independent relations and goals
Power remains with organisation	Power remains with organisations	Shared power
Resources - remain own	Shared resources around project	Pooled, collective resources
Commitment and accountability to own agency	Commitment and accountability to own agency and project	Commitment and accountability to the network first
Relational time frame requirement - short term	Relational time frame medium term - often based on prior projects	Relational time frame requirement - long term 3-5 years

Source: Keast & Brown, 2003; Keast et al 2007

Successful networks must be built upon trust, a common purpose, mutual understanding, shared values and behaviour that not only bind the members of networks, but also facilitate collaborative action (Cohen & Prusak, 2001). Having, a strong governance structure is key to creating the right conditions to create the appropriate environment for networks to be effective. In summary, an effective governance structure will promote the development of trust, the transfer of fine-grained information and knowledge, and joint problem-solving (Uzzi, 1996; 1997; Rowley et al., 2000).

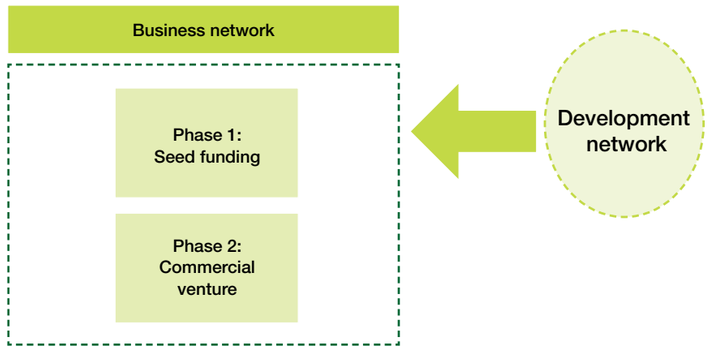
Finally, the research has shown how a large proportion of networks receive some form of assistance from EU or state agencies. On average, networks on the island receive over half of their funding from public funding sources. There are a core set of networks that are heavily reliant on public money to fund their activities.

That said, network facilitators have identified some potential for alternative sources of finance for networks. Although network facilitators have identified limited potential to charge increased fees, a commercial reality is that if the network offering is of value to a business they would be willing to pay. Therefore, as long as members value the network, they should in theory be willing to make a contribution towards its funding.

If networks are to continue be used as a tool in economic development the future approach to funding should be re-visited. Firstly, resources should be prioritised towards 'business networks' on a project basis. Any assistance given to networks should always be linked to market opportunities; this also helps to ensure that networks are industry-led. Funding should be provided to networks on the basis of a business plan with targets that are measureable and can be monitored. There should also be selection criteria for networks in place that would help to prioritise projects. For example, the funding must be used to meet objectives laid out in a business plan such as supply chain development, collaborative product development, total network R&D expenditure, sales in new external markets, etc.

There are some important issues to consider when supporting/funding 'business networks'. Given that one of the market failures associated with networks is the lack of motivation for firms to collaborate at the start of a project and that networks take time to develop into effective and cohesive vehicles capable of delivering economic outputs, it is suggested that a two phase approach is taken to funding (Figure 8.5).

Figure 8.5: Possible approach to funding



Phase 1 should involve a scoping study to research market opportunities, establish the key companies to be involved in a 'business network' and mobilise the key players. Upon delivery of a successful scoping study and business plan a network could then receive funding under Phase 2 which would be tied to commercial targets. This approach acts in the interest of the public purse as significant assistance is not given until the market opportunity is proven and all of the key players have been mobilised. Any assistance given should be regularly monitored and evaluated, and this information used as a basis for prioritising networks with a proven track record of delivery for funding. The funding under Phase 2 should only continue to be provided where there is a proven need, linked to a demonstrable economic benefit/s. In other words, the funding provided should be digressive or have a 'sunset clause' attached. The ultimate aim should be for the network to become self sustaining through a revenue stream in their business model.

9 Summary of findings

This research has identified a number of interesting conclusions with respect business networks and collaboration on the island. In some cases this provides confirmation of known trends. In other cases it identifies new challenges and issues. The main conclusions arising from the research are summarised in this section.

- **A shift in policy focus -** Since 2005 there has been a growing recognition of the importance of collaboration, and policy has developed to be supportive of this. Numerous recent policy documents make reference to encouraging collaboration. The approach taken now encourages collaboration on a 'network basis', and represents an important strategic shift from the top-down approach adopted in the 1990s.
- **Rapid growth in network activity -** The number of networks has grown substantially over the past five years, the growth patterns are broadly reflective of how policy has developed in recent years. Most networks comprise a variety of sectors, although there is evidence of an increasing incidence of networking in growth sectors such as health and life sciences and ICT. Most network members are SMEs, although a small proportion of large firms also participate, a mix of company sizes, which is reflective of the structure of the economies in both jurisdictions.
- **Networks can positively impact on company balance sheets -** There is evidence of direct economic outcomes for businesses that are members of networks. The evidence indicates some quantifiable impacts such as increases in sales, employment, R&D expenditure, exports etc. There is also evidence of unquantifiable benefits including a large proportion of firms developing new sales through the network, and supply chain benefits. Our survey also indicates that companies are more likely to jointly bid for contracts or collaborate on R&D projects if they are members of a network.
- **There is an active role for the public sector to support networks and collaboration -** Due to market failures and the dependence of networks on public funding, particularly in the early stages of scoping and network formation there is an active public sector role in encouraging the development of networks, and collaboration can play a key role in economic policy now more than ever. To overcome the challenges presented by the current recession businesses across the island need to be innovative and develop new markets abroad. This report has shown that in some instances networks can contribute positively to both export sales and research and development activity.

Public sector support can take a number of forms, including broader enterprise policy, direct funding supports, and promotional activities. The nature and scope of this support varies depending on wider policy objectives and the specific aims of the individual networks.

There are a number of key characteristics/factors which support effective networks (many of which are well documented in the literature), namely:

- **Clear and agreed business objectives supported by a defined strategic direction are central to effective networks -** The development of new networks should always be linked to market opportunities; this helps to ensure that they are industry led. Having a scoping study to research market opportunities and establish who the appropriate companies are to form a network is a good model to follow.
- **Effective leadership through facilitation can drive network performance -** The role and skills of the facilitator is an important factor for network success. The right type of leadership skills are required to effectively manage networks, to build trust and encourage network members to work together.
- **Effective network structures are crucial to encourage effective collaboration -** The membership structure and governance arrangements are key to creating the right conditions for network success. How a network is structured determines its strength and how member firms perceive the value of the network and how they behave within it.
- **To function effectively networks need to ensure the 'right membership' mix –** To ensure the optimum consortia of members it is important to have limited membership and formal criteria and processes for network entry and exit. Membership on a cross-border and international basis can be of benefit to boost trade links and help to provide market access in export markets. A good membership mix can also involve firms of differing sizes. For example, SMEs can benefit from having access to larger companies and can provide opportunities for new markets and customers that smaller companies might not have had access to on their own – particularly in the case of export markets. Equally, SMEs can develop opportunities by collaborating with similar sized firms to jointly bid on large scale tenders that they would not have been able to compete for in isolation. Therefore, the 'right membership' can take many forms and is dependent upon the objectives of each individual network.

The main barriers to network effectiveness relate to a lack of commitment of member firms, a lack of members time and financing:

- **Commitment:** Both network facilitators and members identified a lack of commitment by member firms as being an important barrier to the business network working well. The case studies show that member commitment, supported by a good understanding of the benefits of collaboration, is a key factor in effective networks.
- **Time:** A lack of members' time was the most regularly cited barrier to effectiveness (by 73% of members and 88% of facilitators). The lack of time is likely to be related to the relative importance placed on the network's activities by its members.
- **Funding:** This report found that networks are highly dependent upon public funding, although there is some evidence of deadweight. There is a challenge posed to networks, as facilitators have so far identified limited scope for alternative sources of finance. However, in the context of constrained resources, networks will have to look for alternative methods of finance to secure their long term sustainability. One potential approach is that the level of funding is digressive. If the network is delivering real benefits for the member companies then it should be possible to finance the network once the public funding period expires.

As the economy in Ireland and Northern Ireland faces tough challenges following the recession in the path towards recovery, one of the key challenges for economic development agencies is to assist companies and projects that will help the economy to grow by creating employment and wealth within a smaller budget. Networks have the potential to contribute to export growth, innovation and skills; all of which are essential components in helping the economy to grow. They have the potential to be cost effective and can make a contribution to growth by bringing companies together to innovate and access new markets that they would not have been able to penetrate in isolation, helping to ensure that the island economy returns to its long term growth trend.

Annex A: Steering Group

This report was commissioned by a Steering Group comprising InterTradeIreland, Enterprise Ireland, Forfás, Invest Northern Ireland and the Department of Enterprise, Trade and Innovation in November 2009. The Group would like to thank the researchers (Oxford Economics, Perceptive Insight and Chris van Egeraat of NUI Maynooth) for their work on the report.

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Annex C: Other widely used definitions of networks

The term network is often used to denote any kind of arrangement in which two or more organisations work together. The current literature distinguishes between different types of networks. The work of Brown and Keast (2003) and Keast et al (2007) distinguishes between three types of networks as follows:

- **Co-operative networks:** These involve only a sharing of information or expertise. There is very little, if any, risk involved in the transactions. Each member remains independent and only interacts with the others when necessary.
- **Co-ordinative networks:** These occur when organisations find ways to integrate existing services to increase efficiency. In a coordinative network, organisations go one step beyond merely exchanging information and/or knowledge. They interact with each other in order to co-ordinate better their individual efforts. They still remain independent entities, but are willing to make changes in the way they deliver their services.
- **Collaborative networks:** These are only appropriate if there is a need for participants to come together to solve a complex problem or problems that they recognise they cannot solve on their own. In a collaborative network the participants are interdependent. This means they know they are dependent on each other in such a way that for the actions of one to be effective they must rely on the actions of another. The risks are very high. Participants must be willing to develop new ways of thinking, form new types of relationships and be willing to make changes in existing systems.

A second set of definitions is often cited in the literature distinguishes between four types of networks (Agranoff, 2006) as follows:

- **Informational:** In this type of network partners come together almost exclusively to exchange information. Any changes or actions are voluntarily taken up by the members themselves.
- **Developmental:** This is where information exchange between members is combined with education and member services that increases the members' capacities to deliver products or services.
- **Outreach:** This is where the activities of the developmental network are engaged. In addition, however, they also develop strategies that lead to an exchange or co-ordination of resources, although decision making and implementation are ultimately left to the members themselves.
- **Action:** This is where members come together to formally adopt collaborative courses of action and deliver services or products, along with information exchanges and enhanced technology capability.

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