

Innovation Networks

INNOVATION NETWORKS

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TABLE OF CONTENTS

1.	Introduction, objectives and methodology	1
2.	Executive summary and recommendations	4
3.	Networks: definition, benefits and barriers	9
4.	Networks: international experience and practice	16
5.	Network formation: key success factors	26
6.	Networks: Irish policy and practice	33
7.	Findings, conclusions and recommendations	49

Appendices: Case studies

A1	Introduction	55
A2	Supply Network Shannon	55
A3	NETWIN	61
A4	Irish Photonics Association	66
A5	M50 Enterprise Platform Programme	71
A6	Atlantic University Alliance	75



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1. Introduction, objectives and methodology

1.1 Introduction

There is overwhelming evidence internationally that the principal sources of a firm's competitive advantages increasingly lie outside the firm itself. Authoritative empirical studies confirm that, in the case of innovation-driven industries, the acquisition and maintenance of firm-specific technological capabilities rely on extensive contacts with external sources of expertise in both the home and foreign economies. Technological innovation is especially characterised by the acquisition of tacit knowledge through local industry dynamics i.e. networks and clusters.

Interest in the concept of networks and clusters is not a new phenomenon: classical studies by economists such as Alfred Marshall date back to the turn of the century. However, policy interest has been rekindled by the spectacular success stories of the industrial districts in Italy and Silicon Valley and the South Carolina research triangle in the US. The influential Danish Networks Programme and Michael Porter's work on competitive advantage (which strongly advocated networks and clusters), further fastened the attention of policy makers and commentators.

The widely adopted National Innovation System (NIS) approach to economic development prescribes a central role for networks as conduits of knowledge within the system. The NIS doctrine contends that innovation predominantly involves collaboration and the exchange of tacit knowledge at the interfaces between organisations.

Forfás commissioned a study in 2003 to review Innovation Networks throughout the island of Ireland and to contrast them with comparable international systems. The study also sought to review national and international support mechanisms for innovation networks both North and South and to provide outline recommendations for improvements and/or modifications which could be made to these arrangements in order to ensure that they encourage and support a robust island-wide Innovation System.

Tom Martin & Associates/TMA, in association with Vision Consulting in Belfast and Claire Nauwelaers in Belgium, were commissioned to carry out the research.

In its Terms of Reference, Forfás defined innovation networks as independent groups of institutions and/or companies that are:

- Collaborating and competing;
- Geographically located in one or several regions nationally;
- Specialised in a particular field, linked by common technologies and skills;

- Either science-based or business related;
- Either formal or informal.

1.2 Objectives

The purpose of the study was to formulate policy recommendations that address issues in regard to:

- Best practice approach to network formation and sustainability that can be benchmarked internationally including institutional frameworks and informal alliances;
- Improving support mechanisms and incentives to encourage innovation networks and the removal of impediments or obstacles;
- Stimulation of knowledge providers-industry networks, with particular relevance to indigenous SMEs;
- Evaluation mechanisms on network performance that can be benchmarked internationally;
- The promotion of and communication by networks to their respective audiences and society;
- Awareness of the importance of innovation networks.

1.3 Research methodology

The work programme involved a combination of a review of the literature, interviews with key informants, the preparation of case studies of networks, data analysis and report presentation.

LITERATURE REVIEW The research team consulted the national and international literature on networks policies and initiatives;

INTERVIEWS WITH KEY INFORMANTS Consultation was held with a wide range of key informants on the island of Ireland and in Europe;

CASE STUDIES Case studies were prepared on five networks in Ireland (Supply Network Shannon/SNS, M50 Network, Irish Photonics Association, NETWIN and the Atlantic University Alliance);

DATA ANALYSIS The team of consultants analysed the data collected during the research phase;

REPORT PRESENTATION This report presents an abbreviated summary of the consultants' findings, conclusions and recommendations with respect to network policies and initiatives.

Forfás established a Project Monitoring Group to oversee and drive the project comprising representatives from Enterprise Ireland, Science Foundation Ireland, Forfás, Irish Business and Employers Confederation, Higher Education Authority, Combined Heads of Irish Universities and InterTradeIreland.

1.4 Report layout

The following sub-section outlines the terms of reference for the study and the methodology employed by the team of researchers to address the study objectives.

The report is divided into the following sections:

- SECTION 2** presents an executive summary and recommendations;
- SECTION 3** presents a definition of networks and outlines the benefits and barriers of networks;
- SECTION 4** provides an overview of the international experience with respect to networks;
- SECTION 5** examines the key success factors in network formation;
- SECTION 6** examines Irish network policy and practice;
- SECTION 7** presents the report's findings, conclusions and recommendations;
- APPENDIX 1** presents case studies of five Irish networks.

2. Executive summary and recommendations

2.1 Executive summary

1. Forfás commissioned Tom Martin & Associates/TMA in association with Vision Consulting and Claire Nauwelaers to carry out a study of Innovation Networks in the island of Ireland. The objective of the study was to review national support mechanisms for innovation networks on an all-Island basis, review international best practice and provide outline recommendations for improvements and/or modifications which could be made to these arrangements in order to encourage and support a robust island-wide Innovation System.
2. The research methodology employed by the consultants involved a review of the national and international literature, interviews with key informants on the island of Ireland and internationally, preparation of case studies of five networks in Ireland, data analysis and report presentation.
3. The review of the literature found that the terms networks and clusters are used interchangeably. However, networks usually have a somewhat restricted membership and a specific set of objectives while clusters are open in terms of both membership and goals. Networks can often involve formal contractual arrangements while clusters have none.
4. Networks have become an important focus of policy interest not only because they allow small and medium sized companies to gain the advantage of scale but, increasingly and equally importantly, because of the role they play as a conduit of knowledge within a National Innovation System. It is now recognised that innovation occurs most frequently in collaboration and that tacit knowledge—which is gained at the interface between organisations—is an important source of innovation.
5. Apart from economies of scale, networks can bring several advantages to their members. Membership of a network can facilitate the sharing of costs and risks associated with major innovations. It has also been found that networks help to improve the learning capabilities of their members. Speed, flexibility and efficiency are other benefits attributed to networks.
6. There are, however, a number of barriers which militate against the formation of networks. These include the fact there is a lack of awareness among businesses of the benefits of networking and the reluctance to share information and knowledge with other firms, especially competitors, in a network.
7. Policies to foster inter-firm networks first emerged in Italy in the 1970s following the re-organisation of the country into 20 administrative regions. The regional

government in the north-east of Italy (the Emilia Romagna region) introduced initiatives aimed at stimulating collaboration among groups of existing companies. Benefits were only made available to groups of companies working in a collaborative network. These policies helped transform Emilia Romagna within the space of fifteen years from seventeenth to the second wealthiest region of Italy and the seventh most prosperous region of the EU.

8. Denmark then attempted a top-down implementation of the Italian business network model. The Danish Network Programme was established in 1989 with the objective of assisting small companies to compete in the Single European Market. A key element of the programme was the use of brokers to facilitate the development of inter-firm networks. Eighteen months after the launch of the programme, some 3,500 Danish companies were involved in networks.
9. The Danish Network Programme became a blueprint for other countries such as Norway, Australia, the US, Canada, New Zealand and the UK. Countries are increasingly recognising the importance of inter-firm networks as a building block for a successful National Innovation System.
10. The review of the literature and interviews with key informants have indicated a number of key success factors in the formation of networks. Both Irish and international informants have identified that a key success factor is the process, or, the “how” factor, by which a network is developed. Furthermore, the members should have a clear need to belong to a network i.e. the network must achieve something that individual members on their own cannot achieve. Other key success factors include the need for clear objectives, leadership, trust, time and critical mass.
11. An analysis of European network policies indicates a role for government in ensuring the favourable conditions for the development of networks. A combination of bottom-up and top-down approaches has been found to be effective in terms of network formation and development. As companies may not be well-placed to identify the opportunities for network formation and, even where they do, they may lack the resources or skills to facilitate the actual development of the network, there is a role for governments in facilitating collaboration between companies and between companies and the third level sector.
12. Programmes for the development of enabling/facilitating networks should include an evaluation element for the outputs of such networks. Where state financial support is provided, an explicit ‘exit’ mechanism should be included in the design of such a network programme. In these cases, the continued operation of a network after the end of the funded period could be seen as a success indicator.
13. An analysis of recent Irish enterprise development policies starting from the report of the Science, Technology and Innovation Advisory Council (STIAC) in 1995 has shown interest among policy-makers in networks and clusters. The 1996 Science, Technology and Innovation White Paper endorsed a STIAC recommendation to introduce a programme of inter-firm collaboration along the lines of the Danish Network Programme.

14. Forbairt, now Enterprise Ireland, operated a Pilot Network Programme during the period 1997–98 which involved the development of inter-firm networks along the lines of the Danish Network Programme. By the end of the Pilot Programme, a total of 17 networks had been established. The recommendation of the Pilot Network Programme Steering Committee to institute a fully-fledged network programme was not followed through.
15. Enterprise Ireland was also responsible for the National Linkage Programme which sought to develop linkages between multinational companies located in Ireland and their indigenous sub-suppliers.
16. A review of recent Northern Ireland policy documents indicates an awareness among policy-makers of the potential of networks but this has not been followed through in terms of programmes or initiatives. The North's Regional Innovation Strategy does, however, call for stronger linkages between industry and academia.
17. Despite the lack of a dedicated networks programme and the lack of availability of data on networks in Ireland, it is estimated that some 4,800 companies in the South are involved in networks through the Skillnets and Plato programmes.
18. Although there is currently no dedicated networks programme, the State development agencies in the South have facilitated the development of inter-firm networks using existing measures and supports. Enterprise Ireland has facilitated the development of the Irish Photonics Association, one of the five networks studied. Shannon Development has also been instrumental in the development of Supply Network Shannon (SNS). The SNS case study shows that smaller and more tightly focused inter-firm networks can develop out of larger and more informal groupings of companies. Shannon Development also provides secretarial and other support services to the recently launched network of multinational and indigenous companies in the mid-West, the Atlantic Technology Corridor.
19. A key national policy objective is to improve the knowledge base of Irish industry sector so as to move indigenous companies up the value-added chain. There are a number of State-funded initiatives to assist companies to develop linkages with the higher education sector. Enterprise Ireland's Innovation Partnership scheme is an example of an initiative that supports joint industry-academic research. Science Foundation Ireland's Centres for Science, Technology and Engineering (CSET) scheme is designed to enable academic and industrial researchers to collaborate together on high-end research projects.
20. The research has indicated that there are a number of barriers to the development of industry-academia networks. These include the lack of knowledge within the business community of the research being carried out in the third level sector and the lack of a national framework for the transfer of Intellectual Property Rights.
21. The study has revealed the positive impact of the Programme for Research in Third Level Institutions (PRTLTI) in fostering academic-to-academic collaboration. Prior to the introduction of the PRTLTI, the extent of collaboration among third level institutions in Ireland was limited. The limited amount of domestic funding for

research was a factor; similarly, Irish institutions participating in EU Framework Programmes typically were obliged to form linkages with overseas researchers.

2.2 Recommendations

A number of recommendations were made in relation to the development of Innovation Networks:

Overall recommendations

- Government should focus on inter-firm networks as a key building block for the development of the innovation capacity of Irish manufacturing and internationally traded services. Inter-firm networks should be regarded as a means for the creation of enhanced knowledge linkages initially between companies themselves, and then using that platform for the development of knowledge flows between companies and knowledge generators i.e. the third level institutions. Developing inter-firm networks is an important precursor to the formulation of policies in relation to clusters and a successful National Innovation System. State intervention should be in the form of encouragement. The establishment of such networks should be demand-driven, with the state acting as a catalyst, providing encouragement and initial financial support.
- Programmes for the development of enabling/facilitating networks should include evaluation of the outputs of such networks. Where state financial support is provided, it should be for a defined initial period. The continued operation of a network after the end of the funded period could be seen as a success indicator. This recommendation is directed at the Department of Enterprise, Trade and Employment and the Department of Education and Science.
- It is recommended that all support measures designed to encourage the creation and sustainability of networks should include a skills development component. This recommendation is directed at the Department of Enterprise, Trade and Employment and the Department of Education and Science.

Industry-industry/inter-firm networks

1. Government support funding for industry should include a collaborative dimension i.e. a proportion of funds should be allocated to applications from inter-firm networks, and where funding already has a collaborative element, this should be strengthened. This recommendation is directed at the Department of Enterprise, Trade and Employment in respect of the agencies under its aegis.
2. It is recommended that a network initiative be implemented to encourage inter-firm networks. This initiative should be for a three year duration and be implemented on an Island of Ireland, national and regional levels. The initiative should include provision for:
 - creating awareness of the value and benefits of inter-firm networks;

- providing advice and support on network formation issues to organisations interfacing with companies;
- providing training and other skill development issues to network member companies, network brokers and network managers;
- early stage/initial funding for networks to employ network brokers to facilitate the development of networks and network managers to implement network activities.

This recommendation is directed at the Department of Enterprise, Trade and Employment in respect of the agencies under its aegis.

3. It is recommended that government policies and initiatives should encourage the development of inter-firm networks between companies on the Island of Ireland. This recommendation is directed at the Department of Enterprise, Trade and Employment, its counterpart organisation in Northern Ireland and InterTradeIreland.

Industry-academic networks

1. Policy-makers and development agencies need to enhance bridging support measures in order to develop linkages between companies and third level institutions. These measures should be designed:
 - to overcome the lack of information among industry on the type, range and level of research being carried out in the third level sector;
 - to create the conditions for the development of industry-academic working relationships and trust.
2. ICSTI (Irish Council for Science, Technology and Innovation) has recently launched a National Code of Practice for Managing Intellectual Property from 100% Publicly Funded Research. ICSTI should now develop guidelines for the management of intellectual property from public-private co-funded research.

Academic-academic networks

1. Following on from the positive impact of the Programme for Research in Third Level Institutions (PRTLII), it is recommended that Department of Education and Science funding for third level research should incorporate a network/collaborative dimension and where this already exists, the collaborative element should be strengthened.
2. The Department of Education and Science should instigate measures to encourage a culture of co-operation among third level institutions.

3. Networks: definition, benefits and barriers

3.1 Introduction

This section presents definitions of the concepts of networks and clusters. It then examines the benefits of networks and discusses the rationale for public intervention in the development of networks and clusters.

3.2 Definition

The terms networks and clusters seem to be used interchangeably in the public mind and even in some of the literature. They are closely connected and contain some similarities but also some important differences. In a business context, networks and clusters are inter-related phenomena characterised by strategies and practices of co-operation between firms.

O'Doherty (1998)¹ points to the crucial differences between networks and clusters: networks usually have a somewhat restricted membership and a specific set of objectives while clusters are open in terms of both membership and goals. Networks can often involve formal contractual arrangements while clusters have none. Clusters have a geographic, and usually a sectoral, focus while membership of networks does not normally depend on location or sector. A clear overlap occurs in that a great deal of networking takes place in clusters. In general, however, vertical linkages are likely to be more prominent in clusters than networks.

A network may be co-ordinated by one of its members, by a broker or agent who differs from the members, or by a body established by the members collectively. Business networks may involve firms in the same business or firms supplying complementary goods or services. This may involve exchange within the framework of a stable long-term relationship, or more explicit co-operation in certain business activities.

In the interest of clarity it is appropriate to distinguish more formally between clusters and networks.

Cooke (1998)² cites the definitions advanced by Rosenfeld (1995) as follows:

“Networks generally refer to a group of firms with restricted membership and specific, even contractual business objectives likely to result in mutual gains. Network members choose each other; agree explicitly to co-operate in some way (common goals) and to depend on each other to some extent. Networks can develop within clusters especially where a wide range of business transactions conducted over a substantial period of time has developed the reputation of

the partners and helped build up trust in their reliability and willingness to exchange as well as deliver products or process knowledge.

Clusters are geographically bounded concentrations of similar, related or complementary businesses, with active channels for business transactions, communications and dialogue, that share specialised infrastructure, common opportunities and threats. Clusters have open membership based on high-trust relationships between firms. They foster implicit co-operation around a shared vision rather than common goals. Vertical linkages may be more prominent in clusters than in networks and they will rely on collective training, technology transfer, business services and innovation infrastructure, as a consequence.”

Roelandt/den Hertog (1999)³ contrast the cluster concept with the traditional sectoral approach (see Table 3.1 below). While the sectoral approach concentrates on horizontal linkages and “*competitive dependencies*” at the same production or marketing stage, the cluster approach also includes vertical and lateral linkages between firms and service structures at different stages and thus have “*symbiotic reciprocal relationships.*” The cluster approach thus integrates synergy potentials which could emerge from the formation of such cooperation in strategies to promote competitiveness.

Table 3.1: Advantages of the cluster approach compared to the traditional sectoral approach

Sectoral Approach	Cluster approach
Promotion of groups with similar network positions	Promotion of strategic groups with chiefly complementary and non-similar network positions
Focus on the final product of industry	Broader focus which incorporates customers, suppliers, service providers and other specialised institutions
Focus on direct and indirect competitors	Integration of neighbouring industries in order to take advantage of common technologies, skills, information, customers and distribution channels
Reservations about cooperation with rivals	Usually no direct competition among participants; instead, common requirements and limitations
Limitation of dialogue with government actors primarily to subsidies, protection and the restriction of competition	Joint dialogue on a broad spectrum of joint proposals to increase productivity and competitiveness Formation of a forum for constructive and efficient dialogue between the private sector and the government
Attempts to differentiate within existing development guidelines	Attempt to find synergies and new combinations

Source: based on Porter (1997), adapted by Roelandt/den Hertog (1999), p. 13.

Nauwelaers⁴ defined a cluster as a:

“mode of organisation of the productive system, characterised by a geographical concentration of economic actors and other organisations, specialised in a common field of activity, developing inter-relations of a market and non-market nature, and contributing to innovation and competitiveness of its members and the territory.”

This definition is consistent with the Porter definition (1998)⁵. In common, they have:

- Geographic component (proximity, locality, etc.);

- Interaction component, consisting of two sets of interactions. Firstly, those between different sets of institutions, for example between firms and financial institutions or firms and public sector research organisations. Secondly, those between firms, where the interacting firms do not necessarily belong to the same industry.

3.3 Benefits

Networks are becoming increasingly recognised as a valuable tool to foster economic development, in particular where SMEs form a predominant component of the enterprise structure. The review of the literature attributes the following benefits to networks:

- **INCREASED SCALE AND SCOPE OF ACTIVITIES:** the outcomes of collaboration may be applicable to all partners' market, and thus may expand individual firm's customer base. If a firm is part of a customary network, its performance capacity can be considerably extended through synergies between firm's different technological competencies;
- **SHARED COSTS AND RISKS:** costs for major innovations, such as a new generation of semiconductors or aircrafts, have risen rapidly and are now beyond the means of any single firm. Collaboration can share the high costs and therefore risks of innovation;
- **IMPROVED ABILITY TO DEAL WITH COMPLEXITY:** many key technological developments are complex and draw on a wide range of scientific and commercial knowledge. This reinforces the need for co-operation from participants in different fields of expertise and a closer strategic and technological integration between firms is a means for dealing with the complexity of multiple sources and forms of technology;
- **ENHANCED LEARNING EFFECTS:** with continuous and rapid market and technology change there are pressures on firms to improve their learning capacities. Collaboration and networks can provide possibilities not only of learning about new technologies, but learning about methods of creating future technologies and of the ways those technologies might affect the existing business. It can teach companies new ways of doing things not only technologically, but also organisationally;
- **POSITIVE WELFARE EFFECT:** internalising positive externalities through R&D collaboration results in increased R&D efficiency and an increase of overall R&D expenditure. A set of benefits underlying the collaboration is one that considers flexibility and efficiencies;
- **FLEXIBILITY:** networks offer flexibility not in contrast to markets but to hierarchies. Vertically integrated firms establish overheads and production capacities, and in doing so forsake the flexibility of immediate resource reallocation that networks provide. Hence, large firm/small firm interaction might be facilitated such that the resource advantages of the former are linked with the behavioural or creative advantage of the latter;
- **EFFICIENCY:** The efficiency enhancing effect of networks is related to the specific nature of technological knowledge. Much of the knowledge is tacit—that is difficult to codify in the form of blueprints—and firm specific. It is, therefore, difficult to

transfer easily and quickly through market mechanisms. Collaboration provides a mechanism to transfer whereby this kind of transfer is based on trust between the partners;

- **SPEED:** Speed may be needed to take advantage of opportunities that might not exist for long, and might require a fast response. An existing network can put together a package of resources and capacities to meet such challenges in a customised response which, in its flexibility and scope, lies beyond the capacity of an un-networked integrated firm. Moreover, rapid product development depends on the reliance on outside suppliers. Mansfield (1988)⁶ found that time to market was speeded through a policy of outsourcing to suppliers. The capability to commercialise products can in this case be seen to rest on the successful exploitation of the knowledge of other firms.

The National Economic and Social Council (NESC) (1996) found that network arrangements can be seen as organisational instruments to increase economic efficiency in production and distribution, and more fundamentally, networks are now seen as advantageous in securing innovation. Networks can focus on, among other activities: joint marketing, bulk purchasing, training, product development, technical problem solving, technology transfer, R&D, and sub-supply.

O'Doherty (1998)⁷ summarised the benefits of networking as follows:

- **MATERIAL BENEFITS:** Firms can increase sales and lower production costs by working together.
- **PSYCHOLOGICAL BENEFITS:** As firms eliminate their isolation they learn that their problems are shared by others.
- **DEVELOPMENTAL BENEFITS:** By promoting interaction with other firms, networking increases learning and the ability to adapt to the changing economic environment.

3.4 Barriers

The following factors militate against the spontaneous formation of networks:

- There is a general lack of awareness as to the benefits of networks (as distinct from networking) among the business community;
- There is a reluctance, especially on the part of SMEs, to commit time and resources to a process that is not well understood, or the results of which are not clear;
- Networks are too closely aligned with '*networking*' in the mind of business managers and seen as a quasi-social activity rather than an important business function;
- There is a reluctance to share information and knowledge with other firms, especially competitors;
- Firms are not always well placed to identify the opportunities for network relationships with other companies since their knowledge and information base may be limited to their own contacts;

- Membership of a network may expose companies to the danger of “lock-in” where excessive focus is placed on the affairs of the network to the detriment of events in the outside environment;
- Even where managers foresee a benefit in establishing a network relationship they may not have the skills or resources to facilitate or co-ordinate the actual implementation of the network. This has been referred to (Dixit and Nalebuff, 1991)⁸ as the ‘*collective action problem*’, where a group of individuals or firms may frequently fail to achieve co-operation, even where it would be beneficial to every individual in the group.

3.5 Rationale for public policy intervention

If the benefits of the network/cluster approach are so clear why should public policy seek to promote or support it?

The National Economic and Social Council (NESC) (1996)⁹ 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.”

The Department of Trade and Industry in the UK (1998)¹⁰ recognised that clusters or networks were desirable in the context of overall industrial development, but added that *“there is also reason to believe that firms may find it difficult to come to these arrangements of their own accord, suggesting that there may be a role for government in brokering greater collaboration between firms or between firms and universities.”*

Table 3.2 below indicates where government intervention can be of assistance in the development of networks and clusters.

Table 3.2 Government support for networks and clusters

Obstacles	Network/cluster-oriented assistance strategies	Assistance instruments
Insufficient awareness of the benefits	<ul style="list-style-type: none"> • Identify incipient clusters; • Market cluster idea. 	<ul style="list-style-type: none"> • Sector/SWOT analysis in the regions; • Inventory of initial stages of clusters; • Identification/communication of the benefits of networks/ clusters.
Little willingness to cooperate	<ul style="list-style-type: none"> • Promote dialogue. 	<ul style="list-style-type: none"> • Dialogue promotion/exchange of information (network programs); • Promoting the formation of regional clusters by supporting joint activities (e.g. procurement of inputs, export marketing); • Promoting alliances, e.g. by linking public tenders to the formation of a consortium; • Training and upgrading of networking specialists (brokerage, in-/outsourcing etc.).
Weak internal cluster structures	<ul style="list-style-type: none"> • Promote cooperation; • Promote investment; • Improve institutional support. 	<ul style="list-style-type: none"> • Promotion of management competence and communication culture among cluster members; • Bringing together suitable (brokerage) partners for cooperation/investment; • Promotion of start-ups which fit the cluster.
Underdeveloped innovation power	<ul style="list-style-type: none"> • Create favourable framework conditions; • Improve R & D offerings; • Adapt training and upgrading to needs. 	<ul style="list-style-type: none"> • Reform of legal and administrative rules and regulations; • Reform of tax/incentive system; • Restructuring of training, upgrading and research services.
Obstructive government regulations	<ul style="list-style-type: none"> • Create favourable framework conditions. 	<ul style="list-style-type: none"> • Identification of regulatory obstacles in cluster-specific forums; • Reform of legal and administrative rules and regulations; • Reform of the tax/incentive system.
Limited access to information	<ul style="list-style-type: none"> • Improve the systems for the collection, processing and dissemination of information; • Training and upgrading in knowledge management. 	<ul style="list-style-type: none"> • Exchange of information; • Building up information systems (such topics as marketing, technology, research results etc.); • Establishing/expanding cluster-specific technology and research centres; • Supporting cooperative research and development as well as cooperative technology transfer.

Endnotes

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4. Networks: international experience and practice

4.1 Introduction

In this section efforts to implement inter-firm networks in other countries are described. The emergence of industrial districts in Italy, believed to be the cradle of the business network concept, is discussed followed by the experience of Denmark which attempted a radical, top-down implementation of the Italian business network phenomenon. The formal Danish Network Model became the blueprint for other countries such as Norway and the UK.

4.2 Italy

Piore & Sabel (1984)¹, in a much quoted work in business literature, argued that the growing number and output of small enterprises in areas such as “*The Third Italy*” could compete effectively with larger, well established companies and make a significant contribution to economic development in their region. Since then numerous delegations of politicians and administrative staff from many countries have visited the region, including several from Denmark. In many cases the inspiration led to policy programmes supporting inter-firm networks.

The ‘Third Italy’ refers to an area in Northeast Italy centering on the regions of Emilia Romagna and Tuscany. Although a number of substantial cities, such as Bologna, Modena, Florence and Reggio-Emilia, are in the area, much of the industry is located in smaller towns that specialise in the production of various traditional items including ceramic tiles, textiles and machine tools. These local industries are frequently organised in government-sponsored co-operatives that provide access to cheap capital and to services in marketing, accounting, etc. Initiative in design and other fields, however, is retained by the member firms that are commonly family-owned and have twenty or fewer employees.

Italy re-organised itself into 20 administrative regions in the 1970s. These regions were given a considerable degree of autonomy in programming their own innovation and industrial support activities. Thus, much of the decisions affecting business was made at the ‘*meso*’ [regional] level although competence tended to be shared between regional and national governments, particularly in terms of finance.

The research excitement about the ‘Third Italy’ derives from the economic transformation of its industrial districts in the 1970s. By 1985, some fifteen years after its formation, the old, historic, rural area of Emilia Romagna, the fourth poorest region of the country, had jumped from the seventeenth to the second wealthiest region of Italy and it was cited as the seventh most prosperous region in the European Economic Community.

This transformation was due to enlightened regional government initiatives introduced in the mid-1970s to stimulate collaboration among the existing strong foundation of small enterprises. Benefits were made available only to groups of enterprises working in a collaborative network.

Italian industrial districts may now provide a model for the rest of Europe. Among the needs identified by the European Commission's March 2003 Communication on Innovation Policy² is that of strengthening the regional dimension of innovation in Europe. Recognising that smaller companies are anchored at the local level, the Commission aims to encourage regional authorities to develop measures to help them at that level.

The Communication sees the creation of clusters—where a range of firms and research centres working in related fields with common goals benefit from shared infrastructure—as crucial in developing world-leading companies in Europe. The example picked out in the Communication is that of the industrial districts, common throughout the north of Italy, which illustrate the ability of European small companies to reach a position of global leadership.

“The Italian “industrial districts” illustrate how regions specialising in specific sectors and dominated by small firms are able to grow rapidly and develop global leadership in their sector. Industrial districts are characterised by high productivity and specialisation in complementary phases of production, founded on the presence of subcontractors, component suppliers and fierce competition among them. Accumulation of know-how is an important factor behind the lasting competitiveness of such clusters.

A well-known example is the Prato region near Florence, an international leader in the production of yarns for knitwear, and knits and textiles for the garment, upholstery and other industries. This success is complemented by the construction of textile machinery, which is also highly export-oriented. Italian “industrial districts” demonstrate how global leadership can be achieved by close interaction and sector-specific patterns mixing co-operation with competition (“co-opetition”) among SMEs, and by a type of creativity that absorbs R&D inputs without entirely relying on them.”

—EU 2003 Communication on Innovation Policy

TRANSFERABILITY OF THE ITALIAN DISTRICT MODEL The industrial districts structure has evolved in northern and central Italy, but the Italian government is now trying to encourage the creation of such clusters in the South (the ‘Mezzogiorno’). Successful examples include furniture making in Bari, cork in Sardinia and tomato sauce making in an area where tomatoes are widely grown. In Sicily, growers of oranges and olives found they were no longer competitive as fruit producers, but created new markets in growing ornamental plants.

DISTRICTS MUST DEVELOP INTERNATIONAL CONTACTS Cooke³ (1996) warned that Italian district firms must look beyond the industrial district to systems integration if they were to avoid the dangers of ‘lock-in’. For the more dynamic, strategic innovations by means of which global competitiveness is sustained, firms in local networks need to be in touch, not necessarily directly, but through the supply-chain, with global networks.

Pyke (1998)⁴ described how, attempts were being made in regions such as Emilia Romagna to develop a high-value locale i.e. move the region's industries towards the higher value end of production chains. This policy thrust included a strategy of integrating large international firms into the local economy for mutually beneficial ends.

4.3 Denmark

In 1989, Denmark's economy was approaching a crisis. For the previous three decades, the country had recorded trade deficits in its exports. With 1992 approaching, the country faced the Single European Market which would mean a quantum surge in international competition.

According to a government-funded report by McKinsey & Company, prospects for the Danish economy were bleak, "*size is the problem.*" The Danish economy consisted of a large number of small firms (with 10 to 30 employees) which were too small, too dependent and too diversified to compete in an increasingly global market. Moreover, these firms were operating in traditional industries such as textiles, metalworking, wood and furniture, food processing, tools, etc.

Management consultants McKinsey recommended that Denmark should re-organise its industrial infrastructure through mergers of these isolated small enterprises. Only then could the country create a "*critical mass*" necessary for large-scale financing, access to new technologies, marketing and sourcing world-class management experience.

But the merger prescription had two flaws. Firstly, the small business entrepreneurs were likely to resist giving up their control over businesses they had built up over generations. Secondly, the Danish small enterprises were so small that, even by merging them, they would still be dwarfs compared to foreign multinationals.

An alternative route presented itself during a seminar for Danish manufacturers at which Richard Hatch shared his first-hand experience of the "*flexible manufacturing networks (FMNs)*" which had turned around the economy of Emilia Romagna region.

Richard Hatch had seen this blooming of the "third Italy" first-hand. He had lived in the region where he owned and managed a specialised metalworking company in Modena, Emilia Romagna, which was a part of the flexible manufacturing network. In 1988, Hatch conducted the seminal study of Emilia Romagna networks for the Corporation for Enterprise Development (later he was to lead a US study tour to Emilia Romagna and design Oregon's Network programme).

One of the participants of that seminar, Niels Christian Nielsen, who worked with the Jutland Technological Institute (JTI) and later became the Director of Corporate Strategy at the Danish Technological Institute, was deeply impressed by Hatch's ideas. He urged Hatch to write a joint letter to Niels Wilhjelm, the Denmark's minister of industry, proposing a programme to encourage collaborative efforts among the Danish small business enterprises.

The initial efforts met with widespread resistance. But Minister Niels Wilhjelm saw merit in the idea (perhaps because he himself was a businessman). He set up an industry steering

committee to oversee the network project. JTI was co-opted to develop the programme, and, in turn, it hired Hatch to develop the broker training programme.

In March 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. This was a controversial plan and national trade associations opposed the idea. On the other hand, it had the wholehearted support of the smaller sector trade associations and the Federation of Crafts and Small Industries. The ensuing two month long controversy, however, gave valuable publicity to the plan by keeping it on the front page and on TV news. The bill, approving a \$25 million (€21.7 million) for the plan, was finally passed in the spring and the programme became operational in August. The legislation was approved with a three-year limit put on the experiment.

The implementation of the Network Plan was divided into three phases. Phase I, which was crucial for the success of the plan, was aimed at encouraging companies to come up with an explicit idea for networking. The government outlay for grants was \$3 million (€2.6 million). In addition, another \$3 million (€2.6 million) was apportioned for creating an overall environment for networking (promotion, technical support, evaluation, and broker training). The key elements of this phase were:

- Companies intending to create a network had to conduct a feasibility study;
- Any group of three or more firms with an intent to network could apply for a “*micro-grant*” of \$10,000 (€8,696) to investigate the feasibility;
- The application form was just two pages long, and the response time to an application was just one month;
- The companies did not have to write or request for the form. Instead they were made freely available in places, such as banks, post offices and insurance offices, which are frequented by business people. In fact, banks who had been losing money on small businesses, became the strongest advocates of the plan;
- The Ministry financed lawyers, accountants and tax consultants to work out standard contracts, product liability issues and financial issues of the networking feasibility studies. This avoided duplication of efforts across different studies, thereby saving time and reducing costs;
- A parallel evaluation process was instituted to ensure that the programme administrators learned from the mistakes and take advantage of the opportunities;
- To encourage the process of networking of starting to think in terms of inter-firm collaboration the criteria for approving the micro-grant were purposely kept quite lax. Virtually all applications for the feasibility grant were approved. The subsequent evaluation of the programme showed that this had a multiplier effect. While a large number of initial ideas for networking turned out to be unsound the feasibility studies identified new opportunities and options. Ultimately almost all companies which applied for networks did end up in networks, though not necessarily the same network.

Phase II of the plan focused on detailed planning of how the network would operate. The planned outlay for this phase was a grant figure of \$5 million (€4.3 million), but now the participating companies had to come up with matching investment. Also, approval of grants was not automatic, but the more detailed scrutiny of the application often provided new direction for successful projects.

Phase III had an outlay of \$14 million (€12.2 million), and featured an innovative approach to providing venture capital to the networks during their initial years. In this phase grants covered up to 50% of the cost of setting up the network in the first year and up to 30% in the second year. This financial support was critical for the success of the experiment.

Within a year of its launch, the Network Plan had more than 1,500 firms operating in networks. This number had grown to 3,500 covering nearly half of the country's manufacturing companies within the next six months.

But the real success was in terms of the enormous scale and scope the networks afforded the small business enterprises. An example is CD (Corporate Design) Line, a 14 company textile manufacturing network, which focused at the job wear uniforms market. Each of the participating companies produced one part of a complete collection, e.g., shirts, suits, skirts, ties, scarves, men or women knitwear, etc. Networking enabled these firms to offer the customer a complete collection, which was easier to market. Moreover, together it was possible for them to hire famous clothes designers, hire quality managers, and set up sales agents in foreign markets, such as Sweden and Germany. In just a couple of years, CD Line was able to export 45% of its product.

Similarly, flexible manufacturing networks were able to revive the declining Danish furniture industry. Up to the 1960s, Danish furniture companies were known world-wide for their superior design and quality. But then, first the Taiwanese, and later the Italian firms began to outpace them by producing superior 'Danish' furniture. By pooling their resources in the network, Danish companies were able to buy advanced equipment, hire design firms, jointly develop work processes, and fund export marketing.

Sinclair⁵ notes in particular the resolve of the Danish authorities. Having assessed that Danish entrepreneurs do not network naturally or spontaneously, and, because it was important that they do so, the authorities took on the task of inculcating a culture of networking in the SMEs. They decided that a fundamental success factor of the programme was that the benefits of networking should be presented clearly—that a culture of networking among the companies of an economy is essential if the firms and the economy are to be competitive.

Sinclair highlights the Danish decision to go for 'critical mass'. They aimed for, and achieved, participation by at least 10 to 15% of all SMEs in Denmark. Niels Christian Nielsen had stated, when he was in Australia for the international conference on networking in 1995, "if you aren't prepared to go to this level, forget it."

The Danish Networks Programme has been credited for the dramatic turnaround in the economy. It went from a relatively low base in terms of per capita firm profitability to number one out of all OECD countries. The original DNP has been superseded by a clusters approach which is greatly benefiting from the legacy of the networks culture.

Critique of the Danish Network Programme

In spite of the strong influence from the industrial districts in “Third Italy” the Danish programme was modified in a way that made it quite different.

The strength of Italian industrial districts is embedded in the regional culture that has been developed and restructured over many years, and it is not clear whether this structure can be imitated. As stated by Powell⁶, every municipality has been trying hard to build its own Route 128 or Modena; it is hard to find and to replicate the dynamic and self-developing mechanism.

Firstly, it was difficult to copy the macro environment of the industrial district, such as the strong family pattern with family-owned, small, artisan enterprises, the long trade and export tradition, and the close relationship among the firms in the region.

Secondly, at the firm level, attempts to “create” long-term strategic networks in many ways contrasted with the Italian model; in particular the use of mediators or brokers was quite different.

Lorezoni and Ornati (1988)⁷ described the development of inter-firm networks in Italy in the following way:

- In the Danish Network Programme the training of brokers was an important part. The reason given was that the minister feared that the Danish entrepreneurs were by nature so independent that they were unwilling to participate in long-term co-operation. Therefore a number of brokers were educated, and again it was argued that the mediator or broker was a central part in the Italian model.
- In the Italian model the leading firm would be dependent on selling the products of the subcontractors, he would start out with market-like relations in stage one, then intensify the collaboration in stage two, and try to make the subcontractors co-operate in stage three. From this network he would probably find spin-offs in various forms.
- In the Danish model the major task of the broker was to find the firms and “motivate” them to co-operate. The firms should then create “*the network firm*” and the broker would leave them. The difference is quite clear. In the Italian model the mediator is dependent on the result of the network, whereas in the Danish model the broker was dependent on the number of network that he could create.

A final evaluation of the Danish Network Programme (DNP) has been published in 1996. Gelsing and Nielsen⁸ discuss its main findings.

CONTRIBUTION OF BROKERS The value of the brokers’ participation was clear. They had a strong influence in the initial success of setting up the networks. But the data showed that they lacked the competences to sustain the networks once they were up and running.

OLD TIES OR NEW RELATIONSHIPS? There were strong indications from several evaluations that networks formed on old bonds seemed more likely to survive. The data indicated that firm-initiated networks were more robust than broker-initiated ones. Three years after the

end of the programme 71% of networks established without broker assistance were alive compared with only 33% of those established with broker assistance.

An examination of factors mentioned as important for the participation of a firm in a network shows that “*knowledge of one or more of the other participants*” was ranked the third most important of 17 possibilities. Only “*access to new markets*” and “*well defined targets for the network*” were mentioned more often. The finding confirms that old ties matter. This raises the question of additionality (‘deadweight’): is the Network Programme merely achieving formal networks by grant-aiding businesses which have been ‘networking’ with each other for several years?

LEGAL STRUCTURE Another controversial development in Denmark in relation to the Italian evolutionary network structure was the decision that the network should be a “*legal entity.*” It was argued that a legal structure would facilitate long-term commitment and mutual adaptation between the co-operating firms.

For the majority of participants the creation of a legal structure was seen as an unnecessary time-consuming activity that did not have any benefit in terms of committing the parties. On the contrary it was argued that the firms involved felt uneasy about this “*unnatural*” setting. The result was that only peripheral activities were transferred to this new business unit.

LEARNING PROCESSES IN INTER-FIRM NETWORKS An important consideration in the authorities’ motivation in setting up the DNP was to enhance the learning processes of SMEs. The phase-model invited groups of firms to go through various steps in order to gain mutual confidence and trust which then leads to specific co-operative activities. But the Danish SMEs had different priorities. The data showed clearly that the highest priority was to expand turnover and learning processes were not considered important. The indications were that firms focus on short-term gains.

POSITIVE BENEFITS OF THE NETWORKS On the positive side the data indicate:

- 66% of firms claimed that the network experience had positively affected their desire to enter new network projects;
- 50% co-operated with more firms that they did 5 years ago;
- 40% claimed that the network experience had a positive effect on their position in new markets, the ability to undergo changes, management and co-operation with both Danish and foreign firms.

Although the final evaluation seems quite negative, Gelsing does not conclude that the programme is without benefit. It depends on how one measures the benefits.

If the measure of success is the number of surviving networks, it can be argued that the network programme was a failure. The official evaluation states quite clearly that, at best, three quarters of the total budget has been spent on networks that are no longer operating. The results of the Export Network Programme seems similarly discouraging.

However, the programme most certainly made an impact on the culture of SMEs. Many firms were totally revitalised by the valuable experience they gained from the collaboration. As Gelsing states:

“Maybe the form was wrong, but the idea was correct. It would be difficult to find a Danish firm that is now unaware of the possibilities of a long-term co-operative arrangement.”

The programme was in some ways misconceived. Although the model was based on the Italian textile districts, a mis-interpretation of the dynamics obtaining in these locales led to a very different final set-up in the Danish programme. It was not appreciated just how difficult it is to create networks (and sometimes this can be because the networking is already present).

Gelsing points to the principal policy lesson:

“It is difficult to create ‘strategic networks’, but the firms involved have shown, we believe, that they can act strategically in a network arrangement.”

4.4 Norway

The DNP concept was aggressively marketed by the Danish Technological Institute from 1990 onwards and became a role model and a point of reference in fora where practitioners met with researchers to discuss networking and industrial policy.

The table below presents the international spread of network programmes inspired by the Emilia Romagna (and Denmark).

Table 4.1 *International spread of network programmes*

Country	Broker Used	Cluster Focused	Part of 'one-stop-shop' SME assistance	National v Regional	Resources relative to Population
Denmark	Yes	No	No	National	Large
Norway	Yes	No	No	National	Large
Australia	Yes	No	Yes	National	Large
US	Some places	Some places	No	Regional	Small
New Zealand	Yes	No	Yes	National	Large
Canada	Yes	Some places	No	Both	Medium
UK	Yes	No	Yes	National	Large
Spain	Yes	No	Yes	Regional	Large
Netherlands	Sometimes	Yes	Yes	National	Medium

Source: Liston (1996)

Norway was one of the first countries to respond to the Danish experiment with a US\$25 million (€21.7 million) programme starting in 1991. They designed a four-phase programme:

- seeking out partners (Phase 1);
- clarification of intent (Phase 2);
- formalisation and organisation (Phase 3);

- and implementation of joint actions (Phase 4).

Horizontal networks were the main focus—i.e. participants working at the same stage in the value chain of their respective industry sectors. Over the first four years, the Norwegians started 730 networks, of which 450 were still succeeding after 12 months of operation. On the basis of this, in 1995, the Norwegians decided there was sufficient return to the government to justify funding for a second programme. This was initiated, adding supply chain components to the mix of networks that would be approved.

This second business networks programme (BNP) resulted in 340 networks of which 280 were still surviving after 12 months of operation. This made a total of 1,070 networks started and 730 surviving beyond 12 months of operation.

Given the level of investment, the Norwegian government officials have not been as enthusiastic about the second programme which concluded in late 1998. The final report has yet to be published, but the general feeling is that they created a consultancy industry with too little control over how and where the funds should be spent. Consultants were encouraged to make things happen, when, with hindsight, the authorities may have been better served had they made the hard decision to force the networks to commit (with cash) or not proceed.

4.5 Other countries

Following on from the successes of business network programmes (BNPs) in Denmark and Norway, other nations, including Australia, the US (several states, rather than a federal initiative), New Zealand, Canada and the UK were starting their own investigations into the networks approach to economic development.

The UK also followed the Danish model, with brokers trained to deliver through the three stages. They had great problems trying to instil a culture of co-operation and collaboration among British firms. Dr Ian Chaston, research director of the Plymouth Business School and involved in establishing the BNP in the UK, noted in his address to an international conference in Sydney in 1995:

“It is probably true that the worst place in the world to do networking is Britain because, as you all know, the British are anti-social, do not get on with one another and are reluctant to co-operate.”

Sinclair⁹ observed that within the UK, the emphasis was on regional industry clusters (with the Scottish and the Welsh leading the charge). He believed the outcome from these cluster activities was aimed at generating hard business networks.

A study of UK inter-firm network initiatives found that they had faced a number of problems, resulting in the level of inter-firm interaction being generally fairly low and unintensive. This has severely limited the number of firms that had benefited from participation, as well as the overall impact on firm performance and growth.

On a more positive note the study shows that the initiatives have resulted in substantial gains for a small number of participating companies. These are most often those involved in initiatives that were able to formalise sustainable networks. The key policy problem is

that this situation has occurred in only a very restricted number of circumstances, with formal network initiatives being subject to extremely high ‘*drop-out*’ rates.

The study suggests that policies aimed at formal network initiatives should be abandoned as a mechanism for creating a critical mass of sustainable networks. Instead, the progression of policy models based on informal initiatives appears to offer the most feasible means of catalysing sustainable inter-company contact.

The French government has undertaken a project to promote industrial districts in France. Some 60 projects received support, but the momentum of this initiative has been lost with the change of government in 2002.

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5. Network formation: key success factors

5.1 Key success factors in network formation

The programme of research undertaken by the consultants (desk research, interviews with key informants and case studies) has identified the following key factors as critical to the success of a network:

CLEAR NEED An important condition for the development of a network is that the members perceive that there is a clear need to belong i.e. the network can achieve something that the individual members cannot achieve on their own. Interviews with State development agencies have indicated that the threat of overseas competition—particularly from lower cost countries—can have a galvanising impact in terms of encouraging indigenous SMEs to collaborate.

OBJECTIVES Related to the requirement that a network should have clear needs, there is also the requirement that it should have objectives that primarily reflect the needs of the member organisations.

LEADERSHIP AND VISION Networks that have a leader who is able to articulate clear and concise goals are more likely to be successful than those networks whose members are unclear as to its future direction. The leader should not only be able to communicate the network's long term goals but must also be able to translate those goals into a realistic programme of action.

EARLY SUCCESSES The research has indicated the importance of achieving early successes in order to get member organisations to continue their involvement in the network. Supply Network Shannon (SNS) was initially successful in obtaining a Skillnets grant and the provision of joint training programmes was important in helping to retain the members' commitment to the network. It is vital, therefore, that networks structure their objectives and work programme to ensure that members can see a return for their investment in the short term.

TRUST On paper, a grouping of companies in a sector might make the ideal candidates for a network. However, the successful development of networks has been found to be very dependent on the level of trust between member organisations. Since the network involves members who normally act on their own, the implementation of network activities requires a certain level of trust by the members. The gaining of trust is particularly important in those networks whose membership includes companies that compete against each other. A survey of the Skillnets training networks indicated that networks that fostered trust and openness gained positive support from their members. The M50 network (see Appendix A5) is an example of a network where there is a high level of trust and co-operation between the member organisations even though on another level they are competitors.

OWNERSHIP: The State development agencies have played a facilitating role in the development of a number of networks. One such example is the Irish Photonics Association whose establishment has been supported by Enterprise Ireland. The member organisations have, however, recognised that if the network is to succeed then it will be necessary for them to take ownership of the development process and drive the network forward. If the companies do not have ownership of the network they will not be committed to it. They will perceive that it will have an agenda that may not approximate to their own (for an overview of the difficulties facing the Irish Photonics Association in forming a network see Box 5.1 below).

Box 5.1: Difficulties in network formation

The Irish Photonics Association (IPA) is a new organisation representing companies, researchers and other interested parties in the photonics sector. The sector itself is very new and did not exist three years ago.

Enterprise Ireland has played a major role in facilitating the development of the IPA (legally, the IPA is an association as it has not yet been incorporated). The agency has provided the venue for the IPA's network meetings and has organised national and international guest speakers. Enterprise Ireland has also funded IPA participation on market study visits and in participation at major international trade fairs. It has also funded the development of the IPA web site.

A committee of industry representatives has been formed to drive the network going forward. Interviews with key informants within the sector have identified the following difficulties that the committee faces in developing the network:

- As currently defined (and there is some debate as to what constitutes the photonics sector), there are approximately 10 photonics companies in Ireland. The chairman of the IPA recently visited Canada as part of an Enterprise Ireland-sponsored trade mission and found that in the Ottawa region alone there were approximately 50 photonics companies;
- With one or two exceptions, all of the companies—which are Irish owned—are at a pre-revenue stage. This fact combined with the lack of a major photonics player in Ireland limits the amount of resources that the industry can contribute to the network and to its continued development;
- The sector is geographically distributed in a number of locations: Dublin, Cork, Limerick, Galway, Westport. Thus meetings held in Dublin often require IPA members to give up a full day to attend;
- The photonics sector is very diverse in terms of its applications and this is reflected by the fact that the majority of companies operate in different international market sectors. This is somewhat of a double-edged sword; though the companies do not compete with each other, they have little in common with each other;
- The IPA committee would like to see the formation of industry-academia networks. This may be difficult to achieve for the following reasons: 1) there is a lack of knowledge regarding the extent and level of research being carried out in the third level sector; 2) indigenous companies believe that some of the State-funded research being carried out in the third level sector has no relevance to their needs; 3) the focus of the research being carried out within the third level sector is on technology that is 5–10 years out while the companies are working on close-to-market applications that involve technology that is 1–2 years out with the result that there is little connection between the two; 4) the cost of negotiating IPR contracts with academic researchers is a major issue for companies due to the lack of a standardised approach within the higher education sector.

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TIME The formation of a durable network can take time. A considerable period can elapse before the members have developed trust and confidence in the network to undertake joint activities. Member organisations need to interact socially before they can commit themselves to working with other members. The development of the inner, more tightly-focused Tsunami network within the wider, looser SNS network evolved over a period of time as the members of the former developed a relationship with each other during the development of the latter.

CRITICAL MASS As noted above, one of the key issues going forward for the Irish Photonics Association is the small size of the photonics companies (less than 10), the majority of whom are very small and at a pre-revenue stage. The photonics industry is quite diverse and as the majority of companies do not operate in the same sector there is little commonality between them. These factors may impact negatively on the Association's capability to

effectively develop as a network. The Association has seen at first hand that the successful development of equivalent associations in Wales and, particularly, Canada, has arisen as a result of the larger pool of industry players.

KEY PLAYER Related to the issue of critical mass, the presence of a major player with the vision and resources can be influential in driving the network forward. The photonics industry network in Canada has been driven by major companies such as Nortel while Pilkington Glass has played a similar role in the photonics network in North Wales. Box 5.2 provides an example of a French network that failed both because the lack of a key player and critical mass.

Box 5.2: The wood network in Montreuil-sur-mer (France)

A historical concentration of wood products manufacturers exists in Montreuil-sur-mer, composed mainly of very small craft companies producing different ranges of products, many of which were destined for the housing industry. The companies had developed a number of co-operative activities, but these were not wide-ranging and the density of these inter-linkages tended to decline. The enterprises experienced difficult financial circumstances and the group lacked a leader. The initiative to reinforce the networking potential of this group of firms came from the local Chamber of Commerce: it organised meetings and helped identify common needs and a basis for networking. A consensus emerged on the opportunity to buy a shared piece of equipment (a wood dryer), which would generate cost savings and enable better quality control for all the enterprises. The Chamber of Commerce arranged the co-operation agreement for this collective project, and was able to find public funding to finance a large part of this equipment (from national, regional and local sources). This operation was successfully managed with the Chamber of Commerce acting as a leader of the operation.

The network did not, however, take off after this first initial phase. The next step started with an initiative coming mostly from the local and regional authorities backing the project: the idea was to gather several wood producers around a common project, the building of timber-framed houses. A detailed market study, financed by public funds, delivered the conclusion that competition from outside, especially from Poland, was extremely intense, and that the only option was to target the upper-segment of market (high quality and high price product). Since this seemed a more difficult option to follow and, in the absence of strategic vision and sufficient correct commercial capabilities and financial assets within the local SMEs, the wrong option of low quality timber-framed houses was pursued, with disappointing results, despite continuing support from local agencies. The absence of a stronger firm, with integrating capabilities, was a too strong obstacle for this project to take off. As a result, the long-term prospects for the network are not promising.

COMMUNICATION/BRANDING The development of a clear identity for a network can be critical for its longevity. The M50 network is an example of brand identity which has assisted the network to expand its membership to include University College Dublin. A clear and defined identity for the network assists in highlighting to members of its own objectives and activities. The Atlantic University Alliance is another example of a network which gained a high brand-name recognition.

FACILITATION SNS and Irish Photonics Association are examples of networks that have been beneficiaries of facilitation support by the State development agencies. The experience of Skillnets shows that to be successful networks need on-going facilitation—which in the case of Skillnets is provided by a network manager. The inputs of a network manager in terms of supporting the network, brokering the needs of individual members, co-ordinating what is a complex process and implementing the network's work programme can have a significant bearing on its long term viability.

SOCIAL FACTORS An aspect often over-looked in the development of networks is the importance of social interaction. Enterprise Ireland has found that bringing senior managers on overseas trade or study missions can create the environment for social interaction and thus breaking down the barriers between them. SNS has developed a number of social-related activities such as golf outings to foster the development of interpersonal contacts.

TOP-DOWN INCENTIVES OR PUMP PRIMING The provision of State funding where submissions involving two or more applicants can obtain higher scoring points has found to be very helpful in the development of networks. The M50 network and the Dublin Molecular Medicine Centre (DMMC) are examples of networks which involve separate institutions that have collaborated to apply for funding. The important feature of both of the respective funding programmes, the Enterprise Platform Programme and the PRTLII, is that the institutions could have applied for funding individually. However, collaborating increased their chances of success. Box 5.3 illustrates an example of a top-down network programme in Belgium.

PROCESS One of the key findings of the Skillnets training programme was that while the concept of networks is easy to grasp, operationally a network is both complex and challenging to operate. As Maura Hunt, chief executive of Skillnets, has stated:

“Developing a network may appear easy but establishing a successful network takes a great deal of skill, dedication and experience.”

The Skillnets’ experience is that the key success factor is the **process** or the “**how**” factor i.e. how companies are attracted to participate in a network, how their commitment is gained, how the process of developing the network is managed, how it is structured, how decisions are made, how communications is handled, how action programmes are delivered, etc.

Skillnets have developed a training programme which is mandatory for all of the managers of networks funded by the organisation.

5.2 The role of policy in network formation

The review of the international literature has identified a number of key success factors in relation to policies to encourage network formation and development:

CLUSTERS CANNOT BE CREATED—NETWORKS SHOULD BE SELF-ORGANISED There is a large consensus on the view that clusters cannot be created. They emerge from a combination of various events and particular combinations of actions from leading figures, firms and other actors such as research institutes. It is very difficult to predict the development path of a cluster, as it is often the result of unpredictable events and may be affected by unintended effects of policy action or the regulatory context. Governments are becoming more aware of the risks involved with “picking-the-winners” strategies and have gradually turned from top-down selection of target industries or technologies, towards a role of supporting network self-determination.

Box 5.3: DSP Valley – Digital Signal Processing Valley (Flanders-Belgium)

DSP Valley is a technology network organisation, focusing on the design of hardware and software technology for digital signal processing systems. It was founded in 1993–1994 as a private initiative of one University (Leuven), a large electronics research centre (IMEC) with public-private funding and Philips. The main driving force was the desire to exploit technologies developed in those research institutions in the industry. DSP Valley today groups around 20 members of different kinds: universities, research institutes and industrial companies (from small start-ups to large international groups).

This network is supported by the Flemish VIS programme (2002–2012). The programme supports “structured groupings of mainly enterprises, possibly with the participation of other types of organisations, active in the following four areas: collective research, technological services; sub-regional innovation stimulation, and thematic innovation stimulation”. According to those objectives, there are four types of VIS. In particular, the VIS specialising in “thematic innovation stimulation” has the following objectives:

- 1) to inform and support companies, especially SMEs, which are linked by a common technological problem, in order to improve their innovation process;
- 2) to support and optimise the synergy process arising among companies on the one hand, and between companies and knowledge institutions on the other hand.

The VIS networks are required to:

- operate on the level of the whole region;
- address both technological and non-technological needs;
- contribute to international competitiveness of the member companies of the VIS network;
- be technology-oriented;
- show a complementarity with other projects of technological support and training and education in the region.

The minimum number of enterprises participating in a VIS network is 10, and the number should grow to 20 after 20 months. It is a fundamental requirement that SMEs are part of the grouping. Through the VIS programme, the network receives subsidies for four types of innovation activities:

- collective research (up to 50% of funding rate);
- technical advice;
- thematic innovation stimulation;
- sub-regional innovation stimulation (up to 80%).

Criteria for funding are the ‘innovation potential’, the ‘quality’, the ‘additionality’ and the ‘positive externalities’ of the proposals. The funding is ‘quasi-structural’ (2x2 years), as an instrument to provide continuity but also adaptation to improve complementarities among actors. Typical support for a network amounts to the financing of a cluster animator/manager (up to 2 full-time equivalents for 4 years).

The strengths of the DSP network are the following:

1. All DSP Valley members are active in different phases of the DSP product life cycle, from basic research to final commercialisation. This means that both companies and research organisations, both technology users and suppliers, co-operate to obtain a competitive advantage;
2. DSP Valley members are constantly introducing and applying innovative DSP design methods and software tools in new DSP application developments for digital audio, digital imaging and communication and navigation technologies. Feedback between design tools and applications has resulted in some ground-breaking developments;
3. The deeply rooted synergy is one of the greatest strengths of the DSP Valley concept. In addition to the complementary know-how and technological experience among the members, this unique aspect leads to an enhanced transfer of know-how, resulting in shorter time-to-market time-frames and reduction in the technological risks;
4. Technology transfer and diffusion is enhanced through several channels: between universities and research institutes through joint education programs and exchange of PhD students; from universities and research institutes to industry through training and scientific publications; from universities and research institutes to industry through joint R&D programs; within industry through co-operation in commercial projects and international R&D projects.

The DSP Valley clusters encompass most of the known success factors and necessary ingredients for clusters within an integrated framework:

- A critical mass of related and complementary activities and expertise;
- A specialised labour market;
- Strong interplays and networking activities;
- Effective knowledge and technology diffusion mechanisms;
- Strong attractiveness, notably through the presence of world-class research;
- Industrial leadership by 3 main industrial partners (Philips, Alcatel, Agfa-Gevaert);
- Training and education, of scientific and applied nature;
- Specialised venture capital funds;
- Adequate infrastructure, including incubation centres as well as good accessibility;
- Credible and efficient cluster management, combining short term business support and long term regional development goals.

www.dspvalley.be

A FACILITATING ROLE FOR POLICY: ENSURING THE CONDITIONS FOR THE FAVOURABLE DEVELOPMENT OF NETWORKS

The role of policy is more easily seen as one of a facilitator of networks, rather than a role of creator. Because networking needs to be based on firms' dynamics, the prime movers need to be the firms themselves. But policy instruments can be used to favour and accompany such moves, through, for example, the provision of funding for network brokers or other intermediary organisations that can play such a role. The rationale for such intervention relates to the "free rider" problem: all firms in a network will benefit from it while the establishment and management costs will only be borne by the network organiser. Public intervention is, therefore, justified in order to cover the costs of the public good element of network formation or management.

COMBINATION OF BOTTOM-UP/TOP-DOWN APPROACHES A crucial question emerging from the review of innovative networks support programmes is what should be the role of public intervention and how should this role change with the evolution of networks?

In terms of the size of public intervention, the trade-off is as follows: on the one hand, too much public intervention runs the risk of creating "empty shells" or artificial networks with little ownership by enterprises; on the other hand, too little public intervention may mean a loss of opportunities, in cases where impediments need to be alleviated before networking practices can flourish. It is important to support "*natural*" (also sometimes referred to as "*organic*") clusters, rather than artificial ones, because the former are much more likely to be sustainable than the latter. Entirely top-down or entirely bottom-up initiatives are likely to be less efficient than initiatives based on a good mix of the two approaches (see Box 5.4 on plastics industry in Pas-de-Calais).

Box 5.4: Plastics industry network in Pas-de-Calais (France): the right mix between top-down and bottom-up approaches

At the beginning of the eighties, a study was conducted on the potential of the plastics industry in the region of Pas-de-Calais, showing that the growth of the automobile industry offered positive perspectives for the development of the plastics industry, emerging at that time. A club of enterprises active in this sector has been funded on the initiative of one company manager, and the local authorities provided some small funding for this Club. The Club has been hosted by the local Chamber of Commerce, which offered some technical support. Without such "facilitator" support, the Club would probably not have been founded, as enterprises were active in a variety of activities, differed in size and had no obvious reasons to meet. The Chamber of Commerce has facilitated the process, but did not initiate nor direct the activities of the Club.

The most effective support mechanism consists of the funding (through various sources: European, local, regional and company contributions) of one plastics engineer, in charge of coordination of activities. This person acts as a go-between among enterprises, provides technological and financial information, supports enterprises for the acquisition of new technologies, acts as an intermediate for personnel exchanges, etc. By choosing the right profile, the person gained the right level of credibility vis-à-vis the enterprises.

An evaluation of the network shows positive results. The network is composed of 25 companies, and co-operation practices are growing between them, in a variety of areas: knowledge, know-how, personnel and markets. One interesting action of the network was the joint purchase of equipment at the local university, to ensure that students are proficient in the use of the most up-to-date equipment which in turn, makes their integration in the workplace both time and cost effective.

The willingness of companies to provide funding for the running of the network is the best test of the efficiency and reality of network benefits.

This example shows that using a right mix between top-down support and bottom-up initiatives is a good option to follow for network success. The presence of a leading company at the start and companies' involvement throughout the life of the network are essential, but the network wouldn't have met success without the support from intermediary organisations and public funding.

SKILLS A primary area of action for governments is the support for the development of an adequate skill base. Indeed, human capital is seen as a key asset for developing successful networks and clusters and this is an area where governmental responsibilities in education, training and life-long learning can be leveraged to create the favourable conditions for

innovative networks and clusters. This illustrates the more general point that the most effective policies in support of networks or clusters are not necessarily explicit network or cluster policies.

INDUSTRY-HIGHER EDUCATION NETWORKS In relation to the specific case of industry-higher education networks, governments have developed a range of instruments to facilitate industry-academic relationships:

- creating intermediaries such as technology transfer organisations, science and technology parks;
- supporting industry liaison offices within third level colleges;
- enhancing the regulatory environment in order to remove obstacles to industry-academia collaboration (changing the status of researchers, assigning a third mission to universities, etc.);
- funding co-operative research projects that allow for the creation of specific platforms, physical or virtual, that facilitate actors from both industry and academia to work together in a specified technology area (e.g. competence centres programmes in various countries).

Box 5.5: Biotech Valley in Södermanland (Sweden)

Södermanland is a county located not far from the Stockholm region. It has been associated with biotechnology and pharmacy for more than 50 years. The leading biotech company located in the region is Pfizer which has an annual market value of production in the region of \$1 billion. Two other large companies are present, as well as smaller service companies. Recently, a number of new biotech firms located in the region. An important player is the BCS Laboratory, a combined teaching and research laboratory set up jointly by the local industry and a nearby university.

The Biotech Valley initiative is an industry-driven initiative, in which Pfizer has taken a leading role. The aim of this network is to develop the industrialisation and manufacturing processes of the biotech sector: most of the companies working in biotech operate in the early stages of the biotech value chain (genomics, drug discovery, animal studies and early-phase clinical studies). The majority of the companies do not have the necessary competencies to act down in the value-chain and manufacture products from these discoveries. One of the priorities of the network initiative is thus to provide the crucial infrastructure needed by the small biotech companies.

An important element for the success of the initiative is the establishment by the Biotechvalley partnership of education and training programmes providing specific skills and competencies for bio-manufacturing. The programme has utilised the resources of the local university and vocational training institute. The training programmes are specifically tailored to the needs of the biotech industry. Some programmes are unique in Sweden, and have been designed with the participation of the leading companies. These programmes supply the industry with around 70 new, skilled technicians a year.

A key to the success of this network lies in the capacity of regional actors to cooperate and develop common views and projects. The presence of a network of academic and industrial actors, resting on professional but also personal links, is a necessary condition for the further growth and success of this network.

6. Networks: Irish policy and practice

6.1 Introduction

This section reviews the principal policy initiatives, measures and statements bearing on the issue of networks and clusters on the Island of Ireland.

Sub-section 6.2 examines policies in relation to networks in Ireland while sub-section 6.3 provides an overview of industry-industry networks. Sub-section 6.4 deals with industry-academia networks and sub-section 6.5 examines academia-academia networks.

6.2 Irish network policies and initiatives

6.2.1 Culliton Report (1992)

The Culliton Report strongly endorsed a cluster approach to industrial development. It advocated building strengths around sources of national competitive advantage, pointing out how competitive advantage in one industry often spills over into another and citing examples in several countries. The success of the Danish Network Programme was especially highlighted because of Denmark's similar agricultural background to Ireland. The report acknowledged that cluster considerations had not been altogether neglected by the national development agencies over the years. One could see the start of a clustering process in segments of the food industry in the Cork region and an emerging cluster related to aeronautical engineering centred in the Limerick region. However, the greatest emphasis in promotion of foreign industry had been on the so called "high-tech" sector and on pharmaceuticals. Culliton suggested that the "*disappointing linkages that have resulted with pharmaceuticals and electronics*" could be put down to the fact that neither sector built on pre-existing Irish strengths or natural advantages.

Culliton felt that the existence of a rapidly growing international market, advocated by some as the basis for choosing niches seemed much less important a criterion than building on local strengths.

6.2.2 STIAC Report (1995)

Shortly after Culliton the question of an Irish National Innovation System (NIS) was introduced as an analytical and policy tool by NESC (1992) which compared Irish industrial and economic performance with that of a number of other small European economies.

Support for the idea of an Irish NIS was further elaborated in the Science, Technology and Innovation Advisory Council (STIAC) Report (March 1995) as the policy framework within which longer-term, structural interactions between technologies and firms should be analysed and discussed.

Size and scale of Irish firms

STIAC concluded that the basic structural problem of Irish industry—the small size and scale of operation of most indigenous firms—must be directly tackled through a programme to bring enterprises together in co-operating groups. The aim would be to bring a number of complementary, independent companies together, retaining their ownership but collaborating in a number of common areas such as R&D, technology acquisition, process change and market development.

STIAC's model for this approach was again the Danish Network Co-operation Programme (DNP). STIAC noted that Danish managers were just like Irish managers in having no “*natural*” propensity to engage in inter-firm co-operation. Danish industry was scattered and fragmented, there was an absence of clusters and “*industrial districts*”, few regional or sectoral agglomerations of firms and a shortage of sectoral service institutions and industry/trade associations. Yet following the DNP, out of a target of 7,500 the number of Danish firms showing “*a strong interest*” in networking and co-operation was estimated at between 2,500 and 3,500 including those applying to the programme and those setting up their own networks.

Cohesion countries such as Spain and Portugal had also followed the Danish approach and were reporting satisfaction in achieving the necessary interest of small firm entrepreneurs. Other countries adopting the programme included the U.S. (at individual State level), Canada, Norway, Finland and Iceland.

STIAC recommended:

- the establishment in Ireland of an Inter-firm Co-operation Programme modelled on the Danish system. Existing programmes and schemes should be used to encourage such co-operation; for example a 5% premium on grants as a reward for co-operating with inter-firm partners;
- a minimum target of 5% of Measure 1 of the R&D sub-programme should be earmarked for R&D co-operation linked to the Inter-firm Co-operation Programme;
- a special effort should be made to ensure participation by natural resource and service-type enterprises in networking and co-operation. The software sector, characterised by small, high technology R&D performing firms would be a candidate for priority treatment, particularly for co-operation in R&D;
- a new programme should be introduced for enterprises which were not R&D performers. This would be modelled on the EU CRAFT programme and would bring together groups of firms with similar interests and have a third party carry out research on their behalf.

6.2.3 The Science, Technology and Innovation White Paper (1996)

Addressing “*The Problem of Scale: an Inter-Firm Co-operation Programme*” the Government endorsed the STIAC proposal in its White Paper on Science, Technology and Innovation, noting the range of such programmes operating in other countries, and

declared that Forbairt (now Enterprise Ireland) would introduce a programme of inter-firm collaboration, aimed at networking activities of firms.

6.2.4 The Pilot Networks Programme

Responding to the recommendations of STIAC (1995) and the White Paper on Science, Technology and Innovation, a Pilot Programme on Inter Firm Co-operation Networks was introduced by Forbairt on behalf of the Department of Enterprise and Employment to run for a six-month period in 1997. The programme was modelled on the Danish Networks Programme. Over 70 SMEs were targeted and the majority of them expressed an interest in participating in a network.

By the end of the pilot programme 17 new networks had formally come together or were at some stage of development. The main benefit was that the networks enabled the companies involved to work together as a team in strategic development of new business opportunities.

An internal evaluation (1997) found that the Pilot Programme had succeeded in all its objectives. The view was strongly expressed that a longer-term national programme would nurture a strong networking culture in Ireland, leading to a more internationally competitive and innovative SME base.

In the same year the Pilot Networks Programme Steering Group commissioned Tom Martin & Associates/TMA to carry out a survey of existing SME Networks in Ireland. The TMA survey found that the existing networks were of varying quality. While the majority of networks operated below 'threshold' synergy levels, typically exchanging marketing information at infrequent intervals, a small number were achieving genuine network synergies and providing an integrated business solution. An example is three SMEs specialising in plastics, metal and electronic assembly, combining to become a top-tier supplier to an electronics MNC. The report highlighted a number of imperatives for the network project going forward, including professional network facilitators, a databank of potential network partners and more time, patience and support for embryonic networks to build up mutual trust.

The Final Report of the Pilot Network Programme Steering Group (1998) recommended that a fully-fledged networks initiative be instituted at a national level along the lines of the Danish model.

6.2.5 Plato Programme

The Plato networking concept was initiated in Turnhout within the Kempen area of Belgium in 1988 and was designed to stimulate the regional economy. The Plato name reflects the aims of the project: Parenthood, Learning Scheme, Region (Arrondissement, Turnhout), Enterprises (Ondernemingen). The Plato initiative spread to a number of countries including Ireland where there are now eight regional networks (including one cross-border regional network). The first Plato network was established in Dublin by the Tallaght partnership in 1993.

The Plato networks in Ireland were financially supported under the Operational Programme for Local, Urban and Regional Development. Now it is supported primarily

by Chambers of Commerce and the County Enterprise Boards. It is the largest private-sector-led network initiative involving over 1,000 companies around Ireland.

The aim of the Plato initiative is to establish a broadly-based business support structure which provides opportunities for SME owner managers to develop their management skills. It also creates opportunities for commercial development through local and international networking; and facilitates inter-firm cooperation.

Plato's fifth National Networking Event—the Plato All Island Networking Event held on May 2003—was sponsored by InterTradeIreland.

6.2.6 Skillnets

In the mid 1990s the business community, notably through IBEC, had been calling for a business-led response to the challenges of developing a proactive, strategic training process. In the White Paper on Human Resource Development (May 1997) the government responded to the call and agreed to establish an employer/enterprise led body with specific responsibility for training those in employment. This was further encouraged under Partnership 2000 where a large degree of consensus emerged among the social partners about the importance of continuing enterprise-led training, at all levels of the workforce, based on the recognition that training improves productivity and competitiveness for business while enhancing lifelong employability for employees.

Skillnets, established as a limited company in early 1999, comprised business/employer representatives (IBEC, SFA, CCI, CIF), employee representatives (ICTU) and three nominees of the Minister for Enterprise, Trade and Employment.

The government allocated €12 million per annum to fund the initiative for a three-year period and this was matched by industry. An additional €2 million was made available from the European Social Fund to support the programme in 1999.

The key difference between Skillnets and other training schemes which provide support for individual firms is the Skillnets' focus on mobilising groups or networks of companies to develop strategic answers tailor-made to their own specific needs. Skillnets provides greater flexibility in addressing a company's training requirements and enables companies to overcome the barriers they face in meeting their skills needs through a collaborative approach. Apart from improving the effectiveness of existing schemes the programme aims to increase the level of training throughout industry.

6.2.7 Recent Government strategy documents

The 1996 Forfás strategy document, *Shaping our Future*, included the word 'networks' among a long list of measures to enhance the technological capabilities of firms in its chapter on Science and Technology. 'Clusters' are referred to in a similar manner under Regional Policy; but neither are given any special emphasis. "*The whole thrust of the document is geared to strengthening individual enterprises*" (Breathnach, 1997).

The Department of Enterprise, Trade and Employment policy statement on the inauguration of Enterprise Ireland made no mention of inter-firm networking in its substantive document. The subsequent Enterprise Ireland Strategy 1999–2001 statement

launched in mid-1999 continued to address its support package—‘business development solutions’—to individual companies. This package included many ‘linkage’ supporting measures e.g. collaborative R&D schemes (with the public research sector, and with international programme such as EUREKA and EU Framework Programmes), and supplier development programmes. But there was no explicit mention of an Inter-firm Network Programme.

Up to 1999 there still seemed to be a strong focus on individual companies and an increasing emphasis on high potential start up companies that could achieve the status of multinational corporations. An accompanying paper by O’Donnellan (1999) to the Enterprise Ireland strategy launch did include a section on “Building Innovation Networks” which sketched out a medium term scenario boasting Irish Biotech and ICT clusters, but there was no allusion to a hard Inter-firm Network Programme.

The most recent Forfás enterprise strategy document, *Enterprise 2010*, published in January 2000, did make reference to ‘inter-firm networking’ in its chapter on ‘promoting enterprise development’:

“The overall focus of (NDP 2000-2006) funding on the indigenous side, as set out in the plan, is to support the development of company capabilities in respect of strategy formulation, management and employee skills, inter-firm networking and overall competitiveness.”

In the same chapter, under ‘Regional Development’, it lists as a policy objective:

“a strong concentration on the development of business networks in the less developed regions (for example, the linkages between third level research and business sectors) necessary to foster the development of existing businesses and the creation of new high-potential start-ups.”

Enterprise Ireland’s regional strategy document listed a goal of “companies networking effectively in expanding clusters” under its Pillar 1 objective—to develop the competitiveness and export potential of existing companies.

Annual Competitiveness Reports

A renewed call to consider the network approach was issued in the National Competitiveness Council (NCC) Annual Competitiveness Report, 1999 which clearly outlined the advantages of networks. It illustrated how SMEs achieve competitiveness by realising collectively the advantages of economies of specialisation that they do not possess individually because of their small size. The report noted two parallel but contrasting phenomena that were prevalent over the previous decade:

- on the one hand, large firms re-organised their own activities around the world into networks of interconnected activities;
- on the other hand, successful small firms aggregated into networks around the world, thereby networking local clusters.

The NCC report stated that Government can help by facilitating such linkages at both the national and international level. SME policy in Ireland should have two basic (and

overlapping) lines of development if it is to reflect successful experience in other countries, and also to meet the challenge of globalisation.

The first is that of networking and cluster development. The second should be in the area of the fostering of international linkages. In some cases this will be part of the cluster approach, where small firms could have sub-supply linkages or other co-operation with other EMU area firms in particular. The international linkages programme of Enterprise Ireland, and a number of EU programmes, already provide some of the framework needed. But acceleration of existing trends is required, with a special concentration on trade diversification, partnerships and cluster formation. Measures to expand e-commerce will be especially helpful to SMEs in this regard.

The most recent NCC Challenge Report (2003) again calls for the support of the “*spheres of business*” and clusters of related enterprise activities.

6.2.8 Northern Ireland

A review of recent policy documents in Northern Ireland indicates an awareness of the potential of networks. The Invest NI Corporate Plan 2002–2005 identifies its main priorities as addressing the lack of innovative and entrepreneurial forms, low levels of business R&D and the small number of knowledge-based businesses. In regard to networks the plan stressed the importance of on-going development of NI-based Supply Chain Networks. It would seek opportunities to work with its overseas Invest NI representatives to extend these networks. Networks were thus primarily viewed in terms of external contacts affecting exports and FDI; inter-firm networks were not key drivers in the corporate plan.

In its response to Invest NI’s draft corporate plan in March 2002, the Northern Ireland Economic Council (NIEC) welcomed the focus upon enterprise and entrepreneurs, but recommended that the plan should also highlight the role of entrepreneurial firms. The NIEC cited its 2000 report undertaken by Professor Michael Best which urged economic policy-makers to focus upon entrepreneurial firms as well as individuals, because the entrepreneurial firm was a vital actor in an internal/external dynamic based on open-systems networking.

Invest NI had identified four areas of developmental need: innovation, existing businesses, business birth rates and inward investment. The Council recommended that networks should be included as a fifth area of development in this section. Networks not only enhance the infrastructure for entrepreneurial firms but they also promote learning transfers from exemplar companies.

A NIEC paper published in 2002 on regional innovation strategies stated that networks of association and interaction between firms were relatively under-developed in Northern Ireland.

In December 1999, the NIEC had recommended that a research, development and innovation strategy should be developed as a key component of future economic and social development for Northern Ireland. The NI Executive endorsed this recommendation and a commitment for the Department of Enterprise, Trade and Investment (DETI) to lead on the development of a Regional Innovation Strategy was entered into the 2001–2004 Programme for Government. An Inter-Departmental Working Group (IDWG) with

membership from each Government Department and Invest NI, under the chairmanship of DETI, was established and this group developed a range of recommendations intended to stimulate and co-ordinate the development of a world-class regional innovation system in Northern Ireland.

A major driver behind this strategy was that Northern Ireland came bottom of the UK Regional League table in terms of amount spent by businesses on R&D. To address this it was argued that NI needed a “*Regional Innovation System*.”

Accordingly, the document was very focused on research. While acknowledging the work done to forge linkages between industry and the universities, and identifying QUBIS and UUTech as successful vehicles for commercialising university R&D, it called for yet stronger “*links, strategic alliances and collaborative partnerships between industry and academia*.” The document made no reference, however, to inter-firm networks.

6.3 Industry-industry networks

6.3.1 Overview

There is a lack of data on the existence and extent of industry-industry networks in Ireland. The lacuna in availability of data can be attributed to the fact that while there is broad support for the concept of networks at a policy level this has not been translated into practice with the exception of one short pilot programme. The lack of data may also be a result of the lack of a universally accepted definition of inter-firm networks. As has been pointed out in previous sections, there is a tendency to use the terms networks and clusters inter-changeably. There is also a tendency in some circles to equate networking with networks; the former is something which is common to virtually all companies and at a basic level involves the exchange of information whereas the latter is defined as a grouping of companies that have a specific membership criteria and set of objectives.

The lack of data on networks may also be attributed to the fact that the traditional approach to enterprise development for the manufacturing and internationally traded services sector has been on the basis of supports and assistance for individual companies.

As the previous sub-section has indicated there are currently no dedicated programmes aimed at encouraging the formation of industry-industry networks. The most recent example of such an initiative was the Pilot Networks Programme which ran between 1997–1998. The Final Report of the Pilot Networks Programme Steering Group which was published in 1998 recommended that a fully-fledged networks initiative be instituted at a national level along the lines of the Danish model. This recommendation was not, however, implemented.

The National Linkage Programme (NLP) sought to develop linkages between multinational companies based in Ireland and indigenous sub-suppliers. Funding constraints precluded the NLP from reaching its full potential.

A number of current State-funded initiatives have networking as a subsidiary objective. The Skillnets Training Network Programme is an example of a publicly-funded initiative which seeks to improve the skills of Irish industry through the use of networks of companies

based on specific industry sectors, geographical location or small business interests to deliver training programmes. The evaluation of the Pilot Training Networks Programme (1999–2002) indicated that by the end of 2001, 58 networks involving 3,800 companies and 12,800 employees had been developed throughout Ireland.

There are approximately 1,000 companies participating in Plato networks around Ireland. Funding for the Plato programme comes from a variety of sources including the County and City Enterprise Boards, International Fund for Ireland and the EU.

Other initiatives which have an inter-firm network component include Enterprise Ireland's Internationally Traded Services 2000–2006 strategy which provides for the development of WebWorks which aims to develop clusters of regionally-based high-technology start-up companies. WebWorks are expected to come on stream in Galway, Cork, Sligo and Waterford in early to mid-2004.

There are examples of where Enterprise Ireland's grant schemes fund collaborations between companies and between companies and third level institutions or research bodies. Applications to Enterprise Ireland's Research Technology and Innovation (RTI) competitive grants scheme that involve a company in collaboration with a partner (another company, third level institution or research body) receive a higher assessment rating than applications that are submitted by a company on its own. The RTI funding guidelines state that formal collaboration is encouraged; this is defined as occurring where a number of companies and/or research establishments undertake a project on the basis of shared cost, risk and intellectual property rights. International collaboration is also supported by RTI. It is understood, however, that the amount of RTI funding applications involving a research partnership is small.

The absence of a dedicated initiative aimed at facilitating the formation and development of industry-industry networks has not, however, prevented the State development agencies from being active players in this process.

The research undertaken by the consultants indicates that the agencies have assisted the establishment of a number of inter-firm networks. The Supply Network Shannon (SNS) grouping is an example of an industry-industry network whose establishment and on-going development has been extensively facilitated by Shannon Development and Enterprise Ireland. Shannon Development developed a directory of sub-suppliers in the region, provided a venue for SNS meetings and provided secretariat services to the network.

Shannon Development also provides secretarial support to another network, the Atlantic Technology Corridor (ATC). This network was initially started by a group of multinational companies in the western seaboard area who were concerned with inadequacies in the region's economic and physical infrastructure. Though Shannon Development was not an initiator of the network, it has become involved to the extent that one of its executives acts in a project manager/secretariat role to the ATC.

Box 6.1: Supply Network Shannon (SNS), an industry-industry network

Supply Network Shannon (SNS) is an open, sectoral network of engineering and electronics sub-supply companies located in the Shannon region.

The impetus for the formation of SNS was a combination of top-down and bottom-up; in the 1990s Shannon Development was becoming increasingly concerned about the low level of technical capability of the sub-supply base in the Shannon region which was contributing to over-reliance on low labour costs for competitive advantage in supplying multinational companies (MNCs); the sub-supply companies themselves were anxious to move up the value chain to circumvent the increased competition from low cost countries. Prompted by the occasion of an international sub-supply fair in Limerick in 1997 Shannon Development published a Sub-Supply Directory for the region in 1998. This publication galvanised the listed companies into looking at themselves as a group and seeking opportunities to network together, particularly for the provision of integrated supply solutions to MNC customers.

SNS was incorporated as a limited liability company in 1999 and it currently has a membership of some 25 companies. It is driven by an independent Steering Committee whose officers are drawn from nine member companies and two development agencies, Shannon Development and Enterprise Ireland. Maurice McLernon of Gentech Electronics, a member company, has chaired the Committee since its inception.

Shannon Development has provided financial resources and other supports to assist the development of SNS. Limerick University also supports the network through its Small Business Research Unit and Technology Transfer Unit.

The objective of SNS is clearly stated in its charter:

"SNS is an industry-led initiative aimed at representing, promoting, developing and connecting together sub-supply companies in the Shannon Region of Ireland. Supply Network Shannon benefits all engineering and electronics sub-supply companies in the region, regardless of size or activity and will help to reinforce the region's position as a world class source of sub-supply products and services."

The network focuses on three main areas of activities: business issues such as supply chain management (SCM), technical issues relevant to engineering and electrical manufacturers and ICT usage. In its initial phase, SNS concentrated on two core activities, training and promotion.

In 1999 SNS put forward a successful proposal in the first round of Skillnets training programme. The Skillnets funding enabled SNS to employ a training manager. The training focused on SCM and Lean Manufacturing. A second proposal to Skillnets covering the period 2002-2004, was not, however, successful.

SNS has also been very active on the promotional front both in terms of attracting new members and in highlighting the capabilities of the network to prospective members. In addition to maintaining a web site, SNS has co-ordinated collective advertising in trade magazines. Mindful of the need to build relationships between member companies, the network has also arranged social activities such as golf outings. SNS is also working to develop linkages with other networks on the Island of Ireland and further afield.

In its fundamental configuration, SNS is a loose network of sub-supply companies. A first smaller, 'harder' network of SNS member companies has recently emerged under the rubric, Tsunami. This consists of seven complementary manufacturing companies who recognise in the Tsunami concept as an expedient vehicle to approach MNCs with an integrated product offering. The Tsunami companies are also exploring opportunities to reduce costs through sharing functional resources e.g. operating a centralised design for manufacturing unit, quality assurance, costing and invoicing, and logistics management.

Tsunami has applied to Shannon Development for funding to employ a general manager, marketing manager and IT specialist and to operationalise the network. The difficulty for the agency is that Tsunami is not technically eligible for grant support under current structures as it is unlikely to have 10 or more employees.

<http://www.snshannon.com/>

Shannon Development has with EU funding initiated the European Digital Media Network with the objective of enabling digital media companies in the mid-West to promote themselves at a European level, locate partners and keep abreast of developments and practices in the sector. Shannon Development is being partnered in this project by similar organisations in England, Scotland, Austria and Sweden. The member companies can use the network to expand their business through knowledge acquisition, promotion, learning and networking at a European level.

Enterprise Ireland has also played a role in the creation and development of industry-industry networks. Though the Irish Photonics Association (IPA) is a grouping of both companies, researchers and other relevant organisations, Enterprise Ireland saw the association as potentially having a role in fostering (a) inter-firm and (b) industry-academia

linkages. Enterprise Ireland has sought to bring the major companies in the sector together and has facilitated the network in terms of providing a venue for networking meetings and arranging speakers. Through the use of existing supports such as market study visits and participation in international trade fairs, Enterprise Ireland has facilitated networking between the indigenous photonics companies. The agency is also funding the development of the IPA web site.

The agency has played a similar role in encouraging industry-industry networks in other sectors. The development of such networks are seen as conferring a number of advantages:

- Development of integrated offerings by groupings of client companies;
- Raising the profile of the sector both nationally and internationally;
- Joint marketing;
- Joint purchasing;
- Exchange of information.

Both Enterprise Ireland and Shannon Development are considering proposals from existing industry-industry networks to fund a network manager to facilitate the continued development of the network.

Though the agencies have been active in facilitating the development of inter-firm networks, there is a clear understanding that networks are not a solution to all of the needs of Irish industry. Networks of companies are viewed as difficult to create and for which there is no guarantee of success. The formation of networks can be a lengthy process due to the need for companies to build up trust and confidence in other network member firms. State agency personnel have indicated that some of the conditions necessary for the successful development of industry-industry networks may not always be present e.g. lack of critical mass, absence of a large key player, etc., due to the small scale of some industrial sectors. There is also recognition that companies must see a clear need to be a member of a network otherwise its participation will be short-lived. In this regard, executives in the agencies have pointed out that for example the threat of losing business to lower cost countries has concentrated the minds of indigenous sup-suppliers in looking more favourably at the concept of forming networks to provide integrated supply solutions.

The input that the state agencies have made in assisting the development of industry-industry networks can be summarised as follows:

- **CREATING AWARENESS OF THE VALUE OF NETWORKING:** the agencies have in certain cases promoted the benefits to be gained by client companies collaborating together to better serve international customers. Enterprise Ireland has highlighted in a number of engineering and electronic sub-sectors the advantages of complementary suppliers coming together to deliver integrated supply solutions to major OEMs;
- **PROVISION OF INFORMATION ON THE SECTOR:** the publication, for example, by Shannon Development of a directory of sub-supply firms in the mid-West region was a catalyst for future SNS member firms to develop an awareness of the existence of

other similar or complementary companies in the region. The IPA web site which is funded by Enterprise Ireland will assist member organisations to develop an appreciation of the range of commercial and research activities being undertaken in this diverse sector;

- **PARTICIPATION IN TRADE MISSIONS/FAIRS AND MARKET STUDY VISITS:** the use of these supports allows industry players the opportunity to interact with each other. The fact that these supports mean that senior managers are out of their normal environment and in each other's company for a number of days can be important in developing personal relationships. Enterprise Ireland funded a group of photonics companies to visit a network of photonics companies in North Wales;
- **ASSISTING WITH THE HOLDING OF NETWORKING MEETINGS:** the agencies have provided venues and secretariat assistance for networking meetings that help industry members to develop linkages. The agencies have also helped to fund the participation of key national and international speakers for such meetings which is an important method of incentivising companies to attend such events—particularly those company personnel who must travel from peripheral locations. The funding by Enterprise Ireland of an executive from an Arizona photonics industry association to speak at a networking meeting was the catalyst for the formation of the Irish Photonics Association;
- **FUNDING OF NETWORK MANAGERS:** as noted above, both Enterprise Ireland and Shannon Development are considering requests from a number of networks for funding to employ a network manager.

It can be seen that the support by the agencies for industry-industry networks have been funded from existing supports such as market study visits while other supports such as the provision of secretariat services comes from general funding sources. There are, for example, no specific funds that could be used to assist inter-firm networks to employ a network manager.

It should be noted that within the State development agencies there is a considerable amount of expertise in relation to the formation of networks. The expertise has been developed through, for example, participation in EU Framework projects and involvement in technology transfer initiatives. Other sources of experience in network development have arisen from sectoral development initiatives.

A number of inter-firm networks have also been started with the assistance of non-agency funding. NETWIN, one of the five case studies, is an example of a group of SME networks in the Roscommon area that was developed with finance from the EU's Recite Programme. The development of the network of software and allied companies in the mid-West, ShannonSoft, was assisted with funding from the Small Business Operational Programme 1995–1999.

Other networks such as the Atlantic Technology Corridor (ATC) have developed without direct State or EU funding. A key factor in the case of the ATC is, however, the presence of large multinational companies in the network with the capability to fund network activities. Though the ATC started as an industry-industry network, there was a recognition of the

need to build linkages with local universities and hence it can now be classified as an industry-academia network.

Some of the networks profiled during the course of the study indicated an interest in developing linkages with companies in Northern Ireland. SNS is examining the possibility of expanding its network to include companies north of the border. A recent UK government report has highlighted the need for companies in Northern Ireland to develop linkages with companies in the Republic.

6.4 Industry-academia networks

6.4.1 Overview

A key national policy objective is to improve the knowledge base of Irish industry in order to move indigenous companies up the value-added chain. The third level sector has been identified as a key source of knowledge to be tapped by indigenous companies given that Ireland—unlike other larger OECD member countries—does not have a infrastructure of industry or sector-based research centres.

This key policy objective is reflected in the number of State-funded initiatives designed to assist manufacturing and internationally traded services companies to develop alliances with third level colleges particularly with regard to innovation and R&D. An example of such an initiative is Enterprise Ireland's Innovation Partnership scheme which funds joint industry-third level research projects. Similarly, one of the agency's new regional initiatives funds the development of new incubation facilities in Institutes of Technology.

Enterprise Ireland also funds the Technology Transfer Initiative (TTI), a project developed and implemented by the Atlantic University Alliance (AUA), that seeks to provide a structured gateway for indigenous SMEs in the Western seaboard area to access the knowledge and expertise of the AUA member universities.

The Programmes for Advanced Technology (PATs) are an Enterprise Ireland-funded bridging mechanism to assist Irish industry to gain direct access to expertise in the third level sector through technology transfer and specific sectoral networks.

Science Foundation Ireland's Centres for Science, Technology and Engineering (CSET) scheme is designed to link academic and industrial researchers together on high-end research programmes in biotechnology and ICT. One such CSET-funded project involves a collaboration between National University of Ireland Galway (NUIG) and Hewlett-Packard.

InnovationWorks, the new initiative from Shannon Development, is intended to facilitate the transfer of knowledge from third level institutions to new high-technology start-ups.

The Atlantic Technology Corridor network started life as an industry-industry network but the founder members quickly realised the importance of developing linkages with the main knowledge creators in the region such as the University of Limerick and NUIG. As a consequence, the ATC network has expanded to include all of the region's third level colleges.

Irish companies and third level institutions have participated in international industry-academic research collaboration through the EU's Framework Programmes. In the Irish national consultation process in the lead up to the 6th Framework Programme (FP6), one of the recurring issues was the need to ensure that whatever programmes are put in place, they should not be unduly complicated or overly bureaucratic. The consultation process identified a need for the FP6 to be structured in a way that proactively encourages and facilitates SMEs to become genuinely involved in research activities.

6.4.2 Barriers

The research indicates that there are difficulties in relation to the development of industry-academia networks. These difficulties include the following:

LACK OF KNOWLEDGE OF RESEARCH BEING UNDERTAKEN IN THE THIRD LEVEL SECTOR A barrier to the development of industry-academic linkages is the difficulties experienced by companies in identifying what research is being carried out in the third level sector that is relevant to their needs. A factor here is the lack of information on the research being carried out by individual researchers within the third level sector. A number of initiatives have been established to address this issue. As an example, InterTradeIreland has initiated a web-based information site, *ExpertiseIreland*, which is designed to act as an information portal to expertise within the third level sector. The Atlantic University Alliance's Technology Transfer Initiative is intended to provide a structured gateway mechanism to assist indigenous SMEs within the Western seaboard region to access the expertise of the member universities.

INTELLECTUAL PROPERTY RIGHTS (IPR) The case study of the Irish Photonics Association has indicated that small indigenous photonics companies—even those with good linkages to third level institutions—experience difficulties in drawing up contracts with university researchers to cover issues relating to IPR. The difficulties relate to the fact that there are no standardised approaches to IPR contracts within the third level sector. The contracts can vary between individual researchers, departments and faculties within the same institution. The Irish Council for Science, Technology and Innovation (ICSTI) set up a task force to develop a National Code of Practice with respect to intellectual property to address key issues such as ownership, duty to report discoveries, duty to exploit, and share of income and assignment of intellectual property. In a Statement published in 2003, ICSTI recommended a National Code of Practice for the management of intellectual property from publicly-funded research carried out in universities, public research institutions and institutes of technology. The Council said it would take immediate action to progress the development and implementation of the proposed National Code of Practice in conjunction with relevant stakeholders. It should be noted that from the companies' perspective the issue in relation to negotiating contracts with academic researchers is not perceived as barrier to industry-academic networks but rather as a difficulty that can lead to additional costs.

GAP IN TECHNOLOGY TIME HORIZONS One of the issues for indigenous photonics companies is the gap between the basic research being carried out by academic researchers and the close-to-market research being undertaken by the companies. The academic researchers are frequently looking at technology issues that may be 5–10 years out while companies are addressing technology issues that at the furthest may be 1–2 years out. This means that

the technological issues that the companies would like to address may not be of sufficient interest to academic researchers who may perceive that what the company wants from them is consultancy whereas they would prefer to focus on research.

DIFFERENCES IN CULTURE The interviews with both industry and academic representatives have indicated that there can be difficulties between companies and academics in terms of the publication of research findings. The latter's career prospects can depend on publication of research results whereas the former may wish to keep the results of any research activities private and confidential.

6.5 Academia-academia networks

6.5.1 Overview

The advent of the Programme for Research in Third Level Institutions (PRTLTI) has transformed the academic research landscape particularly its emphasis on encouraging academic-academic institutional collaboration. The programme of interviews has indicated that prior to the introduction of the PRTLTI the extent of academic collaboration was limited partly due to competition for the limited amount of academic research funding. Another reason advanced for the fragmented nature of inter-institutional research collaboration was that although Irish academic researchers successfully participated in EU Framework Programmes, their linkages were generally with academics in other European countries. It was, therefore, not uncommon for academic researchers in University College Cork to have better linkages with academic researchers in Spain or Germany than with researchers in the University of Limerick or Trinity College Dublin.

The PRTLTI encouraged academic collaboration on an institutional basis. Individual colleges could still make an application on their own name; however, extra marks were awarded where two or more academic institutions had come together to submit an application for funding. The Dublin Molecular Medicine Centre (DMMC) is an example of a PRTLTI-funded project involving Trinity, University College Dublin and the Royal College of Surgeons.

The development of these PRTLTI-funded networks have been welcomed because they allow for a more efficient interaction with industry as they facilitate economies of scale and they also allow for the provision of a multi-disciplinary research capability.

The Higher Education Authority (HEA) which is responsible for the administration of the PRTLTI also manages two smaller programmes that respectively fund collaboration between (a) North-South third level institutions and (b) third level institutions and Media Lab Europe.

It is important to emphasise that extensive networking takes place at the level of the individual academic researcher. These contacts can be built up through the publication of papers and participation at conferences. They can also arise from student exchanges/placements.

Science Foundation Ireland also funds collaboration between academic researchers in the biotechnology and ICT sectors.

Box 6.2: The Atlantic University Alliance, an academia-academia network

The Atlantic University Alliance (AUA) was established with the aim of pooling the individual expertise and resources of the National University of Ireland, Galway (NUIG), University College Cork (UCC) and the University of Limerick (UL) and making them available to indigenous SMEs in the southern and western seaboard regions. The Alliance was founded in October 1997 after the three universities had failed in their joint tender to Enterprise Ireland for the contract to provide technology management courses to industry. The contract went to University College Dublin which submitted a tender in collaboration with the Massachusetts Institute of Technology (MIT). The three universities realised that they had much in common and following discussions with Enterprise Ireland agreed to form the AUA.

The Alliance does not have a legal structure; it is simply an association of the three member universities whose presidents have signed an agreement to co-operate. Each member university has the right for its president, vice president/dean of research, Industrial Liaison Officer (ILO) and a senior member of the academic community to attend AUA meetings.

The AUA has a number of objectives the most important of which is to provide an academic counter-balance to the dominance of the East Coast universities whose ascendancy could become even more pronounced with enhanced cross-border linkages arising from the peace process. Hence, the AUA member universities see their role as being a catalyst for the economic development of the southern and western seaboard regions. The AUA's focus on economic development means that the member universities can work together on an issue that does not involve head-to-head competition.

The network's work programme focuses on technology transfer and technology management training activities. These arose from an Enterprise Ireland-funded study of the technology needs and resources in the regions in which the AUA member universities are based. The Alliance's main activities are the Technology Transfer Initiative (TTI) and the Technology Management Masters programme, both of which are funded by Enterprise Ireland. The TTI is an industry-academic bridging measure to provide SMEs in the southern and western seaboard regions with a structured access to the resources and facilities of the three member universities. One of the many outcomes of the TTI was the resurrection of another industry-academic bridging initiative, the R&D Managers Club in University of Limerick.

The AUA Masters in Technology Management programme is the first education tri-university collaboration on an academic post-graduate programme in Ireland and is designed to promote and support technology management within Irish industry with the aim of improving product innovation and the development of the knowledge economy.

A number of research funding proposals have been made under the AUA banner; an example of this is the Institute for Environmental Studies, a collaborative research initiative between UCC, UL and NUIG, which secured funding from the Programme for Research in Third Level Colleges (PRTL). The AUA while primarily being an academic-academic network it has a substantial focus on industry-academia collaboration through the Technology Transfer Initiative and the contribution of the TTI team in UL in revitalising the university's R&D Managers Club.

The key issues for the AUA going forward are to clarify the role of the member universities and the AUA itself and to identify a set of activities that will strengthen the relationships between the network members but not threaten their individual missions. These activities might include the development of open distance learning platforms, the provision of research colloquia and doctoral/post-doctoral seminars and the sharing of laboratories and expensive academic programmes (the Dublin Molecular Medicine Centre was identified as a good role model in this connection). These activities would allow the AUA member universities, for example, in the case of open distance learning, to develop new programmes that would be beyond the financial capability of the individual colleges.

<http://aualive.arobis.com/>

6.5.2 Academic-academic network issues

The managers of PRTL-funded networks have highlighted the benefits that have arisen from the collaboration of academic researchers from different third level institutions such as the development of a critical mass in key technologies and the ability to provide industry with an integrated, multi-disciplinary research solution—neither of which were previously within the capacity or capability of individual third level institutions.

Anecdotal evidence suggests that prior to the introduction of the PRTL the amount of funding for academic research was both limited and only available through a competitive tendering process. These factors pitted third level institutions against each other in their search for funding, a consequence of which was that it militated against inter-institutional collaboration.

One of the issues in relation to academic-academic networks is the need for appropriate measurement indicators to be put in place to measure network outputs. The HEA has developed a number of performance measurement indicators that seek to measure the extent of collaboration between academic network partners e.g. number of joint research papers published, number of joint funding proposals submitted, etc. There are some concerns among the managers of academic-academic networks that the metrics for evaluating such collaboration requires careful consideration to ensure that they measure the full extent of collaboration.

The increase in the development of academic-academic networks has led to calls for the provision of network management skills training to the managers of such networks. A limited amount of inter-facing has taken place among the managers of academic-academic networks and it has been recommended that the HEA facilitate the development of a network of academic-academic network managers to facilitate the exchange of best practices and skills development.

7. Findings, conclusions and recommendations

7.1 Findings

1. The review of the literature reveals that networks—along with a related concept, clusters—are increasingly being studied by policy makers because of their role as a conduit in the transfer of knowledge from knowledge producers (third level institutions, research centres) to companies who use that knowledge to produce commercial goods and services.
2. The literature review also indicates that networks can bring significant benefits to member organisations. The network can allow groups of companies to undertake activities that individually would be beyond their capacity e.g. marketing, training and R&D. Membership of networks exposes the managers of companies to best practices and to new methods of doing business. Networks also facilitate the sharing of knowledge among members. Networks may also have a regional development dimension as is the case with the Atlantic University Alliance. The formation of academic-to-academic networks can not only bring advantages of critical mass but also mean that they can offer industrialists a “one-stop shop” for the provision a range of multi-disciplinary expertise.
3. Though networks can bring significant benefits to companies and institutions, the literature review shows that they should not be regarded as a panacea. The establishment of a network can be a difficult and time-consuming process without any guarantee of success. There is also the danger that networks may result in “locking-in” companies into business relationships that may blind them to other more promising business opportunities.
4. The review of the literature also indicates—and the programme of interviews supports this—that networks are rarely static; they grow, mature and decline. The demise of a network can often give rise to the formation of new networks.
5. Policy interest in networks has stemmed from the success of the Italian ‘industrial districts’ concept in which groups of small firms operating in the same business sector were encouraged to co-operate together. The Italian model was further developed by the Danes who saw it as a means by which Danish SMEs could adapt to the increased international competition arising from the implementation of the Single European Market. The Danish Network model with its emphasis on top-down implementation and its use of network brokers became the blueprint for networking programmes in other countries such as Norway, Australia, the US, New Zealand and Canada.

6. The review of Irish enterprise development policy indicates that there is support for the concept of networking. The policy support for networking has, however, only been translated into practice in a small number of cases. Forbairt, now Enterprise Ireland, operated the Pilot Network Programme during the period 1997–98 which involved the development of inter-firm networks along the lines of the Danish Network Programme. The National Linkage Programme also sought to develop linkages between multinational companies located in Ireland and their indigenous sub-suppliers.

The Skillnets programme funds networks of companies to develop joint training programmes. A recent review of the programme showed that by the end of 2001, 58 training networks involving 3,800 companies and 12,800 employees had been developed throughout Ireland. The Plato programme consists of 1,000 companies involved in seven regional networks focusing on business development.

7. Enterprise Ireland's Innovation Partnership scheme is an example of an initiative that supports joint industry-academic research. Science Foundation Ireland's Centres for Science, Technology and Engineering (CSET) scheme is designed to link academic and industrial researchers together on high-end research programmes in biotechnology and ICT.
8. Interviews with key informants have highlighted the positive impact of the Programme for Research in Third Level Institutions (PRTLTI) in fostering academic-to-academic collaboration.
9. The interview programme with key informants indicates that there is some expertise within the development agencies in terms of developing and assisting networks involving both indigenous/overseas partners and companies/academic institutions.
10. Development agencies have facilitated the development of inter-firm networks in a number of sectors as a means of enhancing the development potential of client companies. Enterprise Ireland has, for example, played a key role in establishing the Irish Photonics Association (one of the five networks profiled in this report). Shannon Development is actively involved in supporting another of the networks profiled, Supply Network Shannon (SNS), and it also provides secretarial and support services to the recently launched network of multinational companies in the mid-west region, the Atlantic Technology Corridor.
11. The key informant interviews also emphasise the importance of the members having ownership in situations where the development agencies have been involved in the formation of the network. There is general consensus that the development agencies should assume a supporting/facilitating role in relation to networks and that the members of the network should take responsibility for goal setting and implementation. The interviews indicate that a combined top-down and bottom-up approach to network formation has the potential to yield the best results.
12. Programmes for the development of enabling/facilitating networks should include an evaluation element for the outputs of such networks. Where state financial support is provided, an explicit 'exit' mechanism should be included in the design

of such a network programme. In these cases, the continued operation of a network after the end of the funded period could be seen as a success indicator.

13. The interviews with key informants also indicate that a substantial amount of networking takes place not only between companies but also between companies and academia and between third level institutions themselves. It should be pointed out that much of the network activity is informal e.g. the exchange of information. The instance of where this networking activity has been formalised is, however, small (only one of the five networks studied—SNS—has, for example, a separate legal identity).
14. The interviews also highlight the importance of putting in place a national framework for intellectual property rights (IPR) to facilitate industry-academia networking. One of the major difficulties faced by companies seeking to collaborate with academic researchers is the current lack of a standardised approach to IPR agreements within the third level sector.
15. Though Irish academic researchers have been successful in participating in EU Research Framework programmes, the majority of linkages formed have been with overseas academic partners. Anecdotal evidence suggests that prior to the introduction of the PRTLI, the level of collaboration between third level institutions was low and this was exacerbated by the provision of project-related research funding which obliged colleges to compete against each other.
16. The research identified a number of important factors in relation to the successful development of networks. A key success factor was the process by which the network was formed i.e. how companies are attracted to participate in a network, how their commitment is gained, how the process of developing the network is managed, how it is structured, how decisions are made, how communications are handled, how action programmes are delivered, etc.

7.2 Conclusions

1. The link between network/cluster promotion and economic development is being taken very seriously by other countries. The international review has indicated the importance that other countries have attributed to inter-firm networks. Starting first with the industrial districts in Italy and then moving to Denmark whose Network Programme has been replicated in many countries including Norway, Australia, Canada, US and the UK, there has been a recognition of the key role that inter-firm networks play in economic and industrial development. These countries are now moving to the development of cluster policies and national systems of innovation in which inter-firm networks are respectively an integral element for improving the competitiveness of companies and a learning platform for companies which they can then use to interact effectively with knowledge creators such as third level institutions.
2. There is a definite role for government supports to get these networks and clusters up and running. The international review has highlighted the importance of a 'top-down and bottom-up' approach to network policies in which the government plays

a facilitating role in the formation of networks but leaves decisions on network objectives, composition, structure and activities to the member firms. Governments can play an important role in facilitating network development through the provision of funding that encourages organisations to collaborate. This can be particularly relevant in supporting the development of academic-academic and industry-academic networks with a view to facilitating the development and transfer of knowledge.

3. There is as yet no universally agreed methodology for network formation, however, a number of valuable lessons are being learnt. The research indicates that industry-industry or inter-firm networks can initially evolve in the form of a large, informal network of companies out of which smaller, more tightly focused networks of companies emerge. This was found in the case of the SNS network in the Shannon Region. This network which has over 20 member firms is largely engaged in 'softer' network activities such as training. A new inter-firm network, Tsunami, which has been formed by seven SNS members is focusing on the delivery of 'hard' deliverables such as joint supply solutions. This suggests that policy-makers need to develop policies that take cognisance of the initial 'enabling' networks and the 'operational' networks that emerge from the former.
4. Policy development and implementation should recognise that network development takes time and patience is required.
5. There is by now a fairly wide-spread awareness of the value of the network concept in the country. Though there are no overall figures on the extent of industry-industry or inter-firm networks in Ireland, it is known that there are approximately 4,800 companies involved in Skillnets and Plato networks that are focusing on training and business development respectively.
6. The key impediment to network formation is the lack of funding to recruit the necessary expertise to transform this awareness into operational networks.
7. The programme of interviews with key informants and the preparation of case studies has indicated that there are a number of key success factors in relation to network development. These have also been identified in the international literature review based on the experiences of other countries. One of the fundamental conclusions of this study is that the key to the formation of successful and sustainable networks is the process—or, the 'how' factor—by which the network is established and developed.

7.3 Recommendations

Overall recommendations

- Government should focus on inter-firm networks as a key building block for the development of the innovation capacity of Irish manufacturing and internationally traded services. Inter-firm networks should be regarded as a means for the creation of enhanced knowledge linkages initially between companies themselves and then using that platform for the development of knowledge flows between companies and knowledge generators i.e. the third level institutions. Developing inter-firm

networks is an important precursor to the formulation of policies in relation to clusters and a National Innovation System. State intervention should be in the form of encouragement. The establishment of such networks should be demand-driven, with the state acting as a catalyst, providing encouragement and initial financial support.

- Programmes for the development of enabling/facilitating networks should include evaluation of the outputs of such networks. Where state financial support is provided, it should be for a defined initial period. The continued operation of a network after the end of the funded period could be seen as a success indicator. This recommendation is directed at the Department of Enterprise, Trade and Employment and the Department of Education and Science.
- It is recommended that all support measures designed to encourage the creation and sustainability of networks should include a skill development component. This recommendation is directed at the Department of Enterprise, Trade and Employment and the Department of Education and Science.

Industry-industry/inter-firm networks

1. Government support funding for industry should include a collaborative dimension i.e. a proportion of funds should be allocated to applications from inter-firm networks, and where funding already has a collaborative element, this should be strengthened. This recommendation is directed at the Department of Enterprise, Trade and Employment in respect of the agencies under its aegis.
2. It is recommended that a network initiative be implemented to encourage inter-firm networks. This initiative should be for a three year duration and be implemented on an Island of Ireland, national and regional levels. The initiative should include provision for:
 - creating awareness of the value and benefits of inter-firm networks;
 - providing advice and support on network formation issues to organisations interfacing with companies;
 - providing training and other skill development issues to network member companies, network brokers and network managers;
 - early stage/initial funding for networks to employ network brokers to facilitate the development of networks and network managers to implement network activities.

This recommendation is directed at the Department of Enterprise, Trade and Employment in respect of the agencies under its aegis.

3. It is recommended that government policies and initiatives should encourage the development of inter-firm networks between companies on the Island of Ireland. This recommendation is directed at the Department of Enterprise, Trade and Employment, its counterpart organisation in Northern Ireland and InterTradeIreland.

Industry-academic networks

1. Policy-makers and development agencies need to enhance bridging support measures in order to develop linkages between companies and third level institutions. These measures should be designed:
 - to overcome the lack of information among industry on the type, range and level of research being carried out in the third level sector;
 - to create the conditions for the development of industry-academic working relationships and trust.
2. ICSTI (Irish Council for Science, Technology and Innovation) has recently launched a National Code of Practice for Managing Intellectual Property from 100% Publicly Funded Research. ICSTI should now develop guidelines for the management of intellectual property from public-private co-funded research.

Academic-academic networks

1. Following on from the positive impact of the Programme for Research in Third Level Institutions (PRTLTI), it is recommended that Department of Education and Science funding for third level research should incorporate a network/collaborative dimension and where this already exists, the collaborative element should be strengthened.
2. The Department of Education and Science should instigate measures to encourage a culture of co-operation among third level institutions.

Appendices: Case studies

A1 Introduction

TMA undertook five case studies of networks involving industry-industry, industry-academia and academia-academia collaboration. The preparation of the case studies involved desk research and personal and telephone interviews with key informants. Data was collected on a range of topics including the reasons for network formation, the objectives of the network, network structure and composition, network activities and outputs.

The five networks profiled below are:

- Supply Network Shannon (SNS), a grouping of sub-supply companies in the mid-West;
- NETWIN, an EU-funded but now discontinued initiative which involved the establishment of three networks of SMEs in the food, craft and tourism sectors in Roscommon;
- The Irish Photonics Association (IPA), a newly-formed association representing companies and researchers in the photonics sector;
- The M50 network, a partnership of three third level colleges formed to deliver an Enterprise Platform Programme-funded training and support programme for entrepreneurs;
- The Atlantic University Alliance (AUA), a partnership of University College Cork, University of Limerick and National University of Ireland Galway, set up to promote the development of the Western seaboard.

An analysis of some of the key issues facing the network is presented at the end of each case study.

A2 Supply Network Shannon (SNS)



A2.1 Description

Supply Network Shannon (SNS) is an open, sectoral network of engineering and electronics sub-supply companies located in the Shannon region. It was established in January 1999 with the support of Shannon Development. The vision for SNS is to promote, develop and market sub-supply capability in the Shannon region and thereby reinforce the region as a world-class source of engineering and electronics sub-supply products and services in Ireland. Marketing-related activities including advertising, exhibitions and networking

events are co-ordinated by the AMT Ireland centre at the University of Limerick and the Irish Enterprise Group in Shannon Development.

Origins

From the early 1970s the Shannon area was becoming an important location for Foreign Direct Investment (FDI), particularly in the ICT sector. The challenge for local sub-supply companies became not one of identifying the market so much as obtaining and retaining business from these large potential customers on their doorstep. Hurdles included scale, quality, logistics and trust. Initially a foreign MNC tended to purchase its inputs from known and proven vendors in its 'home' country, but, as it settled into the host economy, it would increasingly seek opportunities for local sourcing. Unfortunately the technological and business capabilities of most local suppliers were not up to the sophisticated standards of the global marketplace. While progressive MNCs offered vendor development programmes to a select core of supply companies, it was clear that the full potential for MNC supplier development was not being exploited, a point emphasised in the influential 1982 Telesis Report to NESC.

In 1997, there was an international sub-supply fair in Limerick (Sub-contract '97) and Brendan McCormack of Shannon Development became aware of the strategic significance of the electrical and engineering sub-supply sector for the region. He decided his first task was to construct a profile of the sector and proceeded to canvass the 80 or so active companies. The resulting inaugural edition of the *Shannon Development Engineering and Electronics Sub-supply Directory* in 1998 details business activity, employment, turnover, and contacts for some 60 companies.¹

Brendan states that the publication of the Directory had a galvanising effect on the listed companies, generating for the first time a sense of themselves as a group. The market environment was cooling down and companies were beginning to look at ways to cut costs. They welcomed the Directory as a benchmarking tool and a resource for potential alliances.

Shannon Development was concerned that the companies had insufficient technical capability and were too dependent on labour costs for their competitive edge. This was obviously not a sustainable position in the face of European Enlargement and competition from low-wage third countries. The more enlightened supply companies themselves recognised they needed to move up the value chain and they were anxious to secure the requisite high-tech equipment and to raise the skill levels of their workers. The local University of Limerick offered specialised production resources in its AMT Ireland/ Materials Ireland and Lean Ireland centres. It was also known that the recently established National Institute of Transport and Logistics (NITL) in Dublin Institute of Technology was building up a solid logistics expertise in the supply chain management (SCM) of global production chains. The feeling was thus ripening from both top-down and bottom-up that an inter-company network was urgently required for the sub-supply sector in the region.

Supply Network Shannon was formally launched in January 1999. Some thirty companies joined the inaugural network as full-time members. Today the paid-up membership numbers are in the mid twenties, while SNS continues to promote its efforts to over 80 companies operating in the target sector in the region.

A2.2 Objectives of the Network

The SNS charter expressed a clear mission:

“SNS is an industry-led initiative aimed at representing, promoting, developing and connecting together sub-supply companies in the Shannon Region of Ireland. Supply Network Shannon benefits all engineering and electronics sub-supply companies in the region, regardless of size or activity and will help to reinforce the region’s position as a world class source of sub-supply products and services.”

To achieve the effective development of the sub-supply sector the following goals were set by the network:

- To provide the sub-supply sector with a strong visible single identity which should become synonymous with the provision of high quality goods and services and strengthen the international reputation of the region’s suppliers;
- To provide companies operating in the sector with a forum for the sharing of business information for the mutual benefit of the sector;
- To organise activities such as site visits, training courses, seminars or workshops focused on the particular requirements of the sub-supply sector;
- To provide all companies involved in the sector with an opportunity to utilise all available resources in their marketing efforts (e.g. Internet, email, etc.);
- To assist the development of the region through the gathering of relevant performance data on all of the sub-supply companies operating in the region;
- To generate co-operative activities among the sub-supply sector in the region and, through strategic partnerships, to help to increase the value added for all involved.

A2.3 Activities

Supply Network Shannon activities are focused on three main areas:

- Business issues such as Supply Chain Management (SCM), networking, marketing and standards;
- Technical issues relevant to engineering and electrical manufacturers;
- ICT usage.

In its initial phase SNS decided to focus on two core activities: training and promotion

Training

SNS has been very active in this area—since its start-up the network has held one training event per month in formats ranging from breakfast briefings, afternoon/evening seminars and day-long workshops. Where possible these events are hosted in local manufacturing companies or labs and coupled with a plant tour.

In mid-1999, SNS put forward a successful proposal in the first round of the nation-wide Skillnets² training programme. A core group of 20 SNS companies agreed to participate in a Strand B³ development project. Of these 11 were SMEs, the other 9 were large companies. Eleven companies were in the 'general precision engineering' cluster while 9 were involved in the 'electronics' cluster in circuit board manufacture and assembly. The SNS Skillnets project focused on those skills which enable a sub-supply company to become a core supplier to a multinational or to a large indigenous organisation.

Unfortunately, SNS was unsuccessful in its second proposal to secure continuing funding from Skillnets in 2002.

Not surprisingly the priority training area for SNS members has been Supply Chain Management (SCM). SNS collaborated with NITL⁴ for a series of very well attended SCM seminars which were held at Dell and at Sercom Solutions. A related theme was 'Lean Manufacturing' and SNS has also conducted a seminar in conjunction with Lean Ireland and Ei Electronics.⁵ Other training courses offered by SNS included Strategic Management, Time Management, Marketing, Human Resources Development and Change Management.

Promotion

The following promotional activities have been undertaken:

- Promotion of SNS services to enlist potential members:
- Promotion of SNS sub-supply resources to national and international audiences.

SNS has co-ordinated collective advertising, (where companies share the cost of running a page of small ads under the SNS banner), in trade magazines such as AMT Ireland and Manufacturing Ireland.

A2.4 Tsunami—a 'hard' sub-network of SNS

As indicated in the international literature review,⁶ the pattern of evolution in a successful network/cluster programme is characterised by:

- An initial phase providing 'loose', informal networking opportunities, typically dealing with the consolidation of a group image and commitment, the establishment of communication channels, a SWOT analysis and formulation of an agreed strategic vision for the group, the identification of capability gaps and the procurement of collective training services;
- An advanced phase which concentrates on the delivery of 'hard' outcomes. This is the stage where sub-groups from within the wider network/cluster will seek to form 'tight' alliances to address specific challenges or opportunities.

The literature varies in its estimates of the necessary duration of phase 1 with periods ranging from 6 months to several years depending on the context—the existing level of group solidarity, the existing capabilities within the group, the industrial structure and density of business opportunities in the local environment, the particular industrial sectors involved, etc.

The SNS programme has so far crystallised out one potential ‘*tight*’ alliance which currently goes under the name of ‘*Tsunami*’.

Tsunami is a proposed hard network of seven SNS companies:

- **LITHO CIRCUITS LIMITED** PCB design/manufacture;
- **GENTECH ELECTRONICS LIMITED** low volume PCB assembly;
- **MTS (SHANNON)** medium volume PCB assembly;
- **AJ PRECISION COMPONENTS** a plastics moulding company;
- **FABRICATED PRODUCTS (SHANNON) LIMITED** offering general engineering/fabrication services;
- **TOWER PRECISION** producing metal products (clips, springs etc);
- **TAKUMI PRECISION** precision engineering & toolmaking with batch production capability.

Self-selection has identified a general complementarity within this group where Gentech and MTS would be the closest in product terms but, even here, they have complementary production equipment that address different volume markets.

The seven companies are well advanced in their quantification of the business opportunities that a hard network would offer. The primary benefit envisaged is that a ‘network company’ configuration would enable them, as a substantial sub-contractor, to approach an MNC or first-tier supplier with an ‘integrated product’ offering. In electronics parlance Tsunami could design and manufacture the complete ‘chassis’ including boards, metal & plastic fittings and metal enclosure.

The greater production capacity and reduced delivery time afforded by the combined resources of the network members would also greatly enhance their profile with the major buyers. Tsunami would not hope to compete with the global, high-volume, cost-based sub-contractors, but they have identified a definite market opportunity in the low to mid-volume segment.

The Tsunami companies are closely examining the opportunities to get costs down through sharing functional resources e.g. operating a centralised design for manufacturing unit, quality assurance, costing and invoicing, and logistics management. This would require a sophisticated group IT system connecting the six companies’ production and administrative information flows. The companies are convinced that the selection of the appropriate Enterprise Resource Planning (ERP) package is key to the success of Tsunami, and they are planning to visit identified sites where successful systems are in use.

Funding of Tsunami

The literature describes the debate between those who argue that ‘hard networks’ bring private gains and should therefore be fully funded by the private actors themselves versus a majority opinion that sees a role for public support to ‘kick-start’ the ‘collective action.’⁷ NESG (1996) argued that Governments (and private sector bodies) need to play an active

role in preparing the ground for inter-firm partnerships through, among other measures, providing local firms with access to information as well as the right mix of financial and technical support. Measures should also include access to independent advice at various stages of a partnership, for example during initial negotiations or when consolidating a partnership. UNCTAD (1998) stated that Governments should work with private- and public-sector bodies in identifying the different types of arrangements being entered into with a view to disseminating best practice.

The SNS Committee put forward two compelling arguments in favour of a generous attitude to the funding of Tsunami. First, they invoke the ‘kick-start’ argument—i.e. providing the right amount of up-front expenditure is vital to push the concept past the ‘sticking points’. The inherent justification of the ‘kick start’ argument is the promise of a self-funding network and an early exit for public intervention. The Committee’s second argument involves the ‘kick-start’ argument on a larger scale. A successful Tsunami would provide a powerful demonstration effect for the other SNS members (and wider national audience) who would consequently need much less ‘encouragement’ to take the plunge.

It is the intention of the Tsunami group to make an application to Shannon Development for assistance to finalise the feasibility study, assemble the network core team, and get the network up and running. However, as Tsunami (i.e. the ‘Virtual enterprise’) is unlikely to employ 10 or more it is not technically eligible for grant support under the current structures. Thus the proposal has been submitted jointly by the 5 participating companies eligible for support (2 of the companies are not eligible for support from Shannon Development as one is from outside the Shannon Region and one is an MNC).

A2.5 Issues and comments

The excitement surrounding the emergence of the Tsunami network has galvanised the SNS network. One Committee member described it as *‘like having a child in the family.’* During the transition period until the hard network acquires its own co-ordinator(s) the SNS Committee face the challenge of managing the twin-track development of a hard and loose network, but they are adamant this will not mean *‘taking their eye off either ball.’*

There is no hostility or begrudgery from the wider grouping towards Tsunami—all members were democratically invited to put their company forward when the Tsunami concept was first floated, and it is now accepted that the success of a Tsunami will lift the whole network. Members are watching its progress and eager for news on the latest developments.

If one takes the original objectives set out in the SNS Charter one must conclude that the Network has performed very well. It has been particularly active in its core SCM training mission as evidenced by its busy calendar of events. Marketing successes directly attributable to an SNS impact are more difficult to quantify, but members acknowledge that the SNS dynamic with its brand and entré has been most influential in their securing orders.

Shannon Development are strongly of the view that the *‘collective action problem’* associated with networks required public intervention to facilitate or prime the network. The benefits that the network brings to the membership justifies this initial intervention.

The initial phase of the network programme received crucial public financial support from the Skillnets programme in addition to the indirect assistance received through the offices of Shannon Development and Enterprise Ireland. It was most unfortunate that SNS was unsuccessful in its application for a second round of Skillnets funding, just at a time when, in the opinion of the Committee, the members had reached a level of group dynamics where another round of collective training would have moved the network into a self-financing mode.

SNS has benefited from the services of a very committed voluntary Committee to get the network up and running. Co-ordination now involves a very substantial investment of time and energy and there is a danger that Committee members could suffer 'burn-out'. The volume of work is such that a full-time co-ordinator is needed.

The funding of virtual enterprises such as Tsunami poses particular problems for the regional authorities. Such enterprises by their nature will only operate a skeleton staff and, thus, do not qualify for grants restricted to 10+ companies under the current structures.

A3 The European NETWIN (Networking for Innovation)

A3.1 Introduction

In 1999 a group of local development agencies from European coastal regions came together in the context of the European Recite II⁸ (DG Regio) programme to explore ways of regenerating their local economies which were badly affected by the straitened circumstances in the fishing sector.

Six European Business and Innovation Centres (all members of the EBN⁹ network) including Westbic presented a joint "NETWIN" proposal to formulate a methodology for local business networking and cluster development. The ensuing three-year pilot NETWIN project involved the establishment and co-ordination of local business networks in each region, and, based on the experience gained, the formulation of an operational and reproducible methodology including analysis grids, key success factor identification, recommendations, questionnaires and case examples¹⁰ that could be used by operators such as local development agencies and SME advisory bodies to detect, develop, monitor and evaluate local SME networks and clusters. The robust NETWIN conceptual framework enabled the development of an innovative and consistent tools package with the flexibility to suit a variety of geographical and economic contexts.

The NETWIN partnership comprised: Aditec Pas-de-Calais, France¹¹; BIC, Greece; CPINAL, Portugal; Westbic (in conjunction with Roscommon County Council and Roscommon CEB); Noribic Limited, Northern Ireland; Tecnopolis novus ortus, Italy.

Each of the six partners involved in the programme undertook to identify local opportunities and develop three to six networks (in total some 166 companies in 24 networks were assisted).

Westbic undertook to establish local business networks in the craft, food and tourism sectors.

The NETWIN international partners shared their knowledge and experiences to evolve best practice in setting up their respective local networks, and, with the assistance of network experts, produced the NETWIN Methodology (a network methodological guide) comprising a reference framework and tools.

On completion of the NETWIN pilot programme in May 2002, a formal European NETWIN association was inaugurated to continue inter-regional discussions and further improve the methodology and skill level of business network field operators. The inaugural meeting of the NETWIN association was held in Malaga on 28th September, 2002.

A3.2 Network overview

Within the context of heightened competition in the emerging global economy, the concept of local business networks was seen as an effective means of conferring on SMEs in a given geographic area competitive advantages inaccessible through use of their resources individually. Among the specific NETWIN business development aims and objectives were:

- Exchange of strategic information and know-how;
- Sharing of tasks and functions such as training, marketing, procurement, new product development etc.;
- Development of a common image or identity at regional, national and international levels;
- Formation of groups of companies to yield critical mass and achieve cost economies;
- Formation of groups with original combinations of special competences to provide a differentiation edge in the marketplace.

A3.3 The Westbic NETWIN project in Roscommon 2000-2002

In mid 2000, Westbic identified three sectors in the Roscommon area for their NETWIN project:

- **CRAFT SECTOR** over 30 craft enterprises;
- **FOOD SECTOR** 10 food businesses, 3 with 15–20 employees, the rest were smaller;
- **TOURISM.**

These sectors identified themselves as the ones from which many companies had approached the CEB in the past looking for various forms of assistance (e.g. financial support to present at marketing fairs).

Sinéad Crean was appointed by Westbic as their full-time co-ordinator to oversee the setting up of the three networks and manage their initial phase. Westbic provided secretariat and advisory assistance to the NETWIN co-ordinator and the County Council and County Enterprise Board played supporting roles through their participation on the Local Steering Committee.

The NETWIN Methodology involved the use of the NETWIN KF (key factor) tool to identify common need areas which could be satisfied through co-operative initiatives. This ‘diagnosis’ included reviews of successful networks in other Irish regions¹², interviews with Local Authorities and Local Development Agencies, and a SWOT analysis of the area drawing on CSO sectoral statistics. An action plan was then elaborated to agree action plans aimed at improving the firms’ performance and competitiveness with particular emphasis on education and training, joint marketing, product innovation and synergies. Individual enterprises were selected for specific networking initiatives using a specially designed NETWIN Evaluation Form which ensured a high level of participation.

Funding

The pilot NETWIN project was 60% funded by the RECITE II Community Initiative which attracts ERDF funding. The remaining 40% funding came from member companies’ fees plus “a little help” from Roscommon CEB¹³. In addition, Roscommon County Council funds Westbic’s rent and utility expenses.

Fees

Participating companies were charged per programme module. Food companies were asked to pay 50% of costs for all projects. The craft companies (being less affluent) were charged €100 per initiative.

Craft Sector

The following was the sequence of events planned out by the NETWIN team based on their methodology:

- Discussions/meetings with local development organisations on potential for network development including financial issues;
- Public meetings with craft enterprises to promote the networking concept, introduce the NETWIN programme and provide them with examples of successful networks from other regions;
- Monitor feedback from craft enterprises to gauge positive attitudes to networking initiatives;
- Leadership of network to be provided by the NETWIN Co-ordinator who would facilitate the development and implementation of joint activity and information dissemination;
- Development of action plan including sourcing of finances for individual projects;
- Implementation of action plan including various joint actions to improve performance and competitiveness of firms;

- Ongoing contact with firms, including provision of information, evaluation of progress, feedback about joint activities and ideas for future co-operation initiatives;
- Ongoing contact with local development agencies relating to progress of the network and sourcing of finance for additional joint projects.

Food Sector

Within County Roscommon a statistical survey of this largely rural area in late 2000 revealed that a significantly higher proportion of people were employed in the food sector compared with the national average. A number of high-quality, value-added food enterprises had emerged at the micro-enterprise/SME level.

The food sector faced a number of significant challenges as a result of the changing external environment in which they operated. These included the following major issues:

- Statutory requirement to implement HACCP procedures;
- Changing distribution arrangements by large retailers from local to central distribution;
- Increased competition from more competitive firms nationally;
- Increased competition from imported products;
- Changing consumer tastes and lifestyles;
- Aggressive marketing and promotion strategy from competing firms.

The effect of these global changes in the sector had led to many small food enterprises nationally re-evaluating their strategy. Some had ceased their operations but the challenges provided opportunities for companies which were able to implement the required standards and perform competitively in the market place. NETWIN hoped that a networking/co-operative approach could bring significant synergies costs and savings.

There had been a previous network initiative in the area promoted by four County Enterprise Boards in neighbouring counties. A total of 16 food enterprises participated in this initiative, seven of which were from the Roscommon region. The aims of this '*Midland Food Cluster*' were to improve the quality of food enterprises, introduce HACCP safety standards in the workplace and increase marketing awareness. The inter-regional cluster provided marketing, promotion and informational support for food enterprises, but, after just one year, it was phased out because of lack of leadership and financial commitment from the development agencies.

The experience gained in setting up the NETWIN Craft Network meant the subsequent Food Sector network could be 'fast-tracked' to some extent. In 2001, a list of prospective network companies was obtained from Roscommon CEB. They were invited to the Royal Hotel where the benefits of NETWIN participation were outlined to them.¹⁴ Ten companies agreed to participate in the network project.

A step by step approach was adopted by the co-ordinator, allowing the companies first to get to know each other and learn about their respective activities in the expectation that this initial introduction phase would induce a culture of trust that could lead to subsequent meaningful co-operation.

A common 'needs analysis' was performed for each company and an action plan agreed. A threshold target for most businesses was to achieve compliance with the statutory requirement to implement HACCP¹⁵ quality procedures. At the upper end the objective of the stronger companies was to gain access to the retail multiples¹⁶ and achieve national market penetration.

The companies were provided with a suite of supports to improve their business and operational standards. NETWIN calculated that these companies should reach a transparently high business standard before they could begin to enlist other companies in the region.

The focus of improvements centred on business development, marketing, product development, process development, quality management and human resource management.

Tourism Sector

Visitor numbers and growth rates for the Roscommon region, which is largely a rural area in the West of Ireland, are significantly lower than the national average. The region suffers from an underdeveloped tourism product and has a poor image from a tourism perspective. During the feasibility/diagnosis phase of the NETWIN Programme, local authority interviews and business interviews were used extensively to establish the potential of developing the tourism sector in the Roscommon region by adopting a networking approach.

Simultaneously, a County Tourism Committee was formed which appointed a Tourism Marketing Executive to provide leadership and co-ordinate the activities of tourism enterprises. This enabled all tourism operators in County Roscommon to develop a common vision for the sector and reach a consensus regarding the development of tourism in the region over the next few years. Regular meetings and joint actions strengthened relationships and helped to improve the co-operation culture.

Tasks undertaken included marketing, promotion and regional branding exercises towards the development of a positive image for the region. These were key areas identified through the use of the KF tool.

A3.4 *Comments and issues*

When the NETWIN project was completed in May 2002 no further funding was available. There followed an understandable sense of despondency in the Westbic camp given the very real danger that the hard-won momentum built up during the NETWIN project would slip into reverse. Westbic are urgently looking into the possibility of sourcing further funding through INTERREG 3C which supports the development of networks in Objective 1 regions.

There is a chance that the Tourism sector may be able to maintain its progress if the County Tourism Committee can retain the services of its Marketing Executive. But things look bleaker for the other two sectors, i.e. Foods and Crafts. NETWIN Roscommon had really only been going for one and a half years, too short a time to establish “*internal momentum*”. The crafts companies had a particularly steep learning curve given that, for many, their background and drive was ‘*creative*’ rather than commercial.¹⁷ This meant that more time was needed to help them appreciate the way markets operated and the benefits a network could bring. Equally most of the food companies were small local players and they, too, had to be introduced to the bigger picture of national and international supply chains.

The NETWIN Co-ordinator believes, from her experience, that it takes about three years before companies reach the stage that can really produce quality alliances. She broke this down roughly as 6 months to identify a promising target sector and select/diagnose the network members, 1 year to design and set up appropriate network programmes, and a further 1–2 years to consolidate trusting relationships before companies would be willing or able to take over themselves.

This means that external funding is needed for at least a further 2 years in Roscommon to pay the salary and programme commitments (costs of external trainers, promotions, etc.) of a Network Co-ordinator. Westbic estimate a figure of somewhere in the region of €50–100,000 per annum is required.

Initiatives must be needs-driven (i.e. bottom-up). NETWIN Food Network companies who had earlier participated in the Midlands Food Cluster experiment in the early 1990s described how the approach was very badly pitched and equally poorly received. The Roscommon, Offaly and Westmeath CEBs and their consultants essentially told the companies what they needed, and what they intended doing for them. But the ensuing regimented training sessions wasn’t what the companies wanted and the project quickly fell through.

The NETWIN Co-ordinator agrees wholeheartedly with the old adage—“*give them something they want early on.*” In her experience there was nothing like a good boost in sales (through joint promotions, collective brochure advertising, etc) to fasten their imaginations.

A4 Irish Photonics Association

A4.1 Introduction

The Irish Photonics Association (IPA) is a small, fledging organisation which was set up in 2002 with the encouragement and support of Enterprise Ireland. It currently does not have any legal status—it is simply an association of photonics companies, academic researchers and other interested organisations.

Photonics is defined as the technology of generating and harnessing light and other forms of radiant energy whose quantum unit is the photon. The range of applications of photonics extends from energy generation to communications and information processing.

The photonics sector in Ireland is both very new—some commentators say that it effectively only started three years ago—and, depending on how the sector is defined, very small.

A4.2 Network structure and objectives

The association as presently constituted comprises indigenous photonics companies, third level researchers and other organisations such as Enterprise Ireland and the Programme in Advanced Technology, Optronics Ireland.

There is some confusion over the sectoral coverage of the Irish Photonics Association given that photonics is a very wide subject area that potentially has applications in almost every business area. If a narrow definition of photonics is taken then the size of the industry does not amount to more than 10 indigenous companies which in total employ approximately 200 people. If, however, a wider definition of photonics is used e.g. to include optics, then the size of the sector would increase by a further 50 companies, mostly multinational companies such as Donnelly Mirrors. Some of the leading members of the IPA have argued in favour of the narrower definition as they say this will provide a better focus for network activities.

The stated aims of the Irish Photonic Association are as follows:

- To create an Irish network, where we know each other and can help each other to develop the Irish Photonics sector.
- To create an Association which can represent our sector nationally and internationally.
- To extend the Association to include academia, government and other interested bodies.

A4.3 Network work programme

The main activities of the IPA are as follows:

NETWORKING MEETINGS The main IPA activities to-date have been the quarterly networking meetings which have sought to develop a greater awareness of the sector among the industry players and to facilitate networking. The meetings have been organised around a half-day workshop at which major national and international speakers have made presentations on key technologies and trends within the photonics sector. At the recent IPA networking meeting in September 2003, the attendance heard presentations from H-P Labs, the European Optical Society, Science Foundation Ireland and Optronics Ireland.

TRADE FAIRS The IPA has also participated in industry trade fairs in Europe and the U.S. The main purpose of its participation has been to create an awareness of the photonics industry in Ireland to key international players. The presence of the IPA stand at these trade shows have facilitated the smaller indigenous photonic companies the opportunity to have a presence which otherwise might have been beyond their resources.

TRADE MISSION The IPA also participated in the recent photonics and software trade mission headed by the Tánaiste to Canada in September 2003 during which it met the national and province of Ottawa photonic industry associations.

STUDY VISITS The Association also undertook a study visit to Wales to collect information on the photonics cluster and the Optronics Technology and Incubation Centre.

WEB SITE The IPA has recently launched its web site (www.photonicsireland.com). In addition to having an objective of raising the profile of the photonics sector in Ireland the web site will also facilitate IPA members to develop a greater awareness of other industry players both in terms of industrial firms and academic researchers.

Funding

The initial funding for IPA activities has been provided by Enterprise Ireland. The agency has funded the Association's initial networking meetings including the venues and speakers for the meetings. Enterprise Ireland is also funding the development and maintenance of the Photonics Ireland web site.

Enterprise Ireland has also funded the association to participate in international trade fairs in Europe and the U.S. It also funded a recent trade mission to Canada in which the IPA and leading photonic companies participated.

The main input from industry has been the time committed by the IPA committee members. This input will increase significantly if the planned work programme is put in place.

A4.4 Impact of network

From an Enterprise Ireland perspective, the association has the potential to be beneficial to its member organisations particularly in terms of international markets in that if the member companies network successfully together they could provide overseas companies with an integrated supply solution. Enterprise Ireland also believes that the development of the IPA could help to foster industry-academic collaboration.

A number of the industrial members of IPA highlighted the importance of the association in facilitating the exchange of information and experiences. One informant noted that his company had undertaken a visit to the photonics sector in the Far East and indicated that he would be happy to share his company's experiences with other companies. Similarly, other companies had developed expertise in industry-academic collaboration through involvement in the EU's Framework Programme and they too believed that their colleagues in the IPA could benefit from this knowledge. Other companies foresaw that membership could bring benefits in terms of access to resources and expertise; one company executive mentioned the possibility of obtaining access to specialised machinery.

A4.5 *Comments and issues*

Current situation

The IPA is at a very early stage of development and is almost totally dependent on Enterprise Ireland funding to finance its activities.

The IPA committee is aware of the need for the industrial members to take control of the association's future development. The committee has developed a series of short and long term objectives for the association and it is in discussion with Enterprise Ireland regarding the resourcing of its planned programme of activities.

Planned changes in membership or activities

The IPA committee—which effectively consists of senior executives from five companies—has developed a programme of action for the future development of the association. The committee sees these short-term activities as being vital for retaining the interest and involvement of the member organisations. These activities are additional to the existing programme of quarterly meetings and to participation in international trade shows.

The committee's proposed programme of activities includes:

TRAINING The committee is looking at the development and provision of industry-wide training courses that will be of benefit to the member organisations. The committee is in discussion with Enterprise Ireland and FÁS regarding the funding of planned training activities. The committee has also received information on Skillnets funding which uses a network approach to the development and provision of sector-based training initiatives.

INDUSTRY REPRESENTATION The committee is conscious of the need to raise the national and international profile of the photonics industry and is considering how it might apply the model of the Canadian photonics association in the Irish context. The committee recognises the importance of having an executive—either full or part-time—who can act as the face of the association. The chairman of the IPA noted that the Canadian photonics association has a full-time employee who apart from arranging networking events also makes representations to government and acts as the industry representative at other fora. The Ottawa branch of the association which has fifty member companies employs a part-time person. The IPA believes that the Ottawa is a good model to follow and, given that the photonics industry in Ottawa is approximately the same size as the Irish sector, the committee is considering how to resource a part-time executive and office.

INDUSTRY-ACADEMIA COLLABORATION The committee sees one very practical initiative that the association could take is to help foster industry-academia collaboration. It is considering activities to make companies more aware of the industry-academia collaboration options and to highlight case studies of best practice. It also wants to alert companies to the effort and risks involved in developing linkages with third level institutions. The committee is conscious that there is a lack of awareness among indigenous players on the research being undertaken by academic researchers and in addition to correcting this lack of information also wants to inform companies on the process of linking up with academic partners. The committee is considering the establishment of a steering group with representatives from industry and academia to develop and implement its planned programme of activities to encourage industry-academia collaboration.

Future development

OWNERSHIP There is general acceptance of the need for the industry to take ownership of the running of the IPA. The photonics industry in Ireland is very small and if a strict definition of photonics is taken then there are less than ten indigenous companies. Not only is the small size of indigenous companies an issue in terms of growing the IPA but also the fact that most of the companies are at a very early stage of development. It is understood that the majority of companies are at a pre-revenue stage and are very reliant on grants to undertake R&D. Only one or two companies have reached a stage where they are making a product. One of the best known companies in the sector, Xsil, was recently in the news through having achieved recognition as a high growth, high technology company. The small number of indigenous companies and the fact that they are at an early stage of development means that there is little critical mass in the photonics sector and equally there is a lack of a major player to drive the industry forward. Since most companies are at a pre-revenue stage there is little surplus funding to properly resource the activities of an industry association. This presents those firms interested in forming an effective industry network with a funding difficulty. Their options are to continue to rely on Enterprise Ireland funding which can bring its own difficulties in that companies will not have ownership of the process—which other more advanced industry associations have advised them is key to IPA's long term success and viability. There is a perception that if the industry cannot stand up on its own two feet financially i.e. without having to rely on Enterprise Ireland support, then there is no point in going further.

SIZE The small size of the industry combined with the fact that there is little commonality within the industry is also a barrier to the development of an effective industry network. The geographic dispersion of the industry players is also a difficulty in forming an effective and cohesive industry association.

SHORT TERM ACTIVITIES There is recognition of the need for the IPA to develop a programme of short-term activities to build up recognition within the sector of the value the association can have to its members. In particular, there is recognition of the need in the shorter-term for the members simply to network among each other since there are few other occasions in which this can happen. There have been calls for the quarterly meetings to be re-structured so that there are less formal presentations and more opportunities for informal networking. This seems surprising since the industry is so small but since it is also so geographically dispersed and much of the industry focus is on international markets there is a need for the industry players to develop a better knowledge of each other.

INDUSTRY-ACADEMIC LINKAGES The small scale of the industry and the wide range of sub-sectors in which the indigenous companies operate have implications for developing industry-academic linkages. Though many of the companies have a connection with the third level sector—it is almost an essential prerequisite that the major industry players would have a third level qualification to be in the sector—either because the founders or key staff members came from university research centres. The major companies tend to have an established relationship with the college from which the founders originated but they do not appear to have such close linkages with other third level centres of photonics expertise. There is a perception within the sector that there is a wide range of photonics research being carried out within the third level sector. However, there is also a perception that because of the wide diversity of photonics that much of the research being carried out

in the colleges and research centres such as the NMRC have little relevance to the activities of indigenous photonics companies.

A related difficulty in terms of developing industry-academic interaction is the difference between the basic research being carried out by academic researchers and the near-to-market research being undertaken by indigenous companies. The colleges are working on a 5+ year time horizon whereas the companies are dealing with a much shorter 1–2 year time frame. The companies find it difficult to work with academic researchers who are grappling with advanced technological issues that might be 5 years further out than what the companies are dealing with. From the researchers' point of view, the companies are not looking to them for research but for consultancy since the level of technology that the companies are involved with is not leading edge to them.

There is also a concern that the funding provided to third level photonics researchers by Science Foundation Ireland will not result in any benefits to indigenous companies because there is little cohesion between the research that is being carried out in the third level sector and the capabilities of indigenous companies.

Though many of the companies have origins in the third level sector it is understood that many do not have extensive experience in IPR issues. One leading indigenous photonic company has spoken about the serious difficulties it has experienced with negotiating IPR contracts with Irish third level institutions due to the lack of a standardised approach not only within the colleges but also within different faculties within the same college. There is a need for a standardised approach to the transfer of intellectual property rights such as the National Code of Practice for IPR advocated by the Irish Council for Science, Technology and Innovation. It is important to emphasise that the lack of a standardised approach to IPR within Ireland is not seen as a barrier to industry-academic collaboration but it is an impediment which raises the risk and cost for indigenous companies wishing to do so.

A5 M50 Enterprise Platform Programme

A5.1 Introduction

The M50 network is a project funded under the Enterprise Platform Programme strand of the Department of Education and Science's Technological Sector Research Programme. The Enterprise Platform Programme is aimed at the Institutes of Technology and is designed primarily to encourage researchers in the Institutes to commercialise the results of their research.

The network members are the Institute of Technology Tallaght, the Institute of Technology Blanchardstown and Dublin City University (and in particular DCU's new incubator facility, the Invent Centre).

The network has been in operation since 2000 when it succeeded in its application for Enterprise Platform Programme (EPP) funding to run an enterprise support programme for the period 2000–2003. The objective of the M50 Enterprise Platform Programme is to assist entrepreneurs to make the leap from employment to full-time operation of their own business by providing training, mentoring, incubation space, funding and other supports over a twelve month period.

The three existing network partners along with UCD have recently applied for a further three years of EPP funding.

Aims and objectives

The main aim and activity of the M50 network is to deliver its EPP-funded project. The EPP funding covers a three year training and development programme for entrepreneurs.

Composition of network

The M50 members include the Institute of Technology Tallaght, the Institute of Technology Blanchardstown and the Invent Centre of Dublin City University. All of these institutions are connected by the M50 motorway.

An important feature of the M50 network is that it was created and developed by the Development Office of the two Institutes of Technology. The Development Office in both Institutes has an internal and external focus; typically they look after external relations and have a mandate to encourage spin-offs from within their own academic staff. The Development Office also includes the Industrial Liaison Office so they have a high level of contact with the external community—as opposed to teaching staff who tend to have a high level of focus within the college. The involvement of the Development Offices of both Tallaght and Blanchardstown means that there is a focus on interacting both with internal and external actors.

Funding

The M50 network was successful in its application in 2000 for funding under the EPP programme. The funding provides for the provision of a training and development programme to entrepreneurs over a three-year period. Though EPP funding is directed at Institutes of Technology, the M50 network includes DCU which though is not a direct beneficiary of EPP funding it is nevertheless a full partner in the project and contributes resources to it.

The EPP funding covers the cost of course material development and the cost of a programme manager. The funding also provides for a monthly stipend for the programme participants.

Programme participants may also be eligible for Enterprise Ireland CORD funding which pays them approximately 50% of their previous year's salary. Eligible participants may benefit from this initiative if they are in the process of establishing an innovative knowledge-based internationally traded service or high technology manufacturing company with significant job creation potential. Enterprise Ireland is heavily involved in the EPP programme and provides mentoring support to eligible participants.

Sponsorship for the M50 Enterprise Platform Programme has also been received from PriceWaterhouse Coopers, Hot Origin and Bank of Ireland.

A5.2 Network organisation

Structure

The M50 network has a loose organisational structure; it operates as a project and does not have a legal status. The network has a Project Management Group (PMG) whose membership consists of two representatives each from IT Tallaght and IT Blanchardstown as well as a representative from DCU. Enterprise Ireland has two representatives on the PMG by virtue of its provision of CORD funding for eligible programme participants and mentoring supports. The programme manager is also a member of the Project Management Group.

In 2003, the M50 network created an Advisory Board composed of successful Irish entrepreneurs to augment its existing organisational structure. The purpose of the Advisory Board is to advise the PMG on the strategic direction, structure and content of the programme. The members of the Advisory Board also attend events and occasional workshops, providing advice and encouragement. They represent inspirational role models for the participants, as well as living case studies of success.

A5.3 Network work programme and outputs

Objectives

The main objective of the M50 network work programme is to deliver the enterprise development programme for the three years covered by the EPP funding.

Activities

The main activity of the M50 network is the provision of training and other supports to the 10 entrepreneurs who participate on the EPP programme on an annual basis.

Outcomes

The main outcome of the M50 work programme has been the delivery of the enterprise development training programme to approximately 30 participants for each of the three years during the period 2000–2003.

A5.4 Comments and issues

Current situation

The M50 network was established as a result of a successful application in 2000 for Enterprise Platform Programme funding. The funding allowed the network deliver three one-year enterprise development programmes during the period 2000–2003.

The partner organisations have submitted a new application for EPP funding to cover the period 2004–2006. The new application, if successful, will involve an extension of the network to include UCD whose Nova Programme—similar to DCU's Invent Centre—is focused on the provision of supports for academic staff wishing to commercialise the results of their research.

State support for networks

The M50 network would not exist without the implicit assumption that Institutes of Technology should collaborate to enhance their prospects of securing EPP funding. Even though Tallaght IT had previously secured EPP funding on its own it was understood that submissions involving two or more Institutes of Technology were likely to be more favourably received. This top-down approach to the provision of funding was instrumental to the formation of the M50 and other similar networks. The EPP funding allowed the M50 network to pool resources and to provide training to participants over a wider geographical area.

The EPP three-year funding time-frame was also important. It allowed the network members to develop working relationships and equally importantly it facilitated the network to refine and enhance its offering to programme participants.

Key learning points

BRANDING/NETWORK IDENTITY With the use of the M50 brand name, the network has developed a very powerful identity for itself. The M50 has developed a level of brand recognition that has surpassed even longer established enterprise development programmes such as the Product Development Centre in Dublin Institute of Technology which has been in operation for a considerably longer period of time. Even though there is some confusion as to the exact composition of the network, there is a very high level of awareness of the network among, for example, the development agencies.

OUTWARD FOCUS OF PARTNER ORGANISATIONS The prime movers of the M50 network in each of the member colleges are the Development Office/Industrial Liaison Office. They have both an internal and external focus and as a consequence are open to interacting with each other even though their respective colleges compete at another level for students. They also share a common desire to increase the level of commercialisation of research undertaken internally and in improving the performance of services and supports they provide in this area.

As a network, the M50 has been very open to using external resources; in fact, much of the training and mentoring support provided to the programme participants is sourced from outside the three member colleges. They also have made extensive use of the resources of Enterprise Ireland.

TRAINING PROGRAMME FOR PROGRAMME MANAGERS There has been recognition not only within the M50 but also in other EPP-funded projects of the importance of the programme managers. The programme manager plays a vital role in the delivery of the EPP to such an extent that if a group of colleges are unsuccessful in a repeat application for EPP funding they face the prospect of losing a substantial amount of knowledge and experience. This has been recognised by Enterprise Ireland which is giving consideration for the provision of training to programme managers. Though programme managers are not the manager of the network they can play an important role in achieving its objectives.

TIME REQUIRED FOR NETWORK DEVELOPMENT One of the lessons of the M50 has been the time taken for the members to develop trust in each other. This is something that cannot be achieved overnight and requires regular interaction and participation in network activities.

The involvement of senior members of the colleges has been important for the building of trust and co-operation within the network.

LEARNING Related to the need for time to successfully develop the network is the learning that can take place as a result of implementing network activities. There have been a number of fundamental changes in the way the M50 has delivered the programme with the result that participants' satisfaction rates have increased significantly over the three period of the EPP funding.

A6 Atlantic University Alliance

A6.1 Introduction

The Atlantic University Alliance (AUA) was established with the aim of pooling the individual expertise and resources of the National University of Ireland, Galway (NUIG), University College Cork (UCC) and the University of Limerick (UL) and making them available to indigenous SMEs in the West, Mid-West and South of Ireland.

The Alliance was founded in October 1997 after the three universities had failed in their joint tender to Enterprise Ireland for the contract to provide technology management courses for industry. The contract went to University College Dublin which submitted a tender in collaboration with the Massachusetts Institute of Technology (MIT).

However, Enterprise Ireland was sufficiently impressed with the submission made by the three partner universities that it discussed with them the possibility of combining their expertise and resources in other areas.

A6.2 Network structure and objectives

Structure

The Atlantic University Alliance does not have a legal structure; it is simply an agreement between the three member universities of UCC, NUIG and UL which has been signed by their respective presidents.

Each member university has the right for its president, dean of research, the Industrial Liaison Officer (ILO) and a senior member of the academic community to attend AUA meetings. In practice, the main representatives from each university that attend meetings are the dean of research, the ILO and senior academics.

The meetings of the main AUA council are held approximately 3–4 times a year with the chairmanship rotating between the member universities on an annual basis. The AUA also has an Academic Committee which examines proposals in relation to the provision of education programmes.

Aims and objectives

One of the most important objectives of the Atlantic University Alliance is to provide an academic counter-balance to the dominance of the East Coast universities. The AUA perceives that dominance could become even more prominent with enhanced cross-

border linkages arising from the peace process resulting in a very powerful Belfast-Dublin corridor. Hence, the AUA member universities see their role as being a catalyst for the economic development of the western seaboard region. The AUA's focus on economic development meant that the member universities could work together on an issue that did not involve head-to-head competition.

A6.3 Work programme

The main AUA activities are the Technology Transfer Initiative (TTI), the AUA Technology Management Masters programme and joint submissions to the Programme for Research in Third Level Institutions (PRTLTI).

The focus on technology transfer and technology management training activities arose from an Enterprise Ireland-funded study of the technology needs and resources in the regions in which the AUA member universities are based.

Technology Transfer Initiative

The Technology Transfer Initiative (TTI) is an initiative to facilitate SMEs in the western seaboard area with a structured gateway to access the resources and expertise of the three AUA member universities. The TTI is funded by Enterprise Ireland and is currently in the final year of its three year funding cycle.

The TTI was developed by the AUA to cater for the needs of small indigenous companies which in the past had experienced difficulties in developing research collaboration with academics. In theory, the Industrial Liaison Office (ILO) is tasked with assisting SMEs to find the academic expertise relevant to their needs. In practice, however, the ILO tends to be under-resourced and must carry out a wide range of duties of which helping SMEs to make contact with academic experts is only one.

The AUA suggested the concept of providing a gateway service for SMEs in the western seaboard region to Enterprise Ireland who agreed to fund a pilot initiative. The results of the pilot led to the development of the Technology Transfer Initiative which Enterprise Ireland agreed to fund for a three year period.

The objective of the TTI is to provide a mechanism for companies to access the expertise and resources of the AUA member universities so as to improve their level of innovation.

AUA Masters in Technology Management

The second output of the Atlantic University Alliance has been the development of a new course, the Masters in Technology Management programme, with funding from Enterprise Ireland. The Masters programme is the first education tri-university collaboration on an academic post-graduate programme in Ireland.

The objective of the new AUA masters programme is to promote and support technology management within Irish industry with the aim of improving product innovation and the development of the knowledge economy. It is seen as an important initiative for the development of the human resource infrastructure to support technology management within the economy.

The new course is primarily a distance-learning programme with students receiving course materials on-line and/or in paper-format. Students are also required to attend periodic tutorials and seminars which form an integral part of the programme. These sessions take place at a number of locations including the AUA member universities and other locations which may suit students geographically.

Joint research collaboration

A number of research funding proposals have been submitted to the Programme for Research in Third Level Institutions under the AUA banner.

A6.4 Comments and issues

Industry-academic collaboration

The AUA while being primarily an academia-academia network has a substantial focus on industry-academia collaboration through the Technology Transfer Initiative (TTI) and the contribution of the TTI team in UL in resurrecting the R&D Managers Club in the mid-West. The TTI is an initiative to provide a structured gateway facility by which indigenous SMEs in the Western seaboard region can access the resources and expertise of the AUA member colleges. TTI activities have resulted in SMEs not only linking up with academic research expertise in the AUA university in their region but also in the other AUA member colleges. Thus not only has there been a transfer of technology from the university to small companies but this technology transfer has also involved an inter-regional dimension. In a number of cases, academic experts from different AUA member colleges have collaborated on research projects initiated by SMEs. The TTI as an initiative has addressed a lacunae in the services provided by the ILOs in the AUA member universities by providing SMEs with a facility to identify the relevant academic expertise to address their technical problems.

Future direction

Professor Eamonn Murphy of UL has argued in a position paper that there is a need for AUA member universities and the AUA itself to reflect on the underlying but unstated principle on which the AUA operates i.e. that the members co-operate on economic development issues when it is in their strategic interests but compete individually for students and academic recognition. He put forward the view that there was a need for greater clarity around the role of the individual member universities and the AUA itself.

He has highlighted the need to identify a set of activities that will strengthen the relationships but not threaten their individual missions. The following is indicative but not an exhaustive list of potential collaborative projects:

OPEN DISTANCE LEARNING (ODL) PLATFORMS The AUA member universities need as individual institutions to become more active in developing and delivering open distance learning academic programmes. The huge cost of entry and or exit from this activity allied to economies of scale would indicate that the member universities should seriously examine ODL from an AUA perspective. The experience in developing and implementing the AUA Masters in Technology Management programme would be very relevant in this regard.

RESEARCH COLLOQUIA AND DOCTORAL/POSTDOCTORAL SEMINARS The AUA is an ideal vehicle to promote best practice and to foster inter-institutional research co-operation and joint supervision to the mutual benefit of all concerned.

FORMER PATS AND TECHNOLOGY TRANSFER PROGRAMMES The AUA provides the member universities with a perfect vehicle to make impacts outside their specific regions and thereby help to increase the return on the investment that Enterprise Ireland is seeking in these programmes.

LABORATORIES AND EXPENSIVE ACADEMIC PROGRAMMES The AUA member universities need to rationalise their use of expensive equipment and to fully utilise personnel involved in expensive, laboratory intensive programmes. This is regarded as a sensitive area but if properly handled could be beneficial for the AUA colleges. The Conway Institute involving UCD, Trinity and the College of Surgeons has been identified as a good role model.

Endnotes

1. A copy of this Directory was mailed to every purchasing manager in the country. It was later uploaded onto the SNS web site.
2. Skillnets focuses on mobilising groups or networks of companies to develop strategic, tailor-made solutions to their own sectoral needs. It provides greater flexibility in addressing a company's specific needs and enables companies to overcome the barriers they face in meeting their skills needs through a collaborative approach.
3. In the Skillnets programme 'Strand A' proposals were made by existing networks; 'Strand B' proposals involved network formation.
4. National Institute for Transport and Logistics.
5. Lean Thinking is gaining widespread acceptance as the most crucial element in maintaining and improving the competitiveness of businesses across all sectors and industries. Lean Ireland is a multidisciplinary group at the University of Limerick set up to bring the benefits of Lean Thinking to Irish Industry.
6. See Huggins, Robert (2001), "Inter-Firm Network Policies and Firm Performance: Evaluating the Impact of Initiatives in the UK," *Research Policy*, 30 (3), March, pp. 443-458 ; also the Australian IDC 'Cluster Deployment' phase.
7. See NESF (1996); Dixit and Nalebuff (1991); DTI UK (1998).
8. RECITE (Regions and Cities for Europe) is a measure to promote the development of co-operation networks and comes under ERDF Article 10 of the European Structural Funds.
9. European Business Network, an EU-wide network of Business Innovation Centres (BICs) and business consultants specialising in providing advice to Small Firms (particularly in the start-up phase).
10. The NETWIN project has 14 fully-documented network studies across Europe.
11. Aditec were the lead consultants.
12. In the case of the food company network, Fuschia Foods in Cork was the paradigm. This network was well resourced by Leader funding; there are 100+ companies involved (food companies and also tourism enterprises); members use both their own and the collective Fuschia brand.
13. Roscommon CEB wholly funded some initiatives (e.g. they paid for the ECDL course).
14. James Donlon had contacted the companies individually beforehand to explain the programme.
15. Hazard Area Critical Control Points, a statutory safety/quality standard required in food production and service industries.
16. Achieving the entry standards set by the multiples is seen as the benchmark. However, multiples have to be approached with caution. To some vulnerable supplier businesses they were the 'kiss of death'. It is down to supplier strength, and here networks help. Multiples like a supplier to offer a range of products (for logistical reasons); again networks help.
17. The Co-ordinator observed that, in crafts, it was their 'commercial' side that wanted the network, not the 'creative' side (the core business).

Functions of Forfás

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- comhairle a chur ar an Aire ó thaobh cúrsaí a bhaineann le forbairt tionscail sa Stát;
- comhairle maidir le forbairt agus comhordú polasaithe a chur ar fáil d'Fhiontraíocht Éireann, d'GFT Éireann agus d'aon fhoras eile dá leithéid (a bunaíodh go reachtúil) a d'fhéadfadh an tAire a ainmniú trí ordú;
- forbairt na tionsclaíochta, na heolaíochta agus na teicneolaíochta, na nuála, na margaíochta agus acmhainní daonna a spreagadh sa Stát;
- bunú agus forbairt gnóthas tionsclaíoch ón iasacht a spreagadh sa Stát; agus
- Fiontraíocht Éireann agus GFT Éireann a chomhairliú agus a chomhordú ó thaobh a gcuid feidhmeanna.

Forfás is the national policy and advisory board for enterprise, trade, science, technology and innovation. It is the body in which the State's legal powers for industrial promotion and technology development have been vested. It is also the body through which powers are delegated to Enterprise Ireland for the promotion of indigenous industry and to IDA Ireland for the promotion of inward investment. The broad functions of Forfás are to:

- advise the Minister on matters relating to the development of industry in the State;
- advise on the development and co-ordination of policy for Enterprise Ireland, IDA Ireland and such other bodies (established by or under statute) as the Minister may by order designate;
- encourage the development of industry, science and technology, innovation, marketing and human resources in the State;
- encourage the establishment and development in the State of industrial undertakings from outside the State; and
- advise and co-ordinate Enterprise Ireland and IDA Ireland in relation to their functions.

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Functions

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- encourage the establishment and development in the State of industrial undertakings from outside the State; and
- advise and co-ordinate Enterprise Ireland, IDA Ireland and Science Foundation Ireland in relation to their functions.

Réamhrá

Is é Forfás an bord náisiúnta um polasaí agus comhairle le haghaidh fiontraíochta, trádála, eolaíochta, teicneolaíochta agus nuála. Is é an comhlacht é a bhfuil comhactaí dlíthiúla an stáit maidir le cur chun cinn tionscail agus forbairt teicneolaíochta dílsithe ann. Is é an comhlacht é freisin trína dtiomnaítear cumhachtaí ar Fhiontraíocht Éireann le tionscail dúchais a chur chun cinn agus ar ghníomhaireacht Forbartha Tionscail na hÉireann (GFT Éireann) le hinfheistíocht isteach sa tír a chur chun tosaigh. Is iad feighmeanna Fhorfáis:

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