

**LEVERAGING THE INNOVATION ECOSYSTEM FOR
BUSINESS ADVANTAGE: A CROSS-BORDER STUDY**

December 2012

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Foreword

Innovation has become a key differentiator for firms seeking to thrive and create competitive advantage. In the face of increasing demands for customer value, firms are looking at ways to increase the efficiency and effectiveness of their innovation processes. In this context, firms are looking to open innovation to give them a vital business edge. Open innovation means expanding the pool of participants in the innovation process to all types of outsiders and tapping into the resources they can provide. This approach points to the significance of organisations outside the firm that can act as catalysts, contributors or collaborators for innovation. These organisations form a wider community – an innovation ecosystem – that firms can leverage for business advantage.

This report gathers insights from over 1,100 firms in Ireland and Northern Ireland on their engagement with the innovation ecosystem and on their internal capabilities, to best exploit it.

From an innovation performance perspective, the study finds that a high proportion of firms (62%) have engaged in innovation activity in the past three years and affirms the positive relationship between innovation and growth. Importantly, the findings debunk the myths that innovation is only applicable to large high-tech industries, and is all about doing R&D and inventing new products. On the contrary, the report confirms that the vast majority of these innovative firms are micro-enterprises with less than 10 employees; they can be found across all sectors of the economy in Ireland and Northern Ireland, that innovation activity is not dependent upon the presence of R&D staff and that firms are engaging in many different types of innovation.

The report also highlights a positive relationship between innovation and export orientation, where firms who export off the island display a higher level of innovation activity compared to non-exporters. This positive influence is evident, but to a lesser degree, for cross-border traders which could signify benefits to businesses of accessing diverse knowledge inputs at the cross-border level.

The report finds that just under half of firms, who have innovated in the past, leverage external resources and supports and that they do so, at some stage, within the broad phases of the innovation process: idea generation, development and launch/commercialisation. Larger firms (55%) are more likely to be outward looking than smaller firms (36%) while the same holds for exporters (58%) and cross border traders (53%) compared to domestic firms (31%). Despite the incentives for firms to take an open approach to innovation and the availability of supports to do so, just over half of firms continue to innovate without formally leveraging external resources.

The views of innovative firms on the importance and value of interactions with the actors in the innovation ecosystem have been interpreted to give a picture of a very effective use of the ecosystem when confined to customers and suppliers. Proximity to local partners is important but there is evidence of cross-border and international partnering. Other innovation partners that can contribute to the innovation process are deemed less important and effective partners are again more likely to be locally based. Issues of scale are evident and, overall, larger firms are more likely to have connections with each category of innovation actor. Despite numerous agents and supports available to support collaboration and networking, it would appear that the full breadth of the ecosystem is not being fully exploited either at the local level or beyond and opportunities exist to increase the relevance of, and connections to, the other innovation partners.

The report also finds that the extent to which a firm engages with the innovation ecosystem is generally influenced by internal firm capabilities and culture. These are important precursors of a firm's ability to benefit from the external knowledge and resources provided by the innovation ecosystem. An investigation of the characteristics of innovative firms in the survey indicates that while the majority possess an ambition for growth, there are deficiencies in innovation leadership, culture and capabilities. There is evidence of a cultural weakness in collaborating with others and consistent with this is the finding that the lowest ranked internal firm capabilities are networking with others in the same sector and finding external support for new ideas and developments.

The report concludes with a series of findings and conclusions designed to provide a positive reinforcement of the message that innovation is a valuable activity linked to the growth of firms and that firms of all sizes and in all sectors of the economy can be innovative. It also addresses issues around innovation leadership, culture and capabilities that will help firms leverage greater advantage from the innovation ecosystem.

1. Introduction

The impetus for this study is the recognition that open systems of innovation offer innovative enterprises the potential to externally source and connect with a wider variety of relevant expertise. The benefits of an open approach to innovation are improvements in the capability and capacity to:

- Access new technologies, know-how, intellectual property and ideas from external sources;
- Integrate and exploit these external elements into innovative new product, process and service developments;
- Collaborate on innovation with suppliers, customers, industry networks and competitors; and
- License-out to gain value from ideas and technologies that do not fit the core strategy of the company.

Leading to:¹

- Faster development and market launch of new products and services;
- More diversity brought to innovation resulting in identification of more opportunities for growth; and
- Improved success rate of new products and services by making the innovation process stronger.

Given the close geographic proximity and the complementary support systems cross-border cooperation on the island is intrinsic to such an open system and brings the additional benefits of a more efficient and effective use of resources to the mutual benefit of firms in both jurisdictions.

InterTradelreland's vision of the ecosystem is one that places the firm at the centre and ensures that the resources, be they financial, technical or otherwise, are readily available and accessible to businesses, no matter in which jurisdiction they are located, so that creative ideas are commercialised more effectively and efficiently.

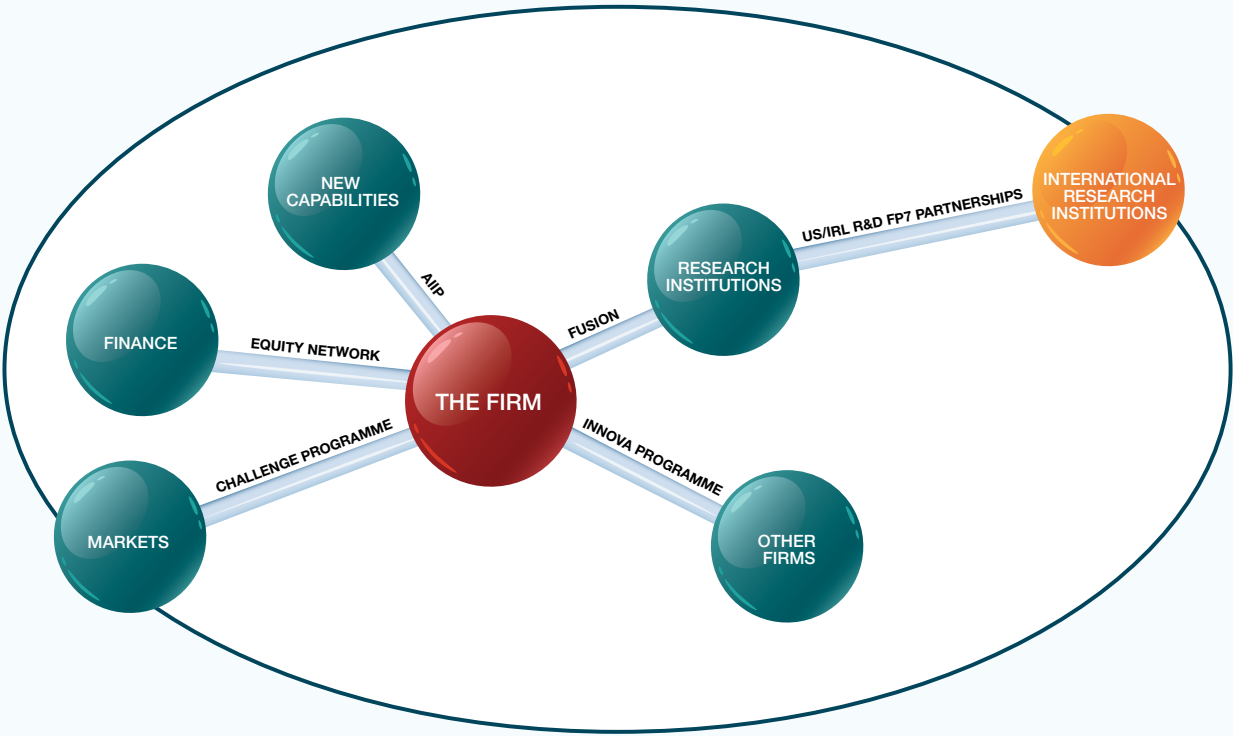
In line with this view of the innovation ecosystem, see Figure 1, InterTradelreland supports the development of an open innovation system working across Ireland and Northern Ireland with programmes such as FUSION, Innova, Challenge, Equity Network and the All-Island innovation Programme. These facilitate greater connections and collaborations across both jurisdictions to assist with the generation, development and commercialisation of business ideas.

This report presents the results of a study to identify the broad characteristics, opportunities and barriers to a well-connected innovation ecosystem covering Ireland and Northern Ireland from the point of view of the firm. Identifying the innovation ecosystem entailed:

- Understanding and mapping how firms leverage external connections within local, cross-border and international contexts in order to drive innovation;
- Understanding and measuring the internal practices and capabilities of firms to manage innovation; and
- Understanding how the local and cross-border innovation systems respond to the needs of firms.

¹ M.M. Keupp and O. Grassmann, *Determinants and Archtype Users of Open Innovation*, *R&D Management*, 30/4 (2009), pp. 331, 341

Figure 1: InterTradelreland programmes supporting an open system of innovation across the island.



2. Open Innovation and the Ecosystem

2.1 Open Innovation

The broad logic behind open innovation is that it is increasingly difficult for a firm to continuously innovate and grow in isolation.² It has to engage with different types of partners to acquire ideas and resources from the external environment to stay ahead of the competition.³

As global competition intensifies, knowledge workers become more mobile and innovation becomes riskier and more costly, more businesses have turned to open innovation as a way of increasing the speed and effectiveness of their innovation approaches.

The new understanding of innovation in the knowledge-based economy is that commercially significant innovations are much more likely to emerge where businesses interact and cooperate to a high degree with their external environment, as catalysts, contributors or collaborators. Serial innovators may draw on higher education institutions for intellectual property and talent, on the financial resources of venture capitalists and angel investors and on the capacities and facilities of other companies, consultants, suppliers and customers.

2.2 Open Innovation and SMEs

Adopting an open approach to innovation may be seen as the preserve of large leading high-tech firms with access to the intellectual and financial resources to explore and experiment and source ideas outside the firm on a global scale. However, young companies and SMEs have also been shown to adopt open innovative activities.⁴

Van de Vrande et al have found that SMEs engage in open innovation practices in stages, their research suggesting "a sequence in the adoption of open innovation, starting with customer involvement, following with employee involvement, and external networking, and ending with more 'advanced' practices like IP licensing, R&D outsourcing, venturing, and external participations".⁵ This progression has been interpreted in a different way elsewhere where businesses begin by being part of another organisation's open innovation strategy while perhaps maintaining fairly traditional processes themselves, before beginning to operate their own innovation pipeline according to open principles.⁶

The added value of a more open approach to innovation may, in fact, be most important for smaller firms whose growth ambitions are often frustrated by limited access to the skills and resources needed to successfully exploit new insights that they have on their market. In opening their innovation processes and partnering with other organisations, SMEs can ensure access to external ideas, enable better utilisation of their innovation potential, implement internal ideas otherwise unexplored, extend their potential for growth through alliances, partnerships and attraction of funding and also gain opportunities from larger companies who wish to access their specific resources or knowledge.

² Henry Chesbrough, *Open Innovation* (Harvard, 2003).

³ Keld Laursen and Ammon Salter, *Open for Innovation: The role of innovation in explaining innovation performance among UK manufacturing firms*, *Strategic Management Journal*, 27, (2006), pp. 137-50.

⁴ Wim Vanhaverbeke and Myriam Cloudt, *Open innovation in value networks*, in Chesbrough, Vanhaverbeke and West (eds), *Open Innovation: Researching a new paradigm* (Oxford, 2006).

⁵ Vareska van de Vrande et al, *Open Innovation in SMEs: Trend, motives and management challenges*, *Technovation*, 29/6-7 (2009), pp. 423-437, p.435.

⁶ Charles Levy and Benjamin Reid, *Missing an Open Goal? UK Public Policy and Open Innovation* (Big Innovation Centre, September 2011).

Ambitious and innovative SMEs are disproportionately effective in stimulating economic growth and the focus of national governments lies in supporting the creation and growth of such SMEs. Analysing empirical data for EU companies, the report ⁷ shows that “innovative companies are more likely to export”, that “they are more productive and therefore internationally more competitive” and that “exporting in turn has a positive impact on innovation”. Hence, “exporting and innovation are complementary strategies that result in higher export shares, turnover and employment growth at the firm level”.

Empirical studies find high growth firms in all sectors (not just those associated with high technology), and that these successful small firms, soon to become medium-sized firms and even large firms in some cases, tend to outperform the majority of their peers through the combination of ambition and innovation. A study of high-growth firms in Scotland, funded by Scottish Enterprise, provides clear evidence of the heterogeneity of such firms (age, size, sector, origin) although most were knowledge-based and innovative, with a strong export orientation.⁸ The study also suggests there may be other commonalities, with partnering and long-term relationships being central to their business models as well as a focus on high calibre staff. They also show a willingness to use external finance or trade partners to fund development or support restructuring in pursuit of growth.

An OECD study on high-growth SMEs confirms the view from Scotland and suggests that higher growth (above average for the relevant sector) will usually happen where multiple factors collide (internal and external to the firm), although it concludes that the strategic ambition to grow is perhaps the one quality that cannot be done without.⁹

While it is difficult to identify those SMEs with the potential for high growth in advance, the policy challenge appears to lie in creating the supportive conditions to encourage such companies to form and thrive while still helping support the rest of the SME population who are the bedrock of the economy. Those supportive conditions include a mix of hard and soft factors – such as legislative, financial, cultural, etc. – including that of encouraging the entrepreneurs who drive such businesses and developing the support ecosystems around them.

An understanding of the entire innovation ecosystem and maximising the connections within it is a critical aspect of open innovation.

2.3 Innovation Ecosystems

An innovation ecosystem comprises all the constituent parts required to enable an innovation and entrepreneur-based economy. It is characterised by the interactions that take place between actors in the ecosystem to facilitate innovation.

Firms are seen as the principal innovation actors, the entrepreneurs sitting at the centre of the innovation system. They are best placed to respond to signals from the market place, on the one hand, for different, better or cheaper products and services and, on the other hand, to mobilise or exploit the opportunities and capacities within their value chains. In their pursuit of innovation, they may draw on the know-how and resources of several other groups of actors.

⁷ A. Reinstaller (coord.), W. Hölzl, J. Janger, I. Stadler, F. Unterlass, S. Daimler-Stehnken, *Barriers to internationalisation and growth of EU's innovative companies: PRO INNO Europe INNO-Grips II report* (Brussels: European Commission, DG Enterprise and Industry, 2010).

⁸ Colin Mason and Ross Brown, *High Growth firms in Scotland* (Scottish Enterprise, October 2010).

⁹ OECD, *High-Growth Enterprises: What Governments Can Do to Make a Difference* (2010).

The entire community works within a wider set of framework conditions defined by policy makers and regulators in some cases and imposed by markets and macro-economic conditions in other cases. In a recent report National Endowment for Science, Technology and the Arts (NESTA) described framework conditions as the factors which "shape the context in which firms innovate and influence their innovation performance and subsequent market success." These conditions tend to be external to firms and they give the character to "the different and competing environments that countries offer to innovating firms". Examples of framework conditions include regulations, demand conditions and the degree of competition in the domestic market (including public procurement) and the availability of high quality human resources and infrastructure.¹⁰

As in nature's ecosystems, no single actor in an innovation system functions in isolation. The ecosystem will only work to the extent that actors know and are known to each other. If one set of actors is weak or there is a lack of awareness and connections between the actors it can constrain innovation.

2.4 Key actors in the Innovation Ecosystem

Table 1 itemises the main groups of actors in the innovation ecosystem and the innovation functions carried out by each of the groups.

This long list of functions can be abridged into four main types of essential resources that the actors provide each other in support of the innovation process. Effectively delivered, these improve the odds of success for innovation activities:

- People and Skills – the talented and skilled workforce to generate new ideas and product enhancements that will drive innovation;
- Finance – the investments required to satisfy the resource needs of companies;
- Advice and Services – the specialised support that innovators require to create and enhance innovation capability; and
- Knowledge and IP – the source of ideas and know-how that create innovation opportunities.

Figure 2 on page 10 represents InterTradelreland's generic model of an innovation ecosystem depicting the connections and the flow of resources between firms and the other groups of actors within the innovation ecosystem. These resources which can include people and skills, finance, advice and services, knowledge and intellectual property, are exchanged within an ecosystem that is influenced by the prevailing framework conditions and market conditions.

The model is simple by design and given the focus on business at the centre of the ecosystem and their engagements with other actors in the ecosystem, it makes no attempt to capture the important bilateral relationships between the other groups of actors.

Businesses are the principal innovation actors in the ecosystem as it is they who leverage the resources within the ecosystem for growth and innovation. Almost the entire industrial base (99.7%) in Ireland and Northern Ireland is made up of SMEs. It is increasingly recognised that these are not only key to job and wealth creation but also in fostering the entrepreneurship, competition and innovation that leads to sustainable growth and development. Table 2 on page 10 gives an overview of the industrial base in Ireland and Northern Ireland and provides an indicative comparison with the EU-27.

All the other categories of innovation actors are represented in Ireland and Northern Ireland notably, banks/financial services organisations and public research organisations are more numerous in Ireland compared to Northern Ireland.

There are a limited number of instances where key actors function across the innovation ecosystem in Ireland and Northern Ireland. These include:

- Dedicated North/South bodies such as InterTradelreland and the Special EU Programmes Body;
- Ad-hoc cooperation between Invest NI and Enterprise Ireland (eg: Innovation Vouchers scheme);
- Cross-border intermediaries (such as the IBEC/CBI Joint Business Council);
- Cooperation among VC funds; and
- Occasional joint interventions of public research organisations (through Universities Ireland).

Table 1 – Key actors and innovation functions

Actors	Function in innovation ecosystem
Businesses	<ul style="list-style-type: none"> • Conceive of radical innovations in anticipation of market demand. • Identify innovation opportunities in response to market demands. • Signal interest in innovation to their customers or suppliers. • Innovate by themselves and in cooperation with others. • Recruit / retain a cadre of professionals / creatives in order to innovate. • Generate or otherwise source the funds necessary to innovate. • Secure any external know-how or technology required.
Banks and Financial Services Organisations	<ul style="list-style-type: none"> • Provide the investment funds businesses may need in order to innovate. • Provide the very much larger investment funds (risk money) businesses need for new products or services (or whole businesses) to go to scale.
Knowledge Intensive, Business Services Organisations	<ul style="list-style-type: none"> • Provide specialist services, from designing user interfaces for new products and services through to researching market entry strategies or prior art searches. • Provide access to specialist people and facilities (from interim CEOs to product testing / accreditation). • Provide a conduit for knowledge flows between science and industry, facilitating knowledge spillovers.
Intermediary Bodies	<ul style="list-style-type: none"> • Aggregate and represent sectoral interests to other actors in the innovation ecosystem. • Share the cost of developing generic solutions / innovations. • Facilitate the diffusion of innovations through new codes and standards. • Aggregate and codify good practice, career structures and CPD frameworks. • Provide CPD and other training to keep people abreast of wider innovation.
Higher Education Institutes which includes Public Research Organisations	<ul style="list-style-type: none"> • Provide a source of graduates and postgraduates. • Offer a portal to the global pool of academics and stock of knowledge. • Provide a source of partners for proprietary innovation projects. • Offer a source of IP, consulting know-how, large-scale facilities and research equipment. • Partners for increasing the innovative capacity of firms through human capital, problem solving and new knowledge.
National and Regional Innovation Support Agencies	<ul style="list-style-type: none"> • Create and maintain a policy framework for innovation. • Administer the innovation budget efficiently and effectively. • Implement innovation-support programmes of many kinds, from grants for R&D to knowledge transfer networks to access to finance. • Implement various tax incentives and reliefs, from business expansion and seed funds to R&D tax credits. • Support / launch topical working groups that come together to articulate innovation challenge. • Administer the national science budget and support universities and research institutes with their third stream. • Identifying and supporting the development of new technologies and new markets.
Policy makers and regulators	<ul style="list-style-type: none"> • Persuade government of the value of public support for innovation. • Define public research and innovation budgets, and determine policy priorities and balance of funding for innovation support. • Set wider framework conditions for innovators, from education policy to fiscal rules and tax reliefs to intellectual property. • Define or implement regulations, such as those governing environmental protection, with short term impacts (e.g. compliance costs) and positive longer term effects on innovativeness.

Source: Technopolis background paper (2011)

Figure 2: Model of an innovation ecosystem.

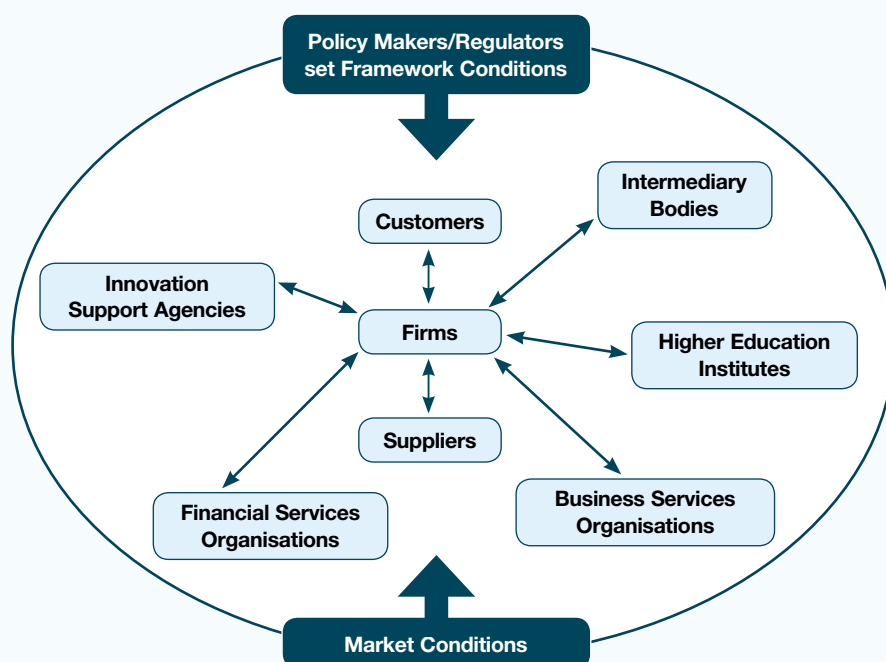


Table 2: Overview of the industrial base in Ireland, Northern Ireland and the EU-27

	Ireland	Northern Ireland	EU-27
Total number of enterprises	195,000	67,525	20,839,226
Birth rates of new enterprises	7.8%	6.5%	7.6%
GVA per Capita (index = 100)	136.2	86.4	100
% micro firms <10 employees	90.8%	89.0%	92.1%
% small firms 11-50 employees	7.7%	9.2%	7.7%
% medium firms 50-250 employees	1.2%	1.5%	0.2%
% persons employed by SMEs	69%	65%	66.9%
% of GVA accounted for by SMEs	46.8%	82%	58.4%
% of SMEs < 10 years old	54%	67%	58%
% of all enterprises that are innovation active	59.5% (CIS 2008-2010)	55.0% (UKIS 2009)	51.6% (CIS 2008/10)
% of all enterprises that are exporters off the island	19%	16%	
% of all enterprises that are cross-border traders	22%	39%	

Sources: CSO, *Businesses in Ireland 2010* (November 2012); DETI, *Inter Departmental Business Register* (December 2011); FSBNI, *Small business and the road to recovery* (September 2009); InterTradeIreland, *Business Monitor* (May 2012); *European Commission, Annual Report on EU SMEs* (November 2011), EuroStat, *Regional GVA per capita* (March 2012); OECD, *Statistics Brief: Selling to Foreign Markets* (February 2011).

2.5 Benchmarking the Ecosystem

To provide an indication of how well the innovation ecosystem performs, published innovation performance data from the Innovation Union Scoreboard (IUS)¹¹ and the Regional Innovation Scoreboard (RIS)¹² has been

used to benchmark performance against the EU-27 average and the UK. The limitations associated with traditional indicators is shown in Table 3 where the gaps show how the available indicators relate only to some, but not all, of the innovation actors.

Table 3: Relationship between innovation metrics and ecosystem actors

	Innovation Ecosystem Actors						
	Firms	Financial Services Orgs	Higher Education Institutes	Innovation Support Agencies	Business Services Orgs	Intermediary Bodies	Policy Makers
CIS/IUS metrics	√	√	√	√	N.A.	N.A.	N.A.

Figures 3 and 4 show the relative performance of Ireland and Northern Ireland against the EU and UK averages. Some significant findings include:

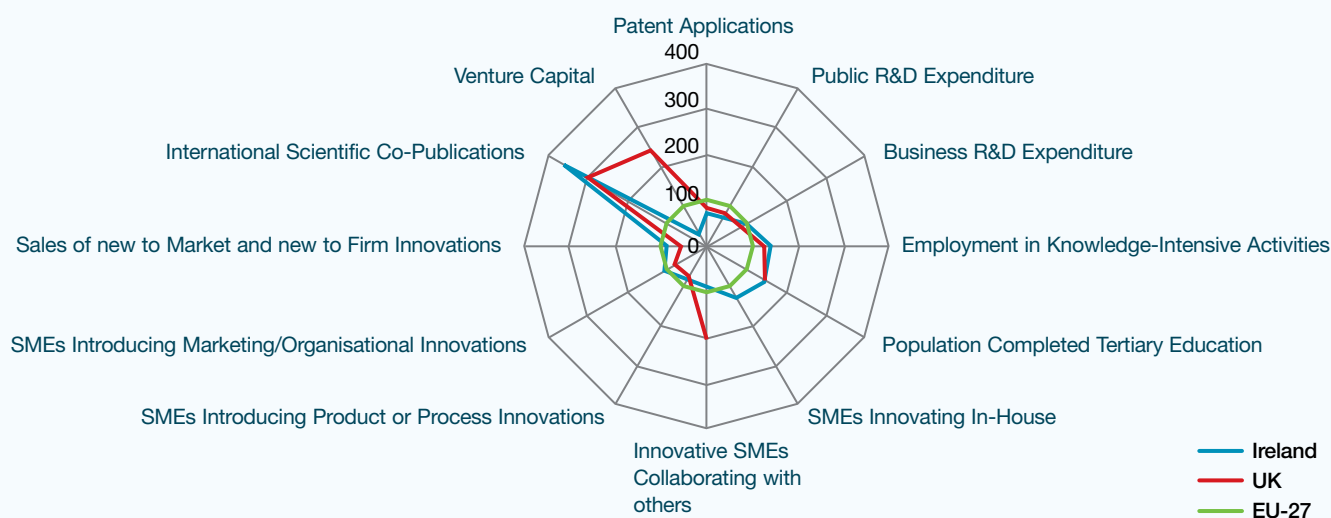
- The business community in Ireland in 2011 was above the EU-27 average in areas such as employment in knowledge intensive activities, marketing/organisation innovation and SMEs innovating in-house. However, firms in Ireland were below average in product or process innovation and filing patents. The scores were quite similar to the UK's with two exceptions: much better at sales of 'new to market' or 'new to firm innovations' and notably much worse at collaborating with others. When compared to Northern Ireland (see Figure 4), albeit with older RIS data and against fewer indicators, the business community in Ireland tended to be better across the following metrics: BERD, SMEs introducing product or process innovations, SMEs innovating in-house, Employment in both medium and high tech manufacturing and knowledge intensive activities. However, Northern Ireland compares better to Ireland in relation to higher education R&D expenditure (HERD).
- Most notably, innovative SMEs in Ireland and Northern Ireland engage in much less collaboration with others when compared to UK firms (see Figure 4).
- In the metrics associated with higher education institutes, such as numbers of international scientific co-publications, Ireland is well above the EU average. Northern Ireland was higher than Ireland and both were better than the UK in numbers completing tertiary education and in the workforce (see Figures 3 and 4), supporting the idea that a relatively large well-educated workforce is available to the ecosystem.
- There is a gap in the data for financial organisations regarding venture capital in Northern Ireland, although recent analysis of BVCA data suggests that just over 2% of UK-wide VC investment between 1989 and 2010 was in Northern Ireland.¹³ From EU-wide metrics Ireland in 2011 lags significantly behind both the EU-27 average and the UK (see Figure 3).

¹¹ The European Innovation Scoreboard (EIS) has been published annually since 2000 and presents key performance metrics for all EU member states. The Innovation Union Scoreboard replaced the EIS in 2011, covering most of the same indicators but with a new name to reflect the European Commission's implementation of the Innovation Union (October 2010). The Innovation Union Scoreboard 2011 is available to download at ec.europa.eu/enterprise/policies/innovation/files/ius-2011_en.pdf

¹² The Regional Innovation Scoreboard (RIS) has been published on two previous occasions and the 2009 RIS uses data from 2004 and 2006 for all EU27 regions.

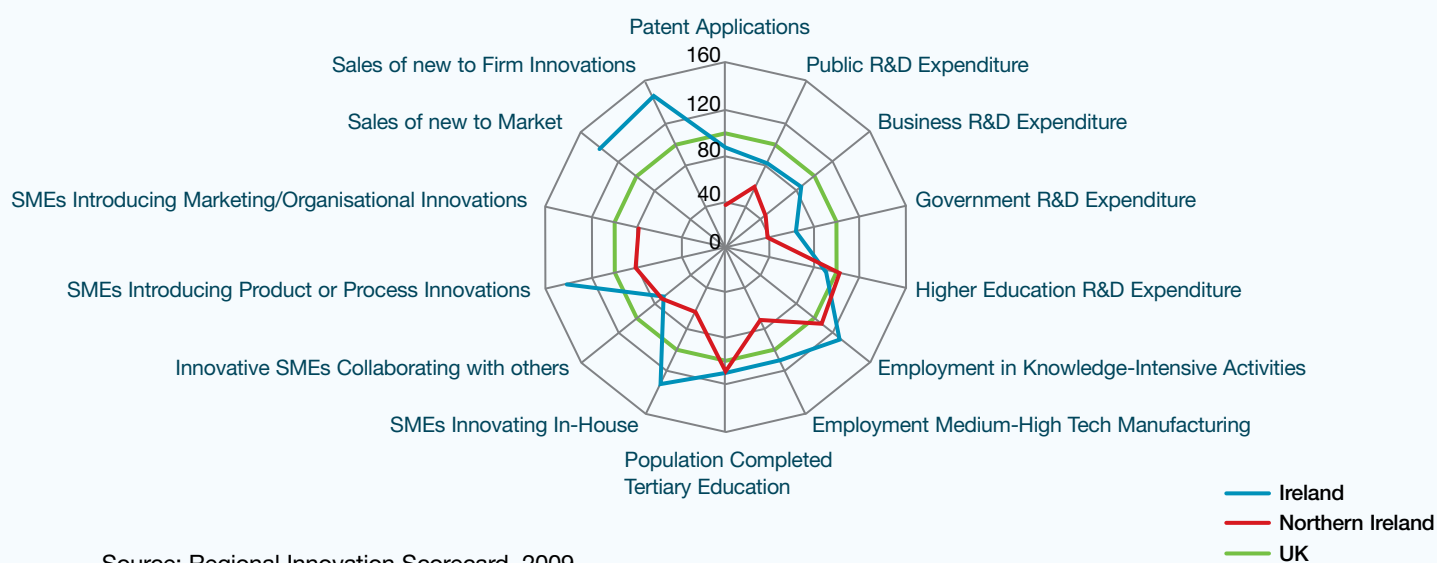
¹³ Northern Ireland Science Park, Northern Ireland knowledge economy baseline report 2011 (2011).

Figure 3: Comparisons of innovation indicators between Ireland, the UK and the EU-27



Source: Innovation Union Scorecard, 2011

Figure 4: Comparisons of innovation indicators between Ireland, Northern Ireland and the UK



Source: Regional Innovation Scorecard, 2009

An innovation ecosystem exists to support an innovation and entrepreneur-based economy. The available metrics on innovation activity have led to the classification of Ireland and the UK as innovation followers rather than innovation leaders. Northern Ireland is classified on a level below, that of moderate innovator.¹⁴ In the absence of data to assess the performance of each category

of innovation actor, this classification points to an ecosystem that is underperforming. The measurement of 'innovative SMEs collaborating with others' provides some indication of the dynamics of the ecosystem that influences its performance. The poor collaboration performance of innovative SMEs in Ireland and Northern Ireland underscores a failure around collaboration.

¹⁴ ProInno Europe, Innovation Union Scorecard (2011). European Regional Innovation Scoreboard (2012).

3. Firm perspectives on the All-Island Innovation Ecosystem

3.1 Introduction

The InterTradelreland Business Monitor was used as the method of reaching a sample of 1,104 owner/managers to assess the views of business on their current performance, as well as their innovation activities, capabilities, external connections and barriers to all of these.

The InterTradelreland Business Monitor telephone survey was undertaken in 2011 and the sample is structured to allow sub-group analysis by region, sector (seven of these), size of business (small, medium and large) and export orientation (exporters off the island, cross-border traders and non-exporters).

3.2 Results of business survey

The findings of the survey reinforce the view that innovation activity and firm growth are linked. By using six criteria to indicate a firm's 'successful' status the survey shows that firms which had undertaken innovation activity in the last three years or planned to do so in the next year were three times as likely to be successful as non-innovators.¹⁵

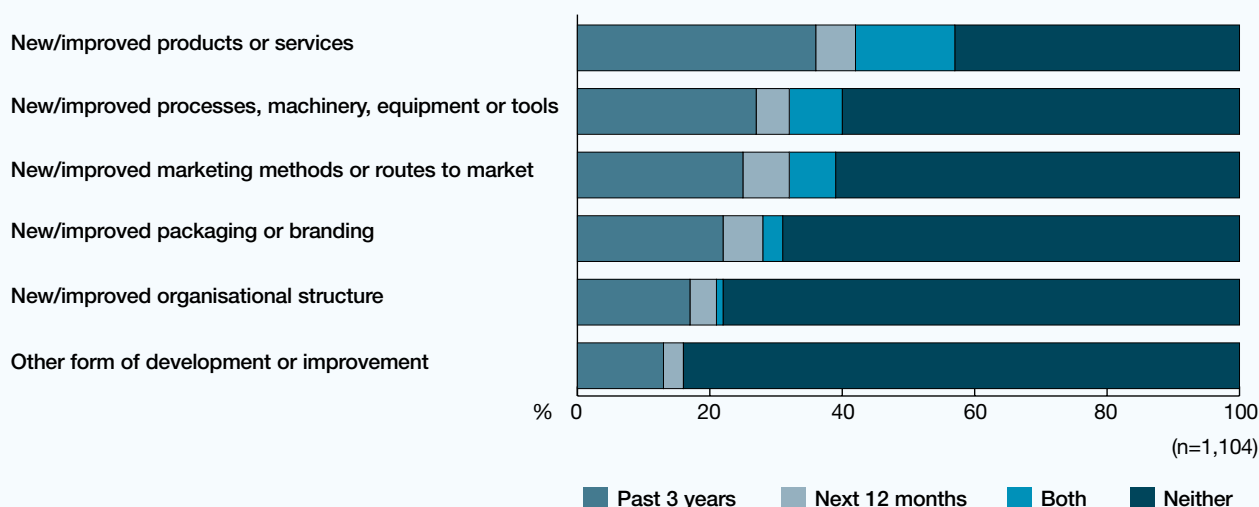
The survey also shows the link between export orientation and firm growth as more international exporters (19%) and cross-border traders (15%) reported themselves in a growing or expansion mode than businesses focused on the domestic market (9%).

3.2.1 Innovation Activity

Firms were asked whether, in the past three years, they had undertaken any one of a range of innovation activities, and whether they planned to do so in the next 12 months.

Overall, 62% of firms had undertaken some form of innovation activity in the past three years, 8% had not innovated in the past three years but have plans to do so in the next 12 months¹⁶ and 30% had not innovated in the past three years, nor planned to do so. Of the 62% of businesses that were previous innovators, the vast majority are micro-enterprises with less than 10 employees.

Figure 5: Firms' innovation activities, by type of innovation



Source: InterTradelreland Business Monitor (2011).

¹⁵ The criteria include: (1) increased sales in previous quarter; (2) increased employment in previous quarter; (3) expected sales increase in next year; (4) expected employment increase in next year; (5) company sells cross-border or exports internationally; and (6) current trading position described as expanding/ growing. To be classed as successful businesses had to be positive about at least two of the criteria.

¹⁶ While the number of future innovators appears low, 40% of the 'past innovators' also expect to undertake further developments in the next 12 months, so the actual proportion of firms planning new developments over the coming year equates to 33% of the sampled firms.

Figure 5 on page 13 indicates the range of firms' innovation activities and shows that development of new or improved products or services is the most commonly undertaken activity: 51% of firms undertook this activity in the past three years, 6% plan to do so in the next year.

The development or acquisition of new or improved processes, machinery, equipment or tools is the next most widely undertaken form of innovation: 35% undertook this activity in the past three years and 5% plan to do so in the next year.

The third most common form of innovation is the development of new or improved marketing methods, routes to market or markets: 32% of firms undertook this activity in the past three years and 7% plan to do so in the next year.

A quarter (25%) developed new or improved packaging or branding in the past three years, 9% plan to do so in the next year.

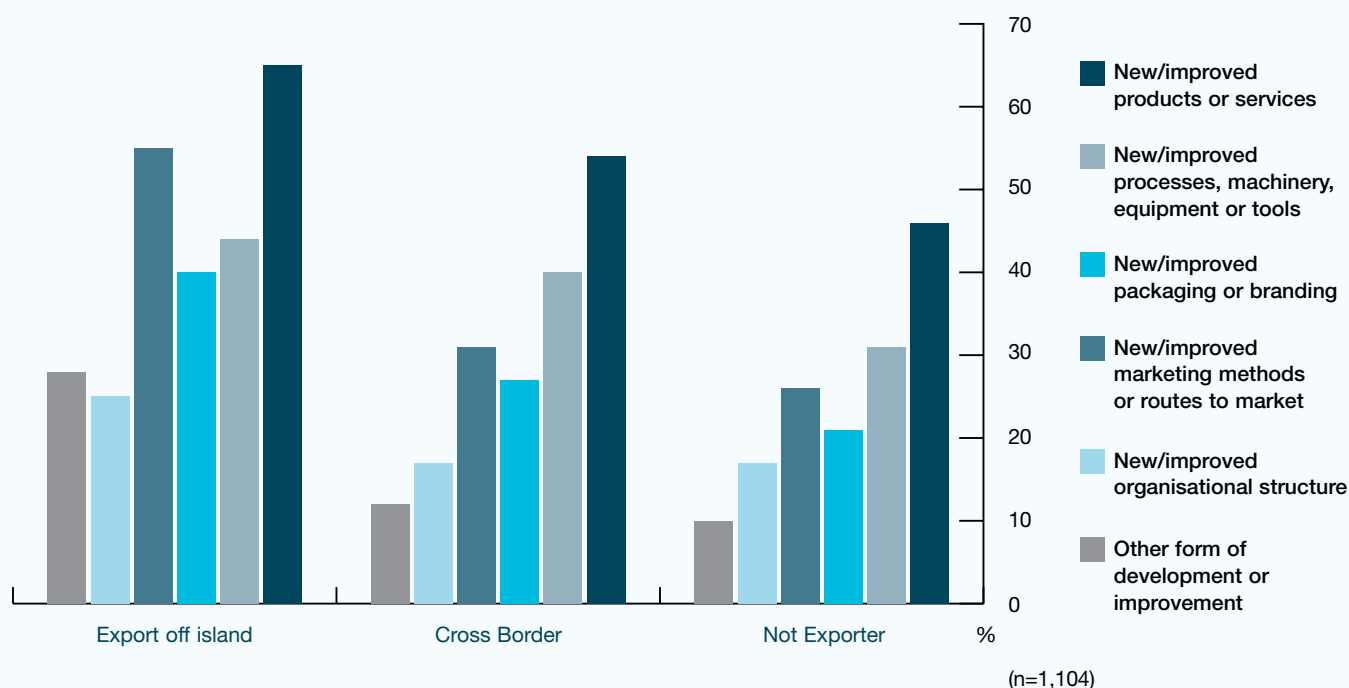
Less than a fifth of businesses (18%) have implemented new or improved organisational structures in the past three years, 5% plan this in the next year.

The smallest number (16%) have undertaken 'other' improvements to their business, including marketing (e.g. new or improved websites) or investments in new technology (e.g. IT upgrades).

In almost every innovation activity there was little difference between firms in Ireland or Northern Ireland. While innovators can be found across all sectors there is little difference between them in terms of activity undertaken.

However, small firms are well behind large firms in terms of activity, while export orientation also has an impact on activity levels. Figure 6 shows firms who export off the island have a higher level of innovation activity than either cross-border traders or firms who focus on the domestic market.

Figure 6: Percentage of firms involved in innovation activities, by export orientation of business



Source: InterTradeIreland Business Monitor (2011).

3.2.2 Internal innovation capabilities

To understand the characteristics associated with innovative firms, the survey sought views of past innovators on a range of indicators to assess a business's internal capabilities.

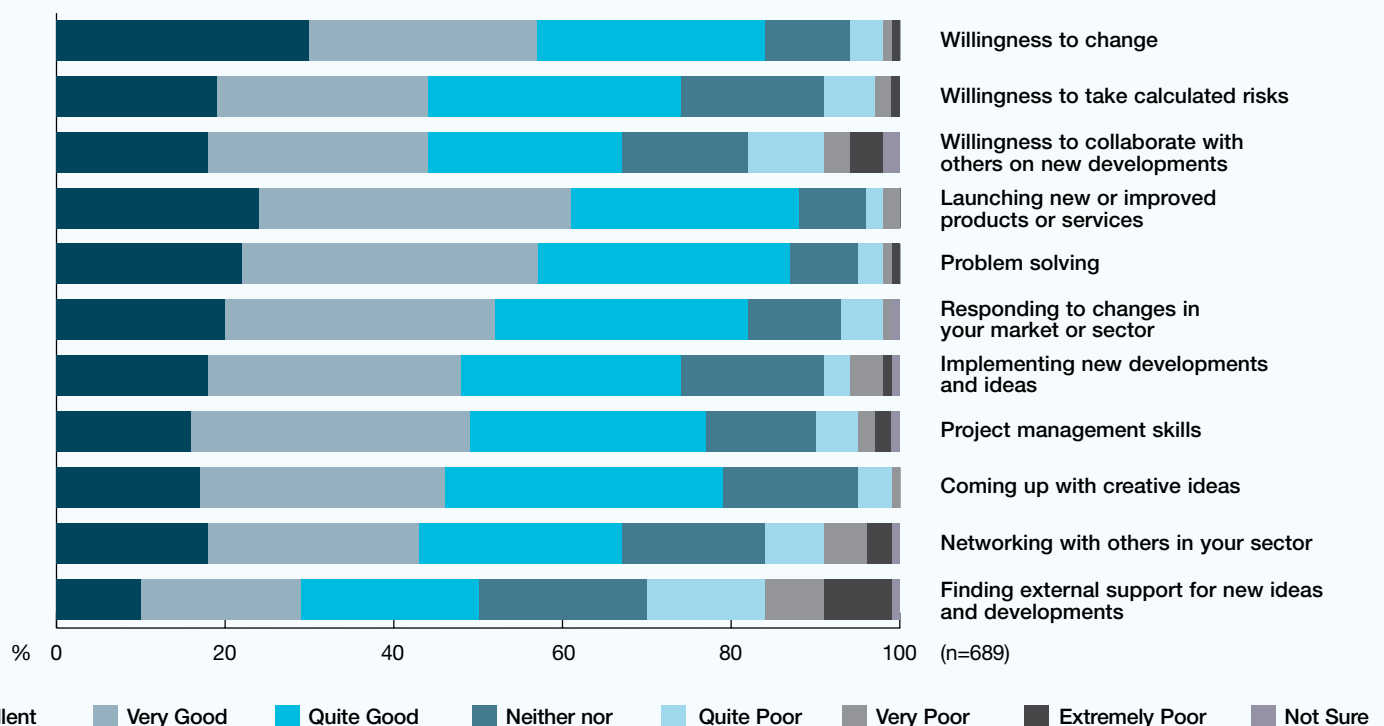
Leadership indicators included strategic ambition, presence of strategy and formal processes for managing business developments. Willingness to take risks, to change and to collaborate with others were used as indicators of an innovation culture. Capabilities surveyed included coming up with creative ideas, solving problems, implementing new developments and ideas, project management skills, launching new products and services, finding external support and networking with others in the sector. Together these indicators help form a view on firms' capability for innovation and particularly for collaboration. Finally, firms were asked to comment on their human resources, particularly if they had dedicated staff carrying out R&D and sales and marketing. They were also asked about financial resources and whether dedicated budgets were set aside for business development activities. The data on human resources help form a view on firms' absorptive capacity.

A significant majority of past innovators (68%) said they possessed ambition to grow. Almost half (49%) have a business strategy, although only one in three (33%) have a formal innovation process. The equivalent figures for non-innovating businesses are 52%, 36% and 13%.

Figure 7 below shows how firms rated themselves on indicators covering culture and capabilities. A culture that supports risk taking and collaboration also supports innovation. Of the three culture-related indicators surveyed, firms were most confident in their willingness to change. Firms were least confident in their willingness to collaborate with others.

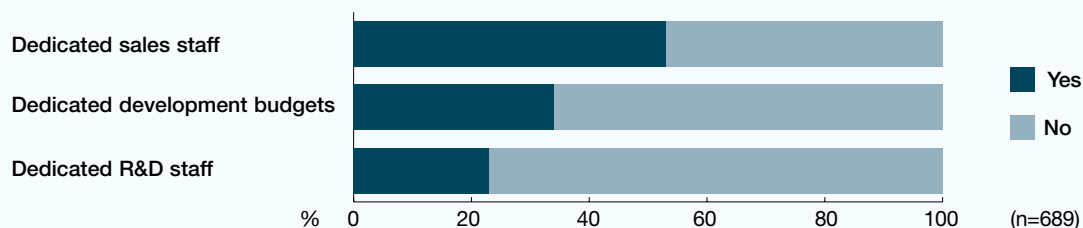
There were only three capabilities where over 50% of firms rated themselves as 'very good' or 'excellent'. These include, 'problem solving', and 'responding to changes in the market or sector' and 'implementing new developments and ideas'. A slightly smaller proportion of firms (over 40%) rate themselves as 'very good' or 'excellent' on seven of the eight capabilities surveyed. The exception to this was 'finding external support for new developments or ideas'. Crucially, in terms of an open system of innovation, only 26% of firms rate themselves 'very good' or better in this capability.

Figure 7: Self-rated innovation attributes of innovative-active businesses



In terms of resources, over half of past innovators (53%) have dedicated sales staff. Just over a third (34%) have dedicated development budgets and a quarter (25%) have dedicated R&D staff.

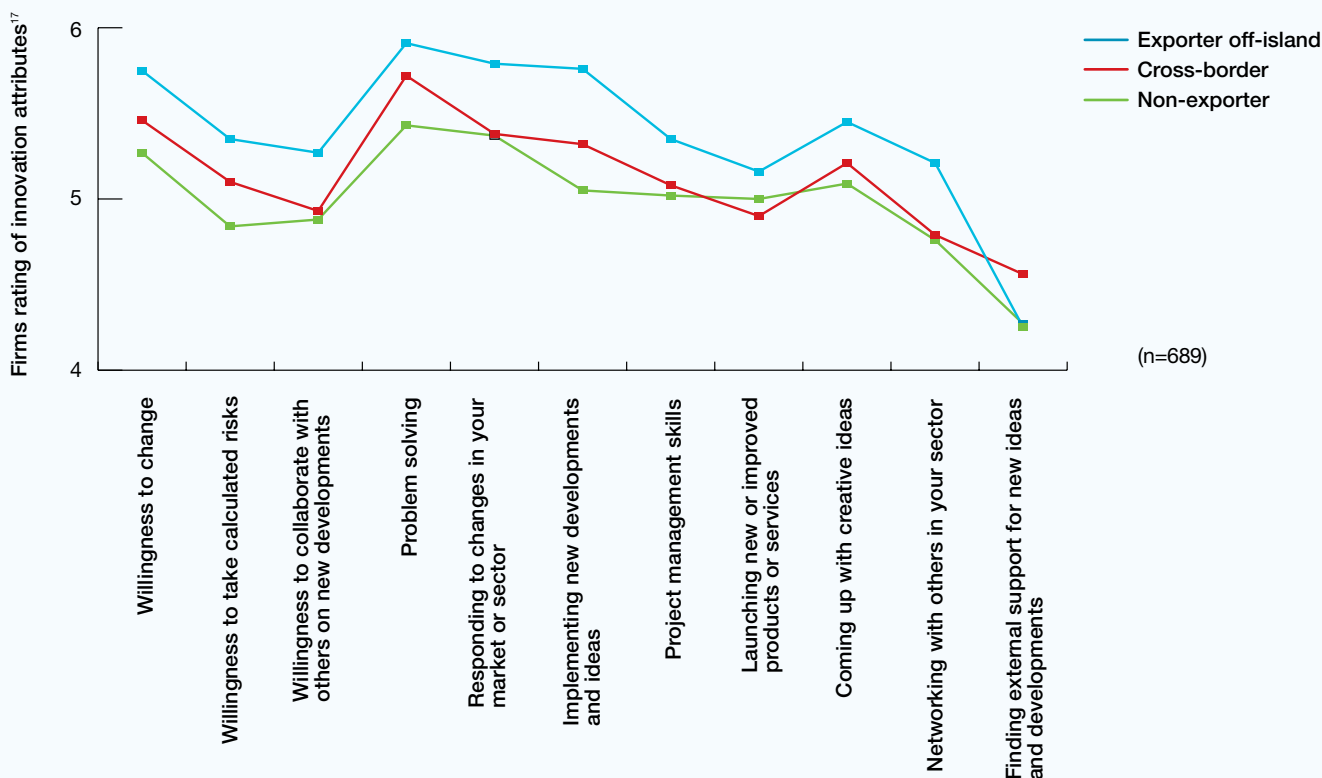
Figure 8: Possession of innovation resources by past innovators



There were no significant differences found in leadership for innovation, culture and capabilities between past innovators in Ireland and in Northern Ireland. However, larger firms were significantly more likely than small firms to have assigned high ratings to their capabilities

across most of the measures, in particular (a) coming up with good creative ideas, (b) responding to changes in their market or sector, (c) finding external support for new developments, and (d) networking with others in their sector.

Figure 9: Self-rated innovation attributes of innovation active businesses, by export orientation



Source: InterTradeIreland Business Monitor (2011).

¹⁷ The scorings come from a scale of 1 (for 'Extremely poor') to 7 (for 'Excellent').

Sectorally, service sector companies rated their capabilities more highly than did those in the agriculture, construction or manufacturing sectors in relation to (a) finding external support for new developments and ideas, (b) networking with others, and (c) launching new or improved products or services.

Looking at the survey results by export orientation, it shows that firms who export off the island regard themselves in a better light than firms who trade cross-border or within their own domestic market. The different types of firms are consistent in their ranking of the various capabilities with one significant exception (finding external support for new ideas and developments). In this area, the most internationalised firms somewhat surprisingly rate themselves worse than cross-border traders and equal to non-exporters.

On the resource issue, there is the unsurprising finding among past innovators that large firms tend to possess much more dedicated sales and marketing and R&D staff than their smaller counterparts. The same holds for firms who export off the island or trade cross-border when compared to domestically-focused firms. With regard to dedicated budgets for new developments more than twice as many large firms (69%) as small firms (31%) have these, although here there is no difference between exporters and domestically-focused firms.

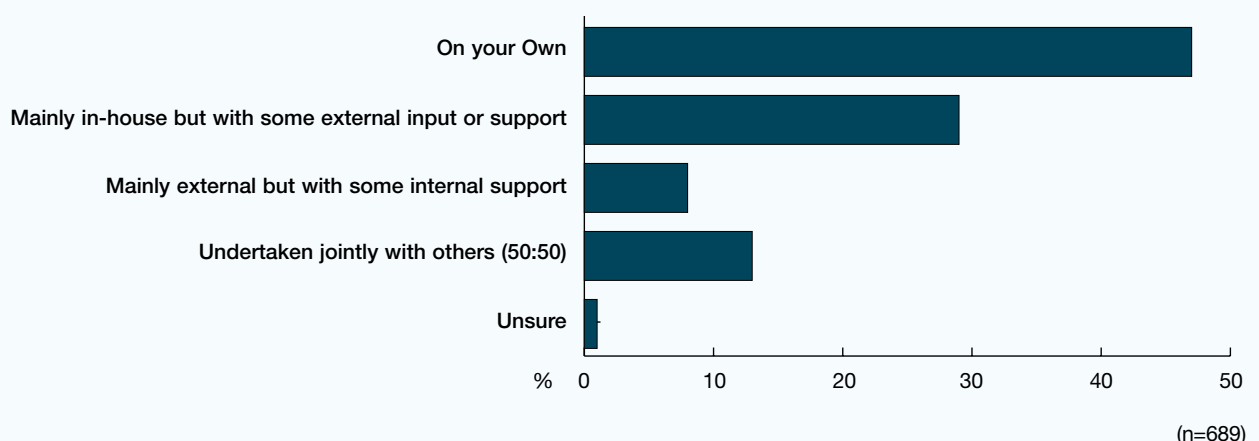
3.2.3 External connections

Sourcing expertise outside the company, particularly to support the identification of ideas and opportunities is not unusual, even in traditional innovation processes. However, in the modern open view of innovation, one would expect to see a greater level of collaboration within the entire 'end-to-end' of the innovation process. The survey revealed (see Figure 10) that just under half of past innovators (47%) innovate by leveraging external resources and supports and that they do so, at some stage, within the broad phases of the innovation process: idea generation, development and launch/commercialisation. Of these, most use a combination of in-house and occasional external resources, while a small minority of firms innovate jointly with external partners or rely mainly on external resources with some internal input.

Moving below the overall responses the following findings emerge:

- Innovative firms in Ireland were slightly more inclined to work on their own than those in Northern Ireland.
- Large firms (55%) were more likely to have an open approach and use external resources than smaller firms (36%).
- Off-island exporters (58%) were slightly more likely to have an open approach than cross-border traders (53%) and much more so than non-exporters (31%).
- Services firms were more likely than firms in the other sectors to use some external input while fewer construction businesses use external support than in the other sectors.

Figure 10: Use of formal external supports for innovation by innovation-active businesses



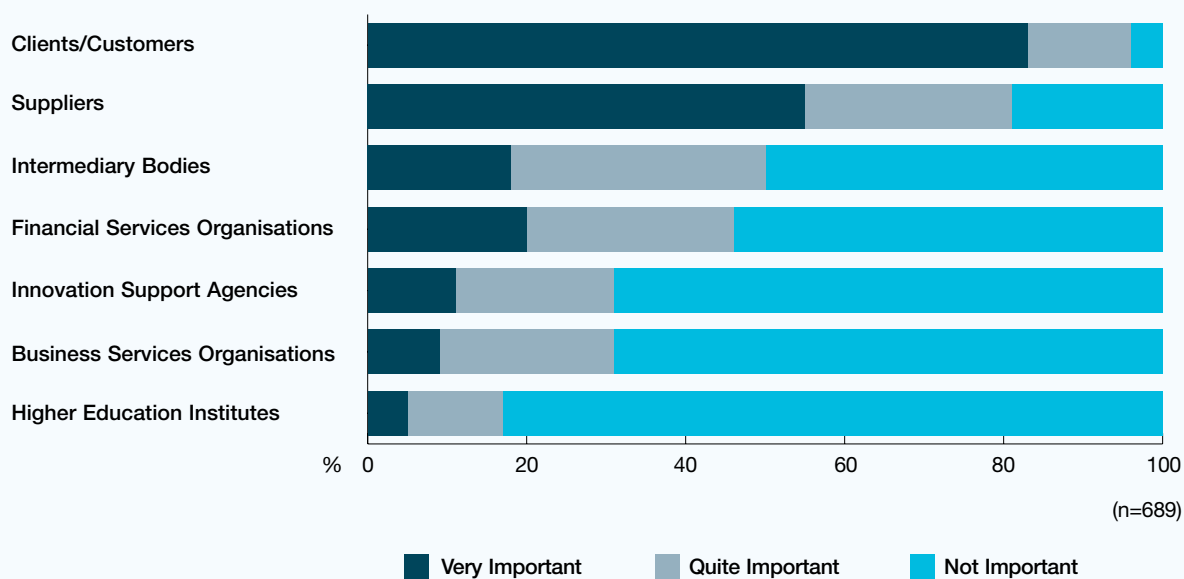
Source: InterTradelreland Business Monitor (2011).

3.2.4 Innovation partners: importance, effectiveness and location

The importance and effectiveness of the various innovation partners was also captured in the survey. While less than half of firms declared that they rely on their own internal resources, it is difficult to envisage that these firms are not at least engaging with their customers and supply chain in an informal manner. Hence, past innovators (i.e. those with an open approach and those with an in-house only approach to innovation) were asked to rank the importance of external partners to their innovation process.

Majorities regarded the following partners as most important: clients/customers (83%) and suppliers (56%). A distant third are intermediary bodies and providers of finance. Innovation support agencies, business services organisations and higher education institutes emerged as the least important partners, with over 80% of respondents indicating that public research organisations were not important.

Figure 11: Ranking of the importance of external partners by innovative businesses



Source: InterTradelreland Business Monitor (2011).

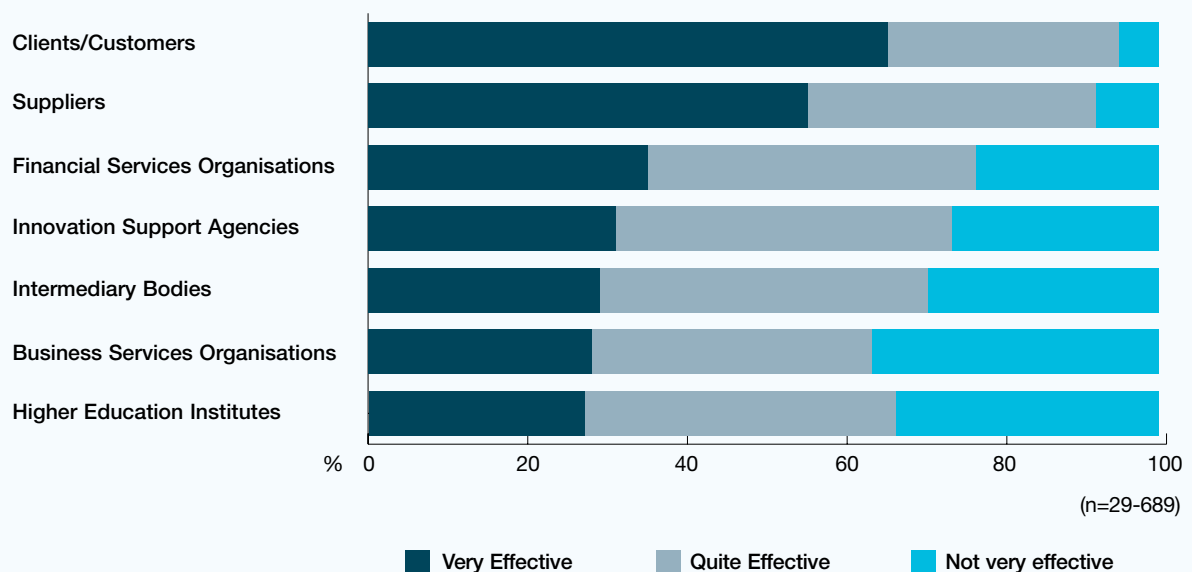
The same ranking of importance was evident for different sub groups of past innovators (i.e. large and small firms, exporters and non exporters and sectoral firms). However, there were some differences in the reported importance of external partners:

- Larger companies are significantly more likely to state that their relationships with parties outside their immediate value chain are very important to their internal innovation activities, whether that was intermediary bodies or higher education institutes.
- However, the level of internationalisation makes little difference when it comes to the importance of external connections for past innovators. The only exception is that exporters off the island see innovation support agencies and business services organisations as slightly more important than cross-border traders or non-exporters.
- Sectorally, construction firms believed suppliers were a more important innovation partner than other sectors while services companies make relatively greater use of industry associations and networks. Manufacturing and agriculture businesses rate innovation support agencies and higher education institutes as being more important innovation partners than do other sectors.

- Innovative firms in Northern Ireland placed slightly more importance on a number of external partners, particularly financial services organisations, innovation support agencies and intermediary bodies.

Turning to the question of effectiveness of key innovation partners, Figure 12 shows that a majority of firms rated the various partners as very effective or quite effective. As before, the highest ranking is reserved for those partners within a firm's value chain (customers or suppliers). Three significant differences appear when comparing rankings by importance and effectiveness. Businesses regarded business services organisations as not very important but relatively more effective innovation partners, while financial services organisations and intermediary bodies were seen as important but relatively less effective.

Figure 12: Ranking of the effectiveness of external partners by innovative businesses



Source: InterTradeIreland Business Monitor (2011).

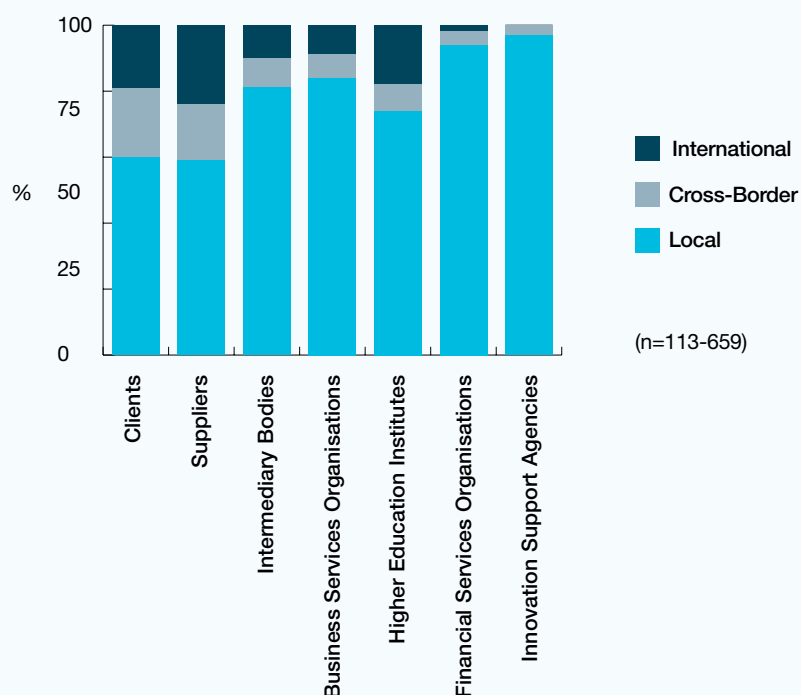
The same ranking of effectiveness was evident for different sub groups of past innovators (i.e. large and small firms, exporters and non-exporters and sectoral firms). However, there were some differences in the reported effectiveness of external partners:

- Large firms regard higher education institutes and financial services organisations as more effective than small firms.
- When it comes to export orientation, exporters off the island consider banks, public research organisations and innovation support agencies as less effective innovation partners. Businesses trading cross-border were more complimentary about the effectiveness of business services organisations, suppliers and innovation support agencies.
- Service sector firms were more likely than those in agriculture, construction and manufacturing (combined) to rate their clients and customers as 'very effective' at supporting their innovations.
- Firms in Ireland and Northern Ireland have the same outlook on the effectiveness of their innovation partners.

Finally, where firms regarded any of their innovation partners as important, they were asked about the location of these. This highlights that:

- Almost a fifth (19%) of past innovators are working with cross-border innovation partners. These relationships are focused heavily on clients/customers and suppliers, with collaboration generally much less widespread for other partners.
- Almost a quarter (24%) of past innovators have international partners. Overall, international partnerships are more widely reported than cross-border ones for links with suppliers, higher education institutes, intermediaries and business services.

Figure 13: Location of external partners of innovative businesses



Source: InterTradeIreland Business Monitor (2011).

3.3 Conclusions

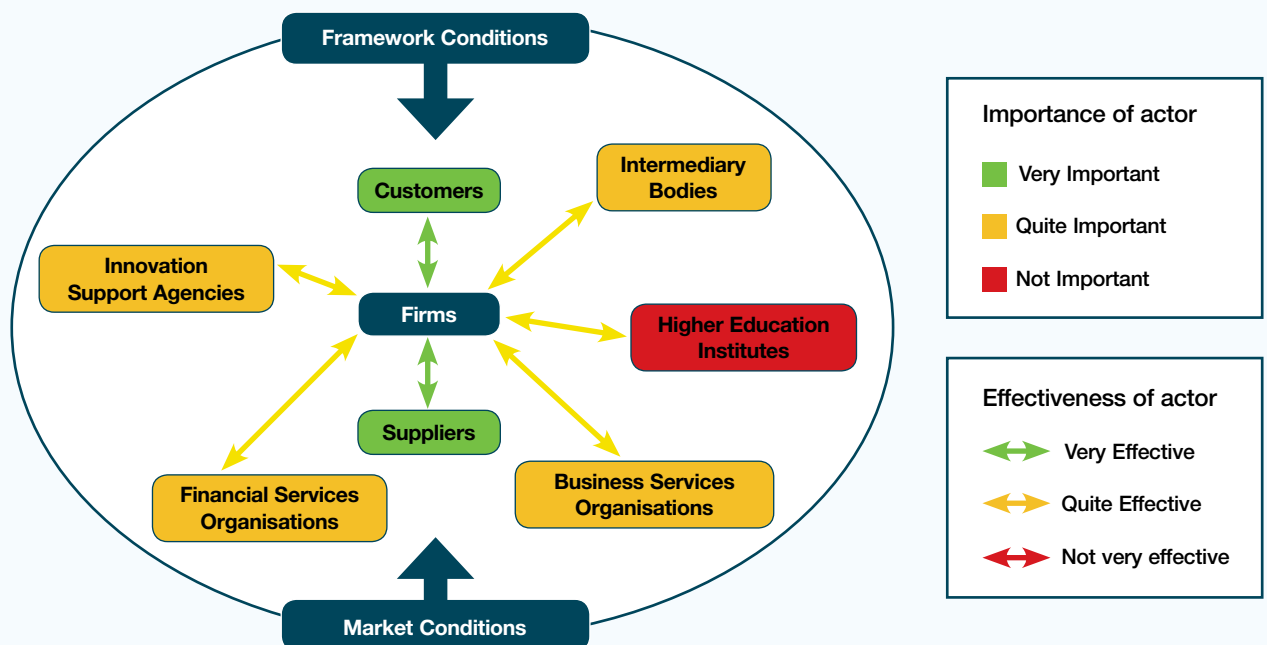
The findings from the business survey on the importance and effectiveness of ecosystem actors as innovation partners have been compiled to produce a RAG analysis.¹⁸ Using the generic model of an innovation ecosystem, as shown in Figure 1, this serves to provide a schematic view of how the innovation ecosystem is regarded by business.

The RAG analysis for all past innovators (Figure 14) indicates the significant importance and effectiveness of customers and suppliers. Intermediary bodies, financial services organisations, business services organisations and innovation agencies are deemed moderately important and quite effective.

A notable aspect of the ecosystem is the view held by firms that higher education institutes are not so important in the working of their ecosystem. The survey did not permit qualifying comments so it is unclear whether firms were considering the role of higher education institutes in relation to a particular contribution to innovation or at a more holistic level. Nonetheless it should be noted that higher education institutes contribute to innovation in a number of ways: educating a skilled workforce; performing research that government and industry commission; and making research discoveries that, through the processes of technology transfer, can be put to work by the private sector.

All of these contributions have the potential to positively impact the innovation performance of firms. While higher education institutes are making strides to reach out and engage with business and the wider community, there is clearly a perception issue among firms which are less than positive about the role performed by higher education institutes in the wider ecosystem.

Figure 14: RAG analysis of innovation ecosystem – all past innovators



¹⁸ The RAG (Red-Amber-Green) diagrams involve assigning a Likert scale of 1-3 to the answers from 'not important' to 'very important'. The aggregate scores were then ranked with 'not important' being <1.3; 'quite important' 1.3-2.3 and 'very important' >2.3.

A separate analysis (Figure 15) of firms with more than 50 employees (described as large firms in the report) indicates a more positive view in relation to the importance of intermediary bodies and higher education institutes.

However, business services organisations are regarded as less important and less effective while higher education institutes and financial services organisations are also reported as less effective.

Figure 15: Rag analysis of innovation ecosystem – large firms

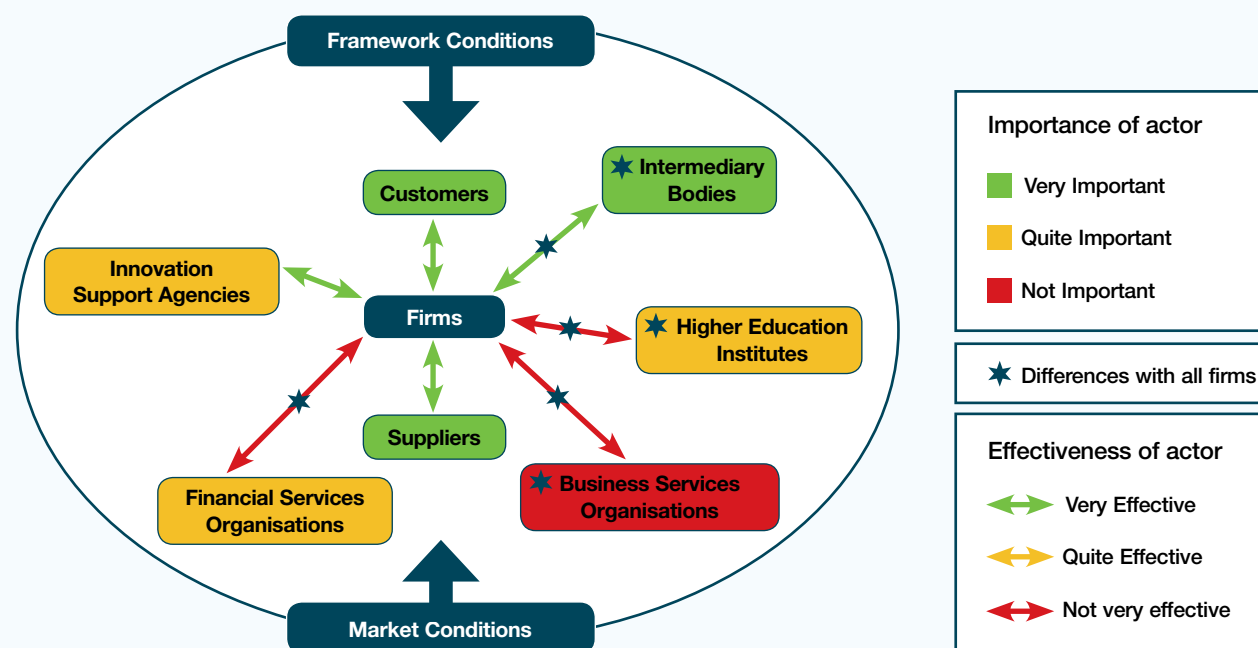


Figure 14 on page 21 indicates the firms' view of an innovation ecosystem that operates quite effectively and has all the constituent parts required to enable an innovation- and entrepreneur-based economy in place, albeit with different degrees of importance. However it is also clear that improvements can be made in the performance of the overall ecosystem.

Increasing the relevance of and linkages to the other innovation partners could be expected to enhance the overall effectiveness of the ecosystem, leading to increased innovation activity and subsequent competitive gains.

A notable opportunity for this is to foster a better understanding amongst small firms of how higher education institutes can contribute to supporting innovation. A further opportunity exists to explore how business services organisations can support innovation in small firms. While there is limited data to benchmark their contribution, InterTradelreland research from 2009, on the design services sector on the island, suggested

that such services were under-utilised both because of lack of design companies (the sector is approximately one third the relative size of the UK's) and also a lack of understanding of the application and benefits of such services.

Another aspect of increasing the effectiveness of the innovation ecosystem is a need to develop and enhance internal firm capabilities and culture. These are important precursors of a firm's ability to benefit from the external knowledge and resources provided by the innovation ecosystem. An investigation of the characteristics of innovative firms in the survey indicates that while the majority possess an ambition for growth, there are deficiencies in innovation leadership, culture and capabilities. There is a cultural weakness in collaborating with others and consistent with this is the finding that the lowest ranked capabilities are networking with others in the same sector and finding external support for new ideas and developments. This should be a concern for policy makers given the numerous bodies and incentives available to support collaboration and networking.

4. Report Findings and Conclusions

Innovation and exporting are vitally important activities for the growth of firms.

The findings of the survey reinforce the view that innovation activity and firm growth are linked. The survey also shows the link between export orientation and firm growth as more international exporters (19%) and cross-border traders (15%) reported themselves in a growing or expansion mode than businesses focused on the domestic market (9%).

Export success and innovative activity are linked.

The survey also shows how firms who export off the island have a higher level of innovation activity than either cross-border traders or firms who focus on the domestic market. Exporters do more of each type of innovative activity, particularly new/improved products and services, packaging and marketing methods. This is consistent with a more discerning international marketplace. The profile of innovative activity for cross-border traders indicates a progressive step up from operating solely in the domestic market, a pay-off that may be explained by accessing diverse knowledge inputs outside a local area.

Innovative activity can be found across all sizes of firms and sectors on the island and innovation supports should reflect this.

The survey provides the positive finding that all types of innovative activities are practised by firms of all sizes and in all sectors. This is an important conclusion showing that there is an audience for innovation policies and supports beyond those firms who are normally targeted by agencies. Within this general picture large firms (>50 employees) were more likely than small firms (<50 employees) to be more active across all types of innovation covered by the survey. Also firms operating in service sectors were significantly more likely than firms in agriculture, construction and manufacturing combined to have innovated around (a) products and services; (b) packaging or branding; (c) marketing methods, routes to market or markets; and (d) organisational structures.

Under half of firms have an open approach to innovation and there is significant scope for promoting the benefits of open innovation, particularly to small and domestically focussed firms.

The survey shows that just under half of past innovators are using external resources and supports to assist their innovation activity. The remainder are not formally leveraging external resources although it is difficult to envisage that these businesses are not at least engaging with their customers and supply chain in an informal manner. It is clear from analysis of the survey results that there are differences between small and large firms in the way they regard the innovation ecosystem.

The ecosystem is used narrowly with the most valued relationships being those with value chain partners.

The survey found that the majority of innovative firms placed most importance and valued the effectiveness of their connections with clients/customers and suppliers, partners within their own value chains. Other innovation partners, such as higher education institutes, financial service organisations, innovation support agencies or intermediary bodies, are regarded as less important and effective partners. Failing to leverage the full scope of the ecosystem may be putting firms at a competitive disadvantage.

Foster better understanding of the role higher education institutes can play in supporting innovation in small companies.

Despite the fact that higher education institutes provide a skilled and talented workforce perform research that government and industry commission and make research discoveries that through the process of technology transfer can be put to work by the private sector, it is interesting to note the view of business that linkages with higher education institutes are not important in their view of the ecosystem. Given the potential for their positive contribution to firm innovation it is worth exploring further the disconnect that exists between firms and higher education institutes.

The use of cross-border and international partners is limited.

Just under a fifth (19%) of innovative firms are working with cross-border innovation partners and under a quarter (24%) with international partners. These relationships are focused heavily on clients/customers and suppliers, with collaboration generally much less widespread for other partners.

Deficiencies exist in firms innovation leadership, culture and capabilities and supports should be focussed on addressing this.

While over two thirds of innovative firms have an ambition for growth, those who have a formal process in place to manage development in the business are in shorter supply. The lack of a formal, managed process to support innovation may mean that firms' plans for innovation are inextricably linked with the owner-manager or they are left relying on 'brainstorming' for new ideas and concepts. While this approach may be suitable for idea generation it does not offer a step-by-step approach to actually engaging employees generating and managing innovation.

A culture that supports innovation can be fostered through a risk-taking attitude and an encouragement for openness and collaboration across different internal teams and external partners. Almost 60% of firms regard themselves as excellent or very good in terms of their willingness to change but this dropped to just over 40% for willingness to take calculated risks and willingness to collaborate with others on new developments.

Taken together, these findings suggest a need to develop and institutionalise a culture and set of processes that support the development of internal innovation management capabilities.

A more positive picture emerges for firms' views on their capabilities, particularly in relation to problem solving and responding to market changes. However, consistent with the cultural weakness in collaboration with others, the lowest ranked capabilities are networking with others in the same sector and finding external support for new ideas and developments. This should be a concern for policy makers given the numerous bodies and incentives available to support collaboration and networking.



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