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GEOSCIENCE IRELAND
The Formation and Maintenance of a Successful Business Cluster
May 2020

Geological Survey Ireland Report

GEOSCIENCE IRELAND
Exploring
Developing
Sustaining

Geological Survey Ireland is a division of the Department of Communications, Climate Action &Environment

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Minister’s Foreword

I am very pleased to introduce this ground breaking research by Geological Survey Ireland on the formation and maintenance of a successful business cluster as exemplified by Geoscience Ireland. The economic challenges facing Ireland a decade ago were severe. A particular sectoral response was the launch of Geoscience Ireland, designed to offer companies opportunities to collaborate in winning international business. The Geoscience Ireland business network now comprises 40 companies providing design and contracting services in over 70 countries. In 2019 the cluster employed 4,650 persons (2,816 of which are employed by SMEs). In 2018, the companies between them generated revenues of € 1.06Bn; export related goods and services accounted for €360M.

While the Covid19 pandemic has already and will further impact heavily on the sector, I am confident that the Geoscience Ireland initiative managed by Geological Survey Ireland and supported by Enterprise Ireland and the Department of Foreign Affairs will continue to offer support and resources to its member companies.

I am also pleased to note that it is hoped to build on this study of the success of Geoscience Ireland by the creation of additional, more detailed guidance documents on the dynamics and operation of business clusters

The geoscience sector provides high value skilled jobs which are regionally dispersed and sustainable. A strong geoscience sector is essential for the provision of essential infrastructure and for climate actions needed by societies everywhere. I wish Geoscience Ireland continued success in its endeavours in fulfilling those tasks.

Seán Canney TD

Minister for Natural Resources

Introduction

Geological Surveys are, as their name suggests, more normally engaged with projects such as mapping and monitoring, and in our own case, major initiatives such as marine mapping for INFOMAR and national programmes such as Tellus. However the global economic crisis of 2008/2009 and its manifestation in the Irish economic downturn, led to a challenge to see how Geological Survey Ireland might assist in national recovery. I am particularly proud that this led to the creation of Geoscience Ireland, which has proved to be an effective and enduring resource in supporting Irish companies to develop and grow their businesses by expanding into international markets.

While the catalyst for the formation of GI was the severe impacts on infrastructure and construction sectors, the initial impetus for Geoscience Ireland was provided in 2010 by my predecessor as Director of the Survey, Dr Peadar McArdle, and by two senior executives in Enterprise Ireland, Dr Paul Butler and Neil Kerrigan. They brought together a group representing the wider Geoscience Sector, and from this came the nucleus of a business cluster, with five volunteer reference companies. The concept was to develop an identity that could then represent the individual companies. Initial marketing and branding advice was provided by Neary Marketing & Communications. I am pleased that four of the five initial reference companies involved are still strong members and supporters of GI. The strong and continuing supports of the Geological Survey's parent, the Department of Communications, Climate Action and Environment and of its successive Ministers have underpinned the success of Geoscience Ireland.

This document is a cumulative effort by several participants whose work I gratefully acknowledge. It was inspired initially by Professor Dermot Duff of TCD Business School, lead author of the Geoscience Ireland Strategic Review 2018-2022, published in late 2018. Geoscience Ireland personnel (led by Andrew Gaynor and Sean Finlay and supported by Stephen Walsh, Jessica Allen and Dr Clare Glanville), developed this document into an easy to follow "How To" guide for business cluster formation and maintenance.

There were many lessons learned from the development of Geoscience Ireland; building trust between competing companies; extending the collaboration between government, state agencies and the private sector; strong political and administrative support and the rigorous pursuit of opportunities by providing accurate market intelligence and contacts are among the skills and competencies grown in Geoscience Ireland.

Not listed here, are the many ancillary benefits for the wider operation of Geological Survey Ireland that have flowed from the creation of the business cluster. These range from engagement with Irish geoscience companies who would not be our normal clients, but have much to teach us, to exposure to latest technology and industry practice. The GI companies have provided a ready industry group to engage with on many diverse topics, from research to outreach. A very real benefit has also come from having the industry focussed GI team within our building and contributing to our daily discussions and thinking. Another unintended consequence is the strong new bonds and useful contacts we have been able to form with sister Departments and other agencies such as Enterprise Ireland, Department of Foreign Affairs and Trade and Department of Business Enterprise and Innovation that we might not otherwise have been engaged with.

This document captures many of the GI development these experiences to date, which we also hope can be transferred to other sectors and to inform the further development of cluster policy in Ireland.

Koen Verbruggen

Director, Geological Survey Ireland

Acronyms

AfDB	African Development Bank
AICC	Arab Irish Chamber of Commerce
BICC	British Irish Chamber of Commerce.
COSME	The EU programme for the Competitiveness of Small and Medium-Sized Enterprises. This is within the mandate of **EASME**: Executive Agency for SMEs
DBEI	Department Business, Enterprise and Innovation
DCCAE	Department of Communications, Climate Action and Environment
DCU	Dublin City University
DFAT	Department Foreign Affairs and Trade
EBRD	European Bank for Reconstruction and Development
EI	Enterprise Ireland
EIB	European Investment Bank
FICC	French Irish Chamber of Commerce
GCC	shorthand for Arabian Gulf: the Gulf Cooperation Council
GEE	Geo-Energy Europe (GI's COSME project)
GI	Geoscience Ireland
GIPH	Geoscience Ireland Procurement Hub
GSI	Geological Survey Ireland
ICBA	Irish Canada Business Association
IBV	Inward Buyers Visit
IEA	Irish Exporters Association
IFI	International Financial Institutions
IMQS	Irish Mining and Quarrying Society
ITC	Institution of Technology Carlow
MSV	Market Study Visit
TCD	Trinity College Dublin
TM	Trade Mission
WB	World Bank

1.Overview

The purpose of this document is to outline the factors which influence the successful formation and maintenance of a business development cluster. The factors contained within this paper have been developed on foot of a comprehensive examination of the Geoscience Ireland cluster, a government backed initiative in the Irish geoscience sector.

While there are many variations of the term, a cluster in the sense meant here may be understood using the European Commission[1] definition:

> *"Clusters are groups of specialised enterprises – often SMEs [Small and Medium sized Enterprises] – and other related supporting actors that cooperate closely together in a particular location. In working together SMEs can be more innovative, create more jobs and register more international trademarks and patents than they would alone."*

For SMEs to remain competitive they must offer innovative solutions (product or service) which will allow them to compete with, or rise above, the competition. To enable such innovation the company may engage with the research and development community or seek to have their commercial endeavours supported by government policies and frameworks which, indeed, are designed at supporting the sector in question. Clustering is therefore an instrument or tool employed as part of a wider government policy whether it be location based or sector specific: cyber-security, food, aviation or geoscience, or to enable broader agendas such as job growth, export growth or smart specialisation.

Successful clustering involves close cooperation, unified teamwork and policy alignment: the various actors must cooperate effectively to achieve the common goal, namely high-calibre sustainable employment and sectoral development.

Clusters can generally be identified as 'bottom-up' or 'top-down'; the former may come as an industry response to an immediate problem impacting a sector while 'top-down' would refer to a broader government strategy or policy such as smart specialisation or regional development and sectors can row in thereafter. GI's creation might be considered 'top-down' as the initiative was created through collaboration between GSI and EI with a strong focus on assisting companies in export markets; this collaboration has grown to include DFAT and DBEI and now comprises 40 companies (from five in 2012).

[1] 2019 EC; https://ec.europa.eu/growth/industry/policy/cluster_en

The *raison d'etre* for formation of GI was to get companies to collaborate together to win work overseas, thus ensuring their survival and growth and hopefully job creation as they expanded. However the successful evolution of GI has also led to a greater understanding and recognition of geoscience by government as a fundamental element of economic and social development. GI's activities have led to continuous engagement by GSI and DCCAE with other government departments (DBEI, DFAT and DoF) together with involvement with Enterprise Ireland at local and international level. This has led to geoscience being included in government policy to a greater extent as evidenced by the Action Plan for Jobs (2018[2]), the Economic Review of the Irish Geoscience Sector (2017[3]) and current Sectoral Review, and Future Jobs policy by DBEI.

This document will describe the situation in which Geoscience Ireland was born (the formation phase) and activities the allowed the cluster to evolve thereafter (the maintenance phase). While this document was commenced in 2019, its relevance is greater than ever in the light of the COVID19 crisis.

[2] https://dbei.gov.ie/en/Publications/Action-Plan-for-Jobs-2018.html
[3] https://www.gsi.ie/en-ie/publications/Pages/An-Economic-Review-of-the-Irish-Geoscience-Sector.aspx

Geoscience Ireland: A Cluster Evolution

*Geoscience Ireland is a business development cluster of companies **brought together in response to the economic crisis of 2009**. Geological Survey Ireland and Enterprise Ireland initially met with a range of participants from the Irish Geoscience sector. These included large and small companies, research institutions, representative bodies and state agencies. Arising from these initial meetings the two sponsoring bodies (GSI & EI) brought together a reference group of five companies, delivering geoscience advisory services to infrastructure and extractive industries, in 2010, in an effort to arrest the resulting acute job losses in the sector.*

*In order to save and create valuable and skilled jobs, **it was clear that geoscience skills developed in the Irish market needed to be sold more effectively into international markets**. Growth of overseas markets allows for greater resilience and increased scale for Irish companies. It was also clear that collaboration between Irish SMEs was essential in order to have greater success in winning large international contracts. In order to foster and develop this collaboration, GI was resourced to assist businesses in winning work overseas with the appointment of a full time Business Development Director based in GSI in 2012.*

***GI engaged Neary Marketing & Communications which assessed the skills of companies, establish routes to markets and, importantly, addressed how to build trust between the companies** who would jointly identify and bid on commercial projects, share market knowledge and leverage each other's networks. GI moved to establish a quarterly workshop which has proven to be a key calendar event and allows for networking between members and an opportunity for members to provide updates on recent and proposed projects thus allowing other members to propose collaboration or provide insights. (see Workshop on pg. 18)*

*Since 2012, the target markets and sectors have widened considerably to include commercial projects in over 70 countries. **Membership has expanded from 5 to 40 companies in 2020 and now includes contractors and the Irish offices of large international consultancies**. GI now has a full time team of 4 persons.*

*In 2017, GSI commissioned Indecon Economic Consultants to provide "an Economic Review of the Irish Geoscience Sector"; Indecon valued the rebounding sector as having a €3,277 million overall worth to Ireland and total overall employment reaching nearly 25,000 persons. **As the geoscience sector recovered between 2012 and 2019, the challenges facing industry have changed**.*

Skills shortages and the low numbers of students choosing third-level science and engineering disciplines in the early 2010's is restricting growth of the sector.

Since the first meeting in 2010, GI's achievements over the past decade include:

- *Developed the Geoscience Ireland **brand and presence** to market the services of all the cluster members.*
- *Developed a **website** containing details of operation and supports and case studies of successful projects developed by the members overseas.*
- *Developed an **"Independent Panel of Experts"** for individual consultants to offer niche services to the GI Member companies.*
- *Successful **engagement with DFAT and its Embassy Network**, including DFAT joining the steering committee in 2014.*
- *Since 2015, GI consolidated Ireland's commercial offer at the world's largest mining show: the PDAC Convention in Toronto. GI delivers a **business forum** annually which attracts over 130 delegates and, in 2020, assisted in the delivery of the **'Industry and Innovation' pavilion**.*
- *Sponsors the annual **Geoscience Ireland Excellence Award with Engineers Ireland** since 2015. The Award provides a platform for companies to showcase their skills and achievements and has raised the profile of geoscience in the engineering profession.*
- *Completion of **EI's M4G 'Management for Growth'** training course at DCU Business School by key personnel, including working up next steps and development plan for GI in 2015/ 16.*
- *Established links with research and participation in **iCRAG** (the Irish Centre for Research in Applied Geosciences is a national research program launched by **Science Foundation Ireland** in 2015); GI supports the Technical Advisory Committee on Geotechnical Research and the Industry Advisory Committee.*
- *Development of relationship with TCD Business School and **completion of MBA Scoping Project** on GI by MBA Students, including growth plan in 2016.*
- *Successful **engagement at high level with DBEI** particularly in relation to jobs initiatives such as **Action Plan for Jobs in 2018** and more recently **Innovation2020**. DBEI joined the steering committee in 2017.*
- *In 2018, developed the **Geoscience Ireland Procurement Hub** (GIPH) for its members.*

- *In 2018, GI partnered with a meta-cluster of European geoscience and geothermal clusters and organisations to deliver a European Commission-funded project focussed on assisting European SMEs in accessing the global geothermal value chain. GI will lead the second phase of the* ***Geo Energy Europe*** *project in late 2020.*
- *Achieved "****Cluster Management Excellence Label BRONZE – Striving for Cluster Excellence****" in 2019. The accreditation is supported by DG Enterprise and Industry (DG Growth) of the European Commission.*
- *Successfully lead the establishment of an apprenticeship focus on Ireland's drilling sector which commenced in January 2020 in IT Carlow in collaboration with industry and GSI. The* ***Geo Driller Apprenticeship*** *is the first of its kind to be focussed on the geoscience sector in Ireland.*
- *Represented the companies on* ***over 20 overseas market visits*** *and* ***over 40 conferences and trade events****.*
- *Assisted in identifying contracts for several members and supported bids thereafter in terms of connecting members with collaborators and in-market stakeholders, notably PW Mining and QME in* ***West Africa****, SLR Consulting and LTMS in* ***Mozambique****, GDG in* ***Guatemala****, PW Mining and FLI Group in* ***West Africa****, APEX and Nicholas O'Dwyer in* ***Malawi****, BRG with both APEX and Priority Drilling in* ***the UK****, IE Consulting with Fehily Timoney in* ***the GCC;*** *ByrneLooby and LTMS in* ***Saudi Arabia****.*
- *Establishing relationships with* ***key trade networks*** *including Chambers of Commerce (BICC, FICC, AICC and the ICBA), the Construction Industry Federation, the Irish Exporters Association and NOF (a key UK energy network).*
- ***Successful engagement with International Financial Institutions*** *and multi-lateral donor agencies including the World Bank, the African Development Bank, the Asian Development Bank, the European Investment Bank, the UN, the EUDP and the EBRD.*
- ***Acceptance as a significant capital project and investment for DCCAE;*** *GI's Key Performance Indicators of cluster member numbers, net jobs created, changes in overseas turnover are reported to Department of Finance annually, and GI's inclusion in the government budget estimates process.*
- *GI is the '****go-to agency'*** *for its members when reviewing export markets.*
- *Assisted its member companies in creating* ***1,251 net new jobs*** *since 2012 up to end-2019.*

2.Situation Analysis: Geoscience Ireland

Uncertainty is always a feature of commerce; current uncertainties and threats, at time of writing in 2020, include COVID 19, Brexit, international trade disputes and the cyclical nature of commodities and oil and gas markets which all impact investment decisions, trade and customs norms, and currency and financing costs. Coupled with the profound human impact of COVID 19, the economic effect is expected to be considerable with the immediate cessation of some commercial activities and the expected readjustment of national budgets; such measures will delay investment decisions and will see a reprioritisation of resources.

The European Commission, in November 2019, noted the European economy looked to be heading towards a protracted period of more subdued growth and muted inflation[4] while it forecasted Irish growth in 2020 and 2021 to slowdown from 5.6 % to 3.5 % and 3.2 % respectively (assuming a soft-Brexit). Fast forward to the COVID crisis and all predictions are being dramatically revised downwards.

The rebound of Ireland's construction sector and increasing investment in mineral exploration since the economic crisis post-2009 have indeed brought about significant employment growth in these recently beleaguered sectors. However, the construction sector now faces competition from overseas companies which are targeting Ireland's high value construction tenders and major infrastructure developments. Globally, the *Fitch Outlook*[5] on global mining maintain a bearish outlook on metal prices for 2020 in the face of trade tensions and a weak demand; it forecasts a weakening price for most metals as macro risks feed into poor sentiment for commodities.

Ireland, and its export agencies, must maintain its pragmatism in supporting its indigenous companies in winning business overseas. There is indeed a supply and pipeline of commercial opportunities in global markets, which is open to global competition and collaboration. This is a cost-effective way of entering new markets and competing contemporaries and super-consultancies.

International Financial Institutions (IFIs) remain practical and low-risk funders and financiers of commercial projects. Between 2015 and 2019, the World Bank spent €58 billion on contract awards while in 2018 alone the European Bank for Reconstruction and Development (EBRD) invested €9.5 billion in projects.

4 https://www.irishtimes.com/business/economy/commission-flags-slowdown-in-irish-economy-1.4075451
5 https://www.fitchratings.com/site/re/10103761

Today, the member companies comprising GI are faced with these macro issues as well as more immediate issues such as shortages in skilled labour and attracting new entrants to the industry. The Construction Industry Federation underlined this issue in a report (CIF, 2020[6]) which focussed on rising salaries in the sector with strong demand for professions creating competition for talent.

A business cluster that was developed to respond to an economic crash in 2010, and was adjusting to full employment challenges by 2020, is already in place to assist members as this latest COVID induced economic crisis unfolds.

6 https://cif.ie/2020/01/14/salaries-in-construction-sector-continue-to-rise-with-strong-demand-for-professions-creating-competition-for-talent/

3.Setting Up and Maintaining a Cluster: 10 Steps

1.Foundation

It is essential that Government should find and commit the resources to support the basic foundations for economic growth required by any cluster. In this regard, the Government, and especially the participating Departments have performed well. Geological Survey Ireland (a division of the Department of Communications, Climate Action and Environment) is the chief sponsor of the cluster while the Departments of Foreign Affairs & Trade and Business, Enterprise & Innovation, and Enterprise Ireland provide unique access to their global footprint, resources, skills and networks, from a commercial and diplomatic point of view.

2.Structures and Governance

A cluster exists in order to achieve a defined goal. GI's mission statement is to help its companies to win business overseas, thus ensuring their growth and resultant employment. The structure of the cluster has evolved to deliver on this goal in practice. Geoscience Ireland's staff of industry experts and business development professionals operates within a structure that draws on their knowledge and proficiencies, thereby **leveraging the resources available under the national 'Team Ireland' or 'Ireland Inc.' banner.**

GI is governed by a Steering Committee drawn from four of its member companies representing different subsectors of the geoscience industry, and representatives from DCCAE, GSI, EI, DBEI, DFAT and TCD Business School. The Chair is the Assistant Secretary for Natural Resources at DCCAE. Commercial confidentiality of companies' information is central to the operation of the cluster, as is a focus on encouraging collaboration and cooperation wherever possible.

3.Trust Building

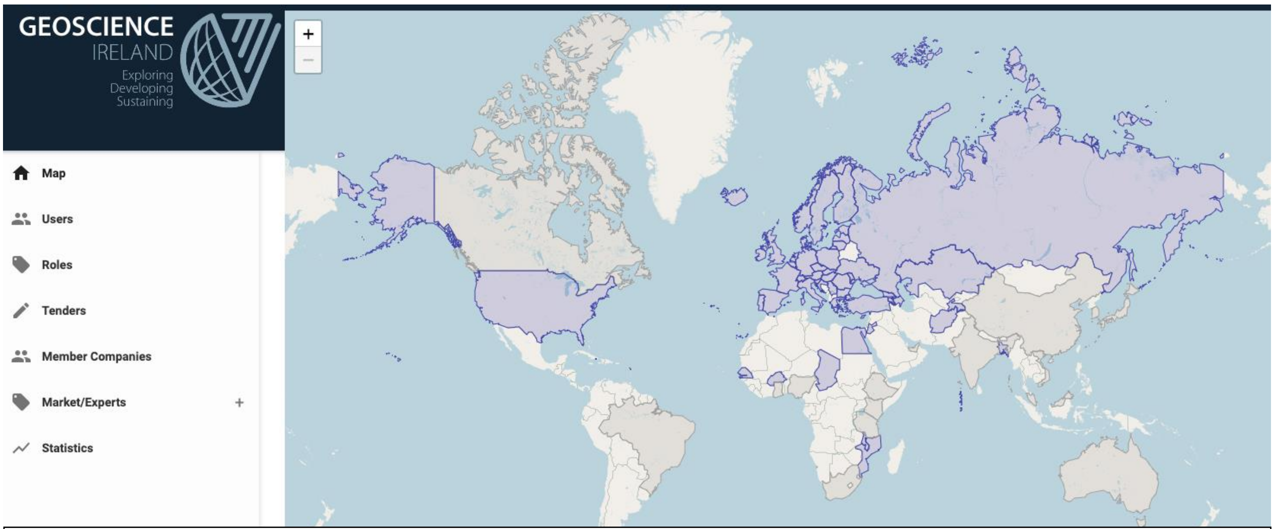
Trust building is a critical element for a cluster to succeed and this was outlined to GI in its formation by EI's Senior Market Advisor, Kelly Spillane, who had completed an MBA on commercial collaboration. Developing collaboration between GI members is fundamentally a matter of trust. Almost every GI member has competitors within the network. EI's Management for Growth included modules delivered by Prof Finian Buckley (DCU Business School) who outlined the nature of 'coopetition' as being **collaboration between business competitors where the companies must relinquish some control and power to achieve a mutually beneficial outcome**.

Building trust between them is enabled by:

- Understanding the scale and scope of international business to be won; this is provided by acquiring and sharing market intelligence and by arranging engagement with agencies and private companies procuring overseas projects.
- Sharing unified objectives of winning larger scale international projects by joining with others, sharing risk and increasing chances of success.
- Sharing common experiences and problems. GI Workshops provide an excellent platform for members to share experiences and to develop working relationships.
- Participating together in "Team Ireland" marketing and promotional events i.e. Trade Missions, Exhibitions, Trade Fairs, Inward Buyer Visits and Conferences. These events are arranged by Irish agencies (Enterprise Ireland, DFAT, GI) or by counterpart organisations (DfIT, British Water, NOF Energy).

4.Communications

While effective clusters communicate frequently, a formal organised mechanism can simplify communication and structure the search for specific information. In this regard, Geoscience Ireland is **proactive in its engagement with members whether this is project-based** (such as individual tenders, or participation at an in-market mission or convention) **or weekly market alerts**. Importantly, GI has built and maintains a **website** (geoscience.ie) and it's **Procurement Hub** (GIPH) that provides a database of capabilities and contacts, a supplier data base, job postings and information on new technologies and innovation in one location.



The Geoscience Ireland Procurement Hub is a source of active commercial tenders, projects and market intelligence including key contacts and country reports.

5.Maximising State Resources

Many Government services have broad responsibilities, for example training, education, financial, technological and promotional. **GI utilises and promotes a number of Government-backed services**, for example its application to the Higher Education Authority to fund the Geo Driller Apprenticeship capitalised on Ireland's ambition to skill-up labour via apprenticeships. A component of GI's workshops regularly promotes the plethora of financial, tax and innovation resources which are available to Irish companies.

Market Study Visits and Trade Missions are key resources to be leveraged by Irish companies when accessing overseas markets; GI has strong relationships with EI and DFAT's overseas networks and works closely with them when devising market entry plans with GI members.

6.Create entrepreneurial support and learning networks

Entrepreneurs and young firms have a greater need for networking than existing companies because they have less experience and few established routines. **SMEs thrive on information, advice and knowledge**. The most effective networks are based on some sort of existing relationships among entrepreneurs, such as incubators, economic development programmes, common sources of capital, and trade and professional associations. Innovative companies can benefit greatly from networks forming, for example, around common problems or specific technologies.

Geoscience Ireland workshops are focused on such supports and have included content such as leadership and management training, marketing and branding, R&D and innovation supports. GI also regularly invites large, or 'Tier-One', contracting and consultancy firms to present at workshops thus affording SMEs unique access and understanding of the firms supply chain and project focus.

7. Use clusters as a context for learning, and for developing firms

Nothing is more important than the development of businesses (and economies). In no other sector are clusters more dependent on the government, which is the biggest investor in education and training.

In 2016/2017, GI staff and 3 member companies participated in a DCU/EI sponsored training programme, **Management For Growth**. In 2018, GI collaborated with the Irish Management Institute and the Construction Industry Federation to deliver the '**IMI Leadership Development Programme for Construction, Engineering and Geoscience'** course; the programme focused on fostering leadership and performance in technically orientated companies.

In responding to industry demand for Irish drilling companies to have certification to access the UK market, Geoscience Ireland led the establishment of the **Geo Drilling Apprenticeship** which commenced in January 2020 and is being delivered by IT Carlow. The apprenticeship is the first and only formal training programme focused on the drilling sector in Ireland.

8. Stimulate innovation and entrepreneurship in Geoscience

Innovation and entrepreneurship are the engines of cluster development and growth. Most clusters have been formed by entrepreneurial employees of existing employers in pursuit of expanding supply chains or new market potential or in response to a company downsizing or closing. Although both innovation and entrepreneurship are influenced heavily by a region's educational processes and cultural norms, they can be enhanced by deliberately supporting policies created and driven by Government.

GSI and Enterprise Ireland provide a suite of research 'calls' and innovation vouchers which GI and the geoscience ecosystem draws on to facilitate enterprise development. GI members have participated in GSI research calls and collaborative GSI research opportunities, which they might not have been aware of, had they not been within the cluster and attending GI workshops.

Geoscience Ireland sits on the Technical, Scientific and Industry Advisory Committees of the Irish Centre for Research in Applied Geosciences (iCRAG) and several GI member companies are actively involved in numerous research areas. GI has delivered innovation-focussed workshops and leverages its partners and stakeholders to provide forums for GI companies to access and present to wider, relevant audiences.

9.Provide national and seek EU funding

Few cluster organisations can support themselves through membership fees alone, and nearly all continually search for sources of funds to support cluster activities. International, national or regional support, and sometimes cost sharing, is crucial. By helping to identify and secure multi-year funding, cluster organisations can get the support they need to firmly establish themselves.

In 2017, **GI signed a Memorandum of Understanding with the French geoscience cluster Pole AVENIA. GI's partnering with Pole AVENIA led to a successful application to the Executive Agency for Small and Medium-sized Enterprises' COSME programme** which funded the collaborative 'Geo-Energy for the 21st Century' proposal. A second COSME Geo-Energy programme led by GI is due to commence later in 2020.

Much of leading edge research takes place at public universities. Historically, it has been funded through a competitive process reviewed by peers in the same field, but not necessarily linked to cluster economies. **Funds have normally been based on publications, not commercialisation, but in some instances the process has given birth to clusters in or around the parent universities. While this is not the case with Geoscience Ireland there are cluster linked research groups at some Irish Universities, such as MAREI in Cork and at Cork IT**. Clusters can be supported by adding to the review criteria for funding, the relevance and commercial potential of the research to specific clusters, such as geoscience in Ireland.

10.Use clusters as a promotional tool

Countries around the world have used clusters to promote themselves as a desirable place to visit and do business. Scotland, New Zealand, Canada, Spain (and indeed Ireland) have all effectively used clusters to market regions to investors and customers.

The European Commission supports the European Cluster Collaboration Platform (ECCP) which profiles GI; the platform is an action that encourages cluster internationalisation. **GI achieved the "Cluster Management Excellence Label BRONZE – Striving for Cluster Excellence" in 2019**; the accreditation is a useful promotional tool and demonstrates commitment to cluster projects when attracting European partners on proposed funding bids.

GI's active presence across Europe, North America, Africa and the Middle East is critical to promoting all aspects of geoscience innovation, its supply chain and the government support which underpins the sector.

GI Workshops: Trust Building, Collaboration and Communication

Geoscience Ireland hosts quarterly workshop which have proven to be a critical component of the cluster. Workshops allow member companies to familiarise themselves with other members, and welcome new members. The member companies are representative of Ireland's geoscience value chain including natural resource exploration and extraction, civil and economic infrastructure development, environmental services and the energy industry.

Since its inception, GI has carefully designed these half-day workshops to balance:

- Introduction and overviews from **new members** and **updates from members** on new projects and initiatives.
- Presentations from senior management in **key client companies** such as ESB International, MACE and Project Management Group.
- **Updates on projects and initiatives lead by government bodies** such as GSI, EI, DFAT, DCCAE and DBEI.
- Presentations from senior officials or experts with regard to **International Financial Institutions.**
- **Professional consultancy services** to assist with tender training, marketing and branding, access to funding and tax considerations for R&D, and accessing IFI markets.
- And critically: **time to network** prior to, during and after the workshops.

GI fundamentally designs its workshop in consultation with its members and stakeholders thus ensuring the content is relevant and responsive to contemporary topics and issues.

In 2020, GI moved to a model of **occasional thematic workshops** and delivered an offshore energy workshop which brought together GI members operating in this field (both in the Irish and overseas markets), a project developer, DCCAE which is responsible for policy instruments and GSI which manages Ireland's national offshore mapping programme. GI members were representative of the commercial value chain: site selection and design, planning and consultation, detailed design and engineering, and project delivery thus **bringing together a group primed for collaboration and information sharing**. Upcoming workshops will be directed at themes including civil and economic infrastructure, natural resource development and also maintain a problem-solving element including: assisting Irish companies in accessing IFI contracts, ongoing assistance in accessing new markets and the technical assistance from tender writing to marketing.

4. Guaranteeing Success: 5 Measures

In order to maintain Geoscience Ireland and therefore ensuring the success of a cluster, several principles have been learned and acted upon by the GI management team and its member companies.

Joining this networked community facilitates the growth of a geoscience cluster, concentrates power, accelerates technical development, deepens the talent pool, leverages research and promotes innovation.

1.Developing Social Capital: Ensuring Trust and Demonstrating Collaboration

Delivering on actions as agreed with members is a tangible method to develop and sustain trusting relationships, while confidentiality and responsiveness allows GI's secretariat of four staff to be regarded as trusted advisors.

Developing such a dynamic has witnessed development of a high level of social capital between GI, its members and its stakeholders. GI has displayed excellent trust building capability: GI is a cohesive association of members, who compete and simultaneously collaborate within the cluster. The GI experience shows that, since its formation in 2012, social capital is strong and new members feel at ease quite quickly upon joining the cluster and demonstrate reciprocal trust thereafter.

Such collaboration may not come naturally, or its necessity evident to all companies. This can lead to members being disengaged, or to leave a cluster; the principle of coopetition requires one to relinquish a degree of control and power for a mutually beneficial outcome. GI, overtime, has communicated this outlook to its members and shows results by way of joint bids between members on commercial tenders or working together at international trade shows; nonetheless, guarded entrepreneurs and business owners exist and ultimately may not engage with a cluster's objectives and its spirit.

Communicating success stories is a key component when demonstrating success in a cluster which is collaboration-focussed. Collaboration happens in numerous ways from sharing experiences in identifying and solving industry-related issues to jointly identifying and bidding on commercial contracts.

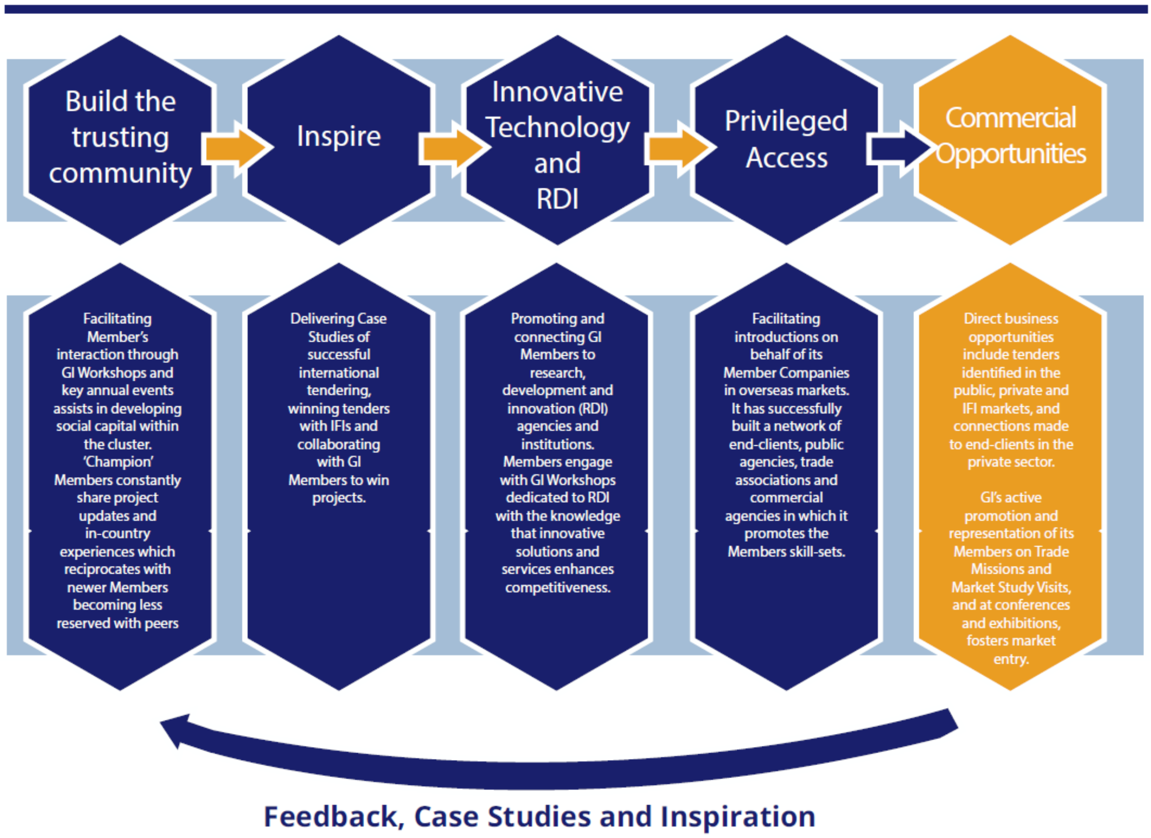


Table 3: Representation of the Reciprocal Approach to Developing Social Capital and Inspiring Knowledge Exchange

2.Ensuring Committed Leadership and Government Support

The GI initiative now operates across government and includes continuous interaction between its sponsor Geological Survey Ireland and its parent Department of Communications Climate Action & Environment, and its supporting governmental stakeholders: Enterprise Ireland and the Departments of Foreign Affairs & Trade and of Business, Enterprise & Innovation.

In 2018, the Government, through DBEI, published its '**Action Plan for Jobs'** and included Geoscience Ireland as a successful case study focussed on exports, job creation and economic development.

GI aligns very well with the evolution of a "Team Ireland" approach to developing international trade. In addition, GI has established close links with trade and commercial bodies in Ireland and abroad as outlined in the Government's **'Global Ireland 2025'** and its 'doubling Ireland's footprint' policy, thus enhancing promotion and connectivity.

Irish government actively engages overseas markets by way of Trade Missions, Market Study Visits and Inward Buyer Visits, and GI compliments and engages with such programmes when its key sectors are represented.

3.Delivering High Quality Services

Geoscience Ireland offers full-time tender tracking, market intelligence and support for joint bid activity. In 2020 it is rolling out its **Procurement Hub which will act as platform for automating tender activity and for collaborative bidding**, and will also provide up to date and advanced focused market intelligence and market access information.

By pooling market knowledge, sourced by GI, and leveraging Team Ireland's support services, companies can expand their global reach and identify opportunities that would not otherwise be visible.

GI is a member of several industry, commercial and professional organisations, thus widening the networks for collecting market intelligence, creating contacts and raising the awareness of the sector and of GI member companies.

4.Operate at key industry events

GI actively promotes member companies in a wide range of international exhibitions, conferences, trade shows, industry fairs and business networking. **GI seeks and maintains a high level of privileged access to business networks, project sponsors, funders and gateway stakeholders**.

GI has participated on **EI Market Study Visits and Ministerial-led Trade Missions** to Ghana, Nigeria, Kenya, Ethiopia, Australia and the UK to promote Ireland's geoscience expertise, to meet key in-market clients and agencies and to assess routes-to-market on behalf of GI member companies. Individual GI members would not have the time, staff or resources to cover all of these potential opportunities, where GI can now effectively represent their offerings, with high-level government backed access and support.

Key trade shows include annual mining conventions: PDAC in Toronto, Mining INDBA in Cape Town, the Mining Show, Dubai, and AME Roundup in Vancouver which are well-attended by GI companies and are supported by Enterprise Ireland and the Irish consular network. Conferences and trade shows focussed on broader natural resources, energy and civil infrastructure include INTERMAT, Paris; Ground Engineering & Tunnelling, London; AMP Water, London; Trafikverket, Stockholm and Geo Energy Days with Pole AVENIA in France.

5.Research and Development: Maintaining an Innovative Edge

Geoscience is representative of many areas of the Science, Technical, Engineering and Math (STEM) discipline. By way of annual GSI research calls and its larger research programs, geoscience companies maintain themselves at the forefront of this technical industry. EI supports business in many ways from innovation funding, to business development (both internal workings of the business and assistance in growing export business).

GI will ensure collaboration between stakeholders and that its members are knowledgeable of the cross-Governmental supports which are designed to keep Irish SMEs in a competitive position (by way of innovation) in international markets.

GSI and DCCAE’s relationship with the SFI-funded iCRAG research centre is important for GI as it exposes member companies to the research community; the relationship reciprocates as GI facilitates introductions to geoscience companies and key clients both in Ireland and overseas.

5. Recommendations: the GI Blueprint

Clusters by definition engage government agencies (and state supports), the private sector and innovation mechanisms; these three elements combine and collaborate to support the development and competitiveness of specific industries or a broader piece of public policy such as job creation, export growth or regional development to name but a few.

GI has demonstrated its effectiveness in forming and maintaining a coherent, commercially-focussed network of companies and agencies which assists its members in winning work overseas through collaboration, achieves Government objectives of job creation and advancing Ireland's overseas commercial footprint and also increasing the visibility of Ireland's geoscience sector to wider Government, broader industries and key stakeholders.

GI can be demonstrated to be a successfully operating government-backed sectoral business cluster. The development of sectoral clusters has been repeatedly recommended in Irish government reports on job creation and development; policy documents include Innovation 2020[7] and the Action Plan for jobs[8]. Therefore if a "GI cluster model" was to be considered for other sectors or subsectors, the following would be recommended steps:

- **Convene a steering committee of immediate industry experts from across government which will also include experts in given policy areas to work up a situational analysis.**

GSI and EI met in 2010/ 11 to describe the problems faced by the industry and collaborated with 5 geoscience reference companies. This initial group laid the foundations for a biannual steering committee meeting which now includes GSI, EI, DCCAE, DFAT, DBEI, 4 companies and Trinity College Dublin. Gauging broader policy areas witnessed GI being used as a cluster case study in the national Action Plan for Jobs and is considered a 'go-to' agency for many Government organisations.

- **Undertake a study of the sectors value to the economy (turnover, jobs, capacity of companies to export and scale in new markets) and analyse the micro and macro threats and opportunities faced by the sector and its companies. Such studies should be reviewed on an ongoing basis and adapted as economic conditions change over a period of time.**

7 https://dbei.gov.ie/en/What-We-Do/Innovation-Research-Development/Innovation-2020/
8 https://dbei.gov.ie/en/What-We-Do/Business-Sectoral-Initiatives/Action-Plan-for-Jobs/

In 2011/12, GI appointed a marketing consultant to assess the situations of the abovementioned geoscience reference companies (GI's first members); the ambition to enter, or increase respective footprints, in overseas markets was clear. Such research provided the foundations for the GI initiative.

In 2016/17, an MBA programme based in TCD undertook a review of GI which provided key insights to trends in adapting to the best business practice; this scoping report provide the platform for GI to develop its online marketplace: GIPH.

In 2017, GSI commissioned an overall economic assessment of the sector which demonstrated its importance to the Irish economy in terms of value (€3.2BN) and employment (nearly 25,000).

To reflect changing economic conditions and new demands on companies (e.g. skills shortages and increasing competition), in 2018 GI undertook a review of strategy which refocussed its efforts for 2018 to 2022. GI plans to an interim review in late-2020/2021.

- **Appoint a full time manager to the cluster initiative to ensure coherency and consistency in activities.**

Prior to GI tendering for a full time director, the five reference companies attempted in earnest to collaborate by identifying commercial proposals and opportunities to tender for, share intel and engage with overseas markets while also balancing the respective demands of their individual companies in a time of economic crisis. It was clear that full time management was required and GSI moved to tender for this position; this has now grown to team of four full-time staff members.

- **Move to create a collaborative environment for companies to discuss and propose joint commercial ventures with one another and to share in-market experience, intel and networks.**

The workshops which GI host on a regular basis has proven to be critical in this regard (see page 18). GI's staff is in regular contact with members and are regarded as 'trusted intermediaries' in terms of receiving market intel and ambitions from its companies and identifying opportunities and crossovers with both fellow members and broader networks. Communicating up to date market intelligence and updates is an effective way to demonstrate GI as a credible and responsive organisation.

- **Assess and align the ecosystem of Government supports.**

GI regularly assesses the broad range of supports from EI and DBEI which assist companies in a number of areas including access to finance, funding for innovation, assistance in scaling in to new markets and operational assistance, to name but a few.

EI and DFAT's overseas networks of offices, embassies and consulates are important when reviewing new markets. It is both organisations mandates to engage overseas and both are well-networked and provide excellent assistance when connecting with proposed clients and government agencies, and when proposing events such as presentation fora and networking opportunities.