Grant Thornton

Development of an Evidence Base to Support the Development of a National Clustering Policy and Framework

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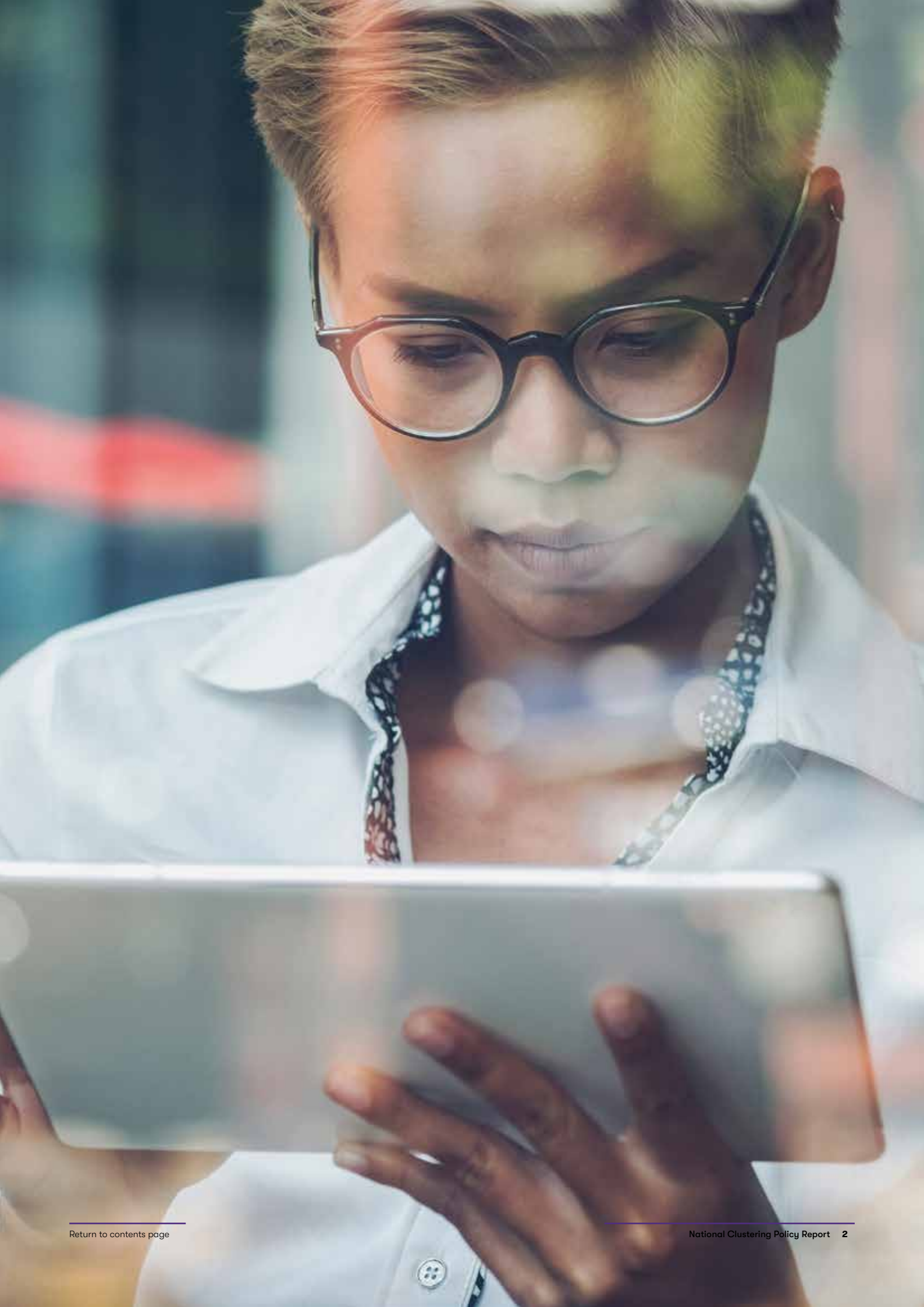
Glossary

BEDF	Border Enterprise Development Fund
BEPS	Base Erosion and Profit Shifting
CCUS	Carbon Capture, Utilisation and Storage
CSEI	Clusters of Social and Ecological Innovation
CSETs	Centres for Science, Engineering and Technology
CSO	Central Statistics Office
ECEI	European Cluster Excellence Initiative
EEN	Enterprise Europe Network
ERDF	European Regional Development Fund
ESCA	European Secretariat for Cluster Analysis
EU	European Union
GBER	General Block Exemption Regulation
GCE	Global Centres of Excellence programme
GHG	Greenhouse Gas
HEIs	Higher Education Institutions
ICN	Initiative Connected Mobility
IoTs	Institutes of Technology
IP	Intellectual Property
KPIs	Key Performance Indicators
MHES	Ministry of Higher Education and Science
MIBFA	Ministry of Industry, Business and Financial Affairs
MNCs	Multinational Companies
NCE	Norwegian Centres of Expertise programme
NCP	National Cluster Platform
NIC	Norwegian Innovation Clusters programme
PPP	Public, Private Partnerships
RDI	Research, Development and Innovation
REDF	Regional Enterprise Development Fund
REPs	Regional Enterprise Plans
RETS	Regional Enterprise Transition Scheme
RIS3	Research and Innovation Smart Specialisation Strategy
RTCF	Regional Technology Clustering Fund
RTDI	Research, Technology, Development and Innovation
SFI	Science Foundation Ireland
SIVA	Industrial Development Corporation of Norway
SME	Small and Medium-sized Enterprises
SPRI	Basque Business Development Agency
STI	Science Technology and Innovation
SWOT	Strengths, Weaknesses, Opportunities and Threats
TGP	Technology Gateway Programme
TRL	Technology Readiness Level
TTSI	Technology Transfer Strengthening Initiative
TUs	Technological Universities
VLAIO	Flanders Innovation and Entrepreneurship
WTE	Whole-time Equivalent



Executive Summary

Cluster

Clusters are geographic interactive alliances of interconnected enterprises, research centres and associated institutions in particular fields that compete, cooperate and face common challenges and opportunities.

INTRODUCTION

Recent national enterprise and economic policies (including Enterprise 2025[1], Future Jobs Ireland[2], and the Economic Recovery Plan[3]) have recognised the potential of collaboration and clustering to support enterprise competitiveness, internationalisation and productivity to secure sustainable jobs and growth. Ireland's current enterprise support framework promotes collaboration, clustering and linkages between enterprises and Higher Education Institutions (HEIs). However, state supports for such initiatives currently operate through a range of innovation, rural regeneration and enterprise policy interventions rather than through a single or coordinated cluster policy framework. As such, the Department of Enterprise, Trade and Employment is developing a National Clustering Policy and Framework, to ensure a strong impact from existing and future clusters in Ireland.

The Department of Enterprise, Trade and Employment appointed Grant Thornton to:

- Carry out a study aimed at evaluating the evidence base to support the development of a National Clustering Policy and Framework; and
- Present conclusions and policy options for consideration in developing a National Clustering Policy and Framework.

Specifically, this study seeks to deliver:

- An assessment of the current landscape of clusters, networks, clustering supports and initiatives and their outcomes;
- An assessment of national and international best practice that may inform future policy enhancements in the Irish context; and
- A shared ambition for clusters and cluster policy in Ireland.

This report, commissioned by the Department of Enterprise, Trade and Employment, comprises Grant Thornton's desktop research process, findings from stakeholder consultation, a current state assessment and a thorough review of international case studies. The purpose of this report is to:

- Provide baseline information regarding the current landscape in Ireland and internationally;
- Benchmark this activity against the stated vision for the clusters and clustering in Ireland; and
- Outline emerging policy options for the development of the National Clustering Policy and Framework in Ireland.

It aims to assist the development of the National Clustering Policy and Framework by offering:

- Clear definitions and a vision for clustering in Ireland;
- A comprehensive understanding of the existing cluster landscape;
- A synthesis of stakeholder views and expert opinion from an extensive consultation process, both nationally and internationally; and
- A review of cluster policy in leading jurisdictions internationally, with learnings and examples informing a set of policy options for consideration in the development of a National Cluster Policy and Framework.

1 Department of Business, Enterprise and Innovation (2018) Enterprise 2025 Renewed: Building resilience in the face of global challenges.
2 Department of Business, Enterprise and Innovation (2019) Future Jobs Ireland 2019: Preparing Now for Tomorrow's Economy.
3 Department of the Taoiseach (2021) Economic Recovery Plan 2021.

SETTING THE DIRECTION FOR CLUSTERS AND CLUSTERING IN IRELAND

Cluster policies have featured in international competitiveness policies since Michael Porter first described the phenomenon of enterprise clustering as a factor in business and national competitive advantage.[4]

Since then, cluster development policies and programmes have become prevalent in economic development policy and practice in many industrialised countries. In Ireland, the current suite of national enterprise policy documentation highlights the importance of cluster development, to achieve certain objectives, including but not limited to:

- Capturing the benefits of Ireland's distinctive enterprise mix;
- Attracting and further embedding foreign owned companies;
- Stimulating the emergence and scaling of more innovative Irish owned enterprises;
- Tapping into opportunities emerging at the boundaries of existing sectors; and
- Taking advantage of convergence, maximising spill over effects, driving innovation and increasing productivity, particularly in SMEs.

The cluster concept has been widely examined since its first emergence over thirty years ago[5]. As such, there is now a well-researched and evidence-based correlation between clusters, innovation, competitiveness and economic development. Porter identified several theoretical benefits of clustering arising from the cooperative dynamics that emerge among the companies, universities, research centres, training organisations, government bodies and other organisations that can make up a cluster. His work on clusters (1990[4],1998[5]) highlights how clustering supports companies to:

- Operate more productively;
- Be more innovative; and
- Achieve better access to employees, suppliers, more specialised information and specialised research institutions.

Furthermore, his research highlights how participating companies broker 'complementarities' with other cluster participants, thereby being able to experiment more effectively and at a lower cost.

Several empirical studies illustrate the positive effect clustering has on innovation, productivity (especially among small firms), regional development and on economic growth. Clusters contribute to employment, job creation, market resilience and innovation. Clusters are a key instrument to support companies accessing global markets through connectivity and partnerships formed between different cluster organisations and cluster members across the world. Furthermore, high-performing cluster organisations play a significant role in increasing competitiveness by delivering innovation and productivity in national and international markets within traded industries. This is a strong consideration for Ireland, whose economic model is based on being pro-enterprise, having an export-oriented open economy, supporting entrepreneurship and innovation and being a competitive location for international investment.

Many international jurisdictions have demonstrated that a national cluster policy enables a coherent and coordinated approach to encouraging cluster development. Furthermore, several international jurisdictions are aligning cluster policies with smart specialisation strategies (S3). Therefore, opportunities exist for a National Clustering Policy and Framework to develop Ireland's sectoral comparative strengths, while concurrently finding new opportunities for growth.

The opportunity and potential benefits of greater levels of clustering are widely acknowledged in Ireland's economic, social and environmental development dialogue. There has been significant policy focus on collaborative industry academic research and innovation over many years in Ireland. However, to date, Ireland has yet to develop a national approach to embedding clustering within economic development policy. It is envisaged that the development of a National Clustering Policy and Framework for Ireland will establish a cohesive and strategic national approach to enabling cluster development as a policy tool and leverage the potential of clusters to deliver several enterprise policy objectives. This includes:

- Enhancing the visibility of Irish businesses in international markets;
- Improving Ireland's attractiveness for new business investment;
- Strengthening SME productivity, enterprise competitiveness and resilience;
- Developing high-quality research and technology partnerships, supply chain linkages and specialist skills; and
- Acting as a driver of the green and digital transition.

Throughout the course of this engagement, in-depth stakeholder consultation, as well as key learnings and information relating to best practice examples of cluster policy, has led to the identification of the following broad, working vision for clusters and clustering in Ireland:

> **Vision for clustering in Ireland** The vision for clusters and cluster policy in Ireland is to develop a centrally coordinated, concentrated ecosystem of excellent clusters and supportive cluster organisations that are internationally competitive and have a positive impact on national financial, social and knowledge economies and sustainable development. Furthermore, it is intended that a future cluster policy will be in full alignment with the national enterprise policy and will bring added value to Ireland's existing enterprise support framework.

4 Michael Porter (1990) The Competitive Advantage of Nations.
5 Michael Porter (1998) Clusters and the new economics of competition

Cluster Definition

Clusters are geographic interactive alliances of interconnected enterprises, research centres and associated institutions in particular fields that compete, cooperate and face common challenges and opportunities.

INTERNATIONAL CASE STUDIES - KEY LEARNINGS FOR THE IRISH CONTEXT

Since the 1990's, many regions across the world have employed cluster-based policies as part of their industrial, innovation and development policy agendas. Over the past three decades, cluster policies have become ubiquitous in both economic development policy and practice, a key tool in smart specialisation strategies and are increasingly used to address critical societal challenges including digitisation and decarbonisation.

A detailed review of key international examples highlighted the fact that the policy approach to support clusters varies considerably across different jurisdictions. However, despite the varying policy architecture, policies are typically designed to strengthen productivity and competitiveness. This is facilitated by increased collaborative interaction, knowledge exchange and targeted research between stakeholders (including companies, universities, research centres and government bodies). Furthermore, the international evidence suggests that cluster-based policies are established as enterprise, innovation or development policy, which may support regional development as a result.

STAKEHOLDER CONSULTATION

An extensive consultation with over 40 individual stakeholders was conducted, to understand the current landscape for clusters in Ireland and internationally, as well as the justification, opportunities and challenges for cluster development across Ireland.The synthesised outputs from stakeholder testimonial identified significant commonality and consistency regarding the key themes identified in the context of developing policy options for a National Clustering Policy and Framework. The report outlines, in detail, key considerations under the three main headings:

- The policy challenge – key issues identified;
- Maximising the economic impact from clustering in Ireland; and
- The critical success factors for impactful cluster organisation.

The stakeholder consultation process identified strong interest in greater cohesion across the landscape and demand from stakeholders for a nationally coordinated support mechanism for cluster development and support. Despite the diverse perspectives of stakeholders consulted, there was significant consensus regarding:

Opportunities for clusters to be used as a tool include:

- Enhancing the visibility of Irish businesses in international markets;
- Improving Ireland's attractiveness for new international business investment;
- Developing Ireland's sectoral strengths;
- Identifying and developing new areas of strength for the Irish economy; and
- Supporting the Irish enterprise sector in achieving green and digital transitions.

The benefits of cluster participation include:

- Strengthening SME productivity and enterprise resilience;
- Enhancing the ability of high potential SMEs to scale and internationalise;
- Enabling multinational companies (MNCs) to achieve stronger partnerships with supply chain contributors; and
- Allowing cohorts of companies to benefit from the dynamics of clusters to enhance their competitiveness and innovation.

Clarity of purpose for cluster organisations is required to ensure they:

- Facilitate inter/cross-cluster collaboration;
- Provide opportunities for change, development and progression of the industry through innovation, collaboration and cooperation.
- Ensure sustainability and ongoing competitiveness for cluster participants into the future; and
- Create and exploit business opportunities for their members to grow and diversify by utilising external drivers such as digital technologies.

A National Cluster Policy and Support Framework may be an opportunity to:

- Create greater coherence and strategic direction for Ireland's cluster landscape;
- Integrate wider enterprise policies including S3;
- Increase collaboration between SMEs and MNCs;
- Pursue an all-island approach, foster North-South collaboration and support the objectives of the Government's Shared Island initiative; and
- Support balanced regional development.

MAPPING OF THE CURRENT LANDSCAPE OF CLUSTER ORGANISATIONS IN IRELAND

The national support frameworks introduced by relevant agencies have significantly supported the development of cluster organisations in Ireland to date. Each of these cluster programmes has its own goals and objectives and is designed to achieve different outcomes. Irish cluster organisations have been in receipt of different levels of technical and financial support in line with the architecture of the different support schemes. Based on the current landscape of clustering supports and initiatives, it can be challenging to build a consistent, clear message regarding Ireland's ambitions for clusters in Ireland. As such, many stakeholders consulted in the context of this study described the development of clustering in Ireland to be *ad hoc* in nature.

A review of the current landscape identified 19 cluster organisations operating across Ireland. The mapping exercise identified considerable variance in the approach taken to identify cluster organisations, as well as the governance, legal structure, scale and cluster management of the relevant cluster organisation. This variance raises questions regarding the most effective circumstances to support effective cluster development. Despite there being a number of grant funding streams available to support clustering initiatives in Ireland, many considered the development of clustering in Ireland to be organic in nature, with many cluster organisations having formed through bottom-up grouping.

POLICY OPTIONS FOR A NATIONAL CLUSTERING POLICY AND FRAMEWORK

In consideration of the evidence base developed to date, Grant Thornton is recommending the following policy options for consideration by the Department of Enterprise, Trade and Employment.

DEFINING THE SCOPE OF THE POLICY

The international evidence suggests that cluster organisations are a critical factor in cluster policy and development. As defined below, cluster organisations can be effective tools to facilitate cooperation between industry and research, innovation and technology development actors. As well as increasing the competitiveness and scale of SMEs, it is intended that this cooperation will stimulate the development of new technologies, generate and disseminate knowledge, drive higher productivity and potentially secure new markets and business growth for participating businesses – ultimately to generate higher growth for the economy as a whole. Additionally, cluster organisations are increasingly driving social and ecological innovation. They are providing benefits to people across the wider economy, not just to company investors and owners.

Cluster Organisation

Cluster organisations are formal institutions that are established to facilitate increased interaction and cooperation between participants in an existing cluster or an emerging concentration of enterprises in a particular sector/activity. They are responsible for organising, facilitating, managing and leading the complex efforts required to increase the growth and competitiveness of a cluster. A cluster organisation is based on an organised partnership between participants in a cluster, often with public development agencies as an important contributor.

To delineate the Irish National Cluster Policies target group, the policy should articulate specific characteristics that support the definition of a cluster organisation. Factors which underpin the development of successful cluster organisations are as follows:

- **Governance |** Appropriate governance structures are a key factor in influencing the cluster's long-term success, facilitating strategic decision making, enabling accountability towards members and ensuring the sustainability of the organisation on a long-term basis. Trends for cluster organisations internationally are for cluster organisations to be governed by a board composed of members representing industry, government and academia. Typically, there is a requirement for a majority (circa. 70%) from industry to ensure that both the strategy and activities of the cluster are adequately serving the needs of its members.

  The international models examined often require governance as an access criterion to the relevant cluster programme, typically determining the existence of robust governance within a cluster organisation based on the presence and composition of a board. This is considered a critical success factor in meeting the needs of the different stakeholders and improving the competitiveness of cluster members by means of cooperation.

- **Legal Structure |** In the majority of international jurisdictions examined, cluster organisations are private organisations established as not-for-profit or for-profit legal entities. The benefit of legal independence is that it enables cluster organisations to determine their own strategy, agenda and implementation. This ensures that activities are aligned with the interests of members rather than the interests of a host organisation.

  However, requiring early-stage or seeding cluster organisations to hold legal entity status could create funding implications and may reduce the viability of the seeding process. Due to the linkages between legal structure and EU State Aid rules, flexibility may be required within the Irish National Cluster Policy and Framework in order to accommodate the variety of funding options available.

- **Funding Model |** Successful cluster organisations will typically operate a sustainable funding model which leverages private funding generated through membership fees, services sold to members and projects funded, or part-funded, by industry. Funding includes State support administered through a cluster programme and funding under European Union (EU) programmes (such as, Interreg or the Research and Innovation Framework Programmes and the EDRF).

  International evidence highlights the benefits of making cluster organisations open to as many companies as possible. However, it is important to be able to easily discern which companies are active participants within the cluster. The introduction of membership fees is a useful tool to illustrate member dedication towards the cluster. It is suggested that all cluster organisations seeking access to a national programme set-up a membership fee. This can vary across different member types, so as not to prohibitive for some members.

- **Scale |** Scale, both in terms of the critical mass of companies and the geographical scope, is an important consideration in a cluster organisation.

  International evidence illustrates considerable variance regarding the minimum number of companies required to consider a cluster organisation to have sufficient critical mass. Several jurisdictions set different thresholds depending on the maturity of the cluster organisation. This approach may be most appropriate, with policy

makers deciding on the minimum critical mass of businesses for an emerging, growing or mature cluster organisation.

It is understood that encouraging collaboration among MNCs and SMEs can garner significant benefits for Ireland's indigenous SME population including: investment; technological leadership and partnering; economies of scale; and enhanced opportunities for internationalisation. As such, the Basque model, which specifies a minimum critical mass of SME members (% of the total membership base) may also be useful to consider in the Irish context.

The geographical scope of cluster organisations is another consideration in the context of scale. Based on the mapping of the Irish landscape, there is an opportunity for the National Cluster Policy and Framework to increase the scope or geographic reach of Irish cluster organisations, specifically with a view to:

- Supporting cluster organisations to reach a higher critical mass of companies and reduce fragmentation (e.g., multiple smaller cluster organisations competing for members).
- Increasing opportunities to connect regional SMEs with MNCs, and business with Higher Education Institutions, Further Education Institutes and relevant research performing organisations, etc.
- Increasing opportunities for internationalisation – particularly if cluster organisations are supported to operate on an all-island basis.

- **Related Variety |** The Porter model for a cluster specifies that members should collaborate but also *compete*. Both theory and practice suggest that cluster organisations benefit from a triple or quadruple helix organisation, i.e., companies, knowledge/education institutions and public partners/civil society stakeholders all take an active part. As such, successful cluster organisations will typically involve a mix of complementary businesses in similar and related industries and associated institutions in particular fields.
- **Strategic Plan |** Cluster organisations aim to build knowledge bridges between companies and knowledge institutions and to stimulate innovation and growth among their members. The exercise of developing an *ex-ante* strategic cluster plan or action plan is critical to identifying how a cluster organisation intends to achieve these goals.
- **Cluster Management |** The breadth of activities delivered by successful cluster organisations, as well the expertise required to successfully support a cluster organisation through the maturity lifecycle requires a unique and technical professional practice. For cluster organisations to achieve their full potential, they require adequate resourcing. International best practice indicates that cluster organisations require, at a minimum, one full-time cluster manager. In addition to a full-time cluster manager, high-functioning, mature cluster organisations internationally will employ an appropriate support team including, but not limited to, the following roles:
  - Project Officer;
  - Marketing Lead;
  - Finance Lead; and
  - Admin Support.
- *Note: Opportunities to build connectivity between cluster managers and drive cross-cluster collaboration may be achieved the proposed National Coordinating Structure approach (see policy option articulated in further detail below).*

While it is important to clearly define the scope of the National Cluster Policy and Framework, strict definitions protecting the title 'cluster' within the Irish landscape may not be necessary. The Danish model demonstrates that not protecting the title 'cluster', enables groups of companies and ecosystems across Denmark to also consider themselves clusters even though they are not part of the national, publicly funded Danish innovation and business support system and they are not a part of Cluster Excellence Denmark's target group.

POLICY APPROACH

Mapping the current landscape indicated that there is rising awareness and an embracing of the concept of clustering across the island of Ireland. The current suite of national enterprise policy documentation illustrates increasing prevalence of the cluster concept, specifically identifying clustering as means to achieve certain objectives.

To date, State supports for cluster development have been predominantly focused on seeding rather than scaling clusters. Therefore, there is significant scope for the future national policy to build on the momentum achieved in developing Ireland's cluster landscape through programmes such as the Regional Technology Clustering Fund (RTCF) and the Regional Enterprise Development Fund (REDF), leveraging potential new sources of funding for the European Regional Development Fund (ERDF) and Shared Island Fund. The international cluster policy journeys outlined in the case studies, suggest that the development, as well as seeding new cluster organisations, and the institutional-strengthening and professionalising of Irish cluster organisations should be the next areas of focus for Irish policy makers.

In general, the strategic selection of a few regional or national strongholds has been the approach adopted in international cluster policies with many jurisdictions integrating cluster policies into smart specialisation strategies. In contrast, the cluster organisation landscape in Ireland has developed in a more ad hoc and 'bottom-up' way relative to the policy-driven and/or 'framework' approaches illustrated by the international case studies. To date, there has been little evidence that thematic or sectoral strategies have strongly guided the admission to Irish cluster programmes.

Many stakeholders have described the current cluster support landscape as confusing and complex. The funding instruments made available to Irish cluster organisations have been administered through a variety of national development agencies. Each of the cluster programmes has its own goals and objectives and is designed to achieve different outcomes. At a strategic level, it is challenging to build a consistent,

clear message regarding Ireland's ambitions for clusters. Furthermore, it is challenging for cluster organisations themselves to navigate this congested space. In addition, the scope of many of Ireland's existing cluster organisations is local. There is a significant opportunity for the National Cluster Policy and Framework to expand the geographic reach of Irish clusters and thereby support Irish cluster organisations to scale.

The mapping exercise conducted for this report, identified 19 cluster organisations and over 130 networks operating across Ireland. In the context of the criteria influencing the success of cluster organisations, a survey and analysis of the self-identified cluster organisations suggests that many may not be reaching their full potential.

As such, there is a clear need to make the system simpler and stronger. For Ireland to strengthen its current cluster landscape, there is a significant opportunity for a new National Cluster Policy and Framework to be better aligned with national enterprise policy objectives and to consider consolidation approaches that build on existing clusters including the identification of opportunities to amalgamate existing cluster organisations operating in similar focus areas, where possible.

The most recent iterations of the Basque cluster policy may provide direction as to how enhanced cooperation across the ecosystem can be achieved. The introduction of more stringent conditions on which organisations and activities were eligible for funding, and the introduction of *ex-ante* evaluation of action plans naturally filtered the key opportunities for consolidation. Organisations that did not meet the new criteria were offered support to explore how they could integrate their activities with others. The international case study of Denmark's national cluster policy demonstrates how the national approach was refreshed to align more deliberately with national enterprise and economic priorities. This came with the effect of reducing the number of cluster organisations across the landscape, to refocus on prioritised Danish strongholds and emerging industries in priority areas.

More fundamentally, it is clear from the analysis of the cluster landscape and clustering supports currently in place, that there are potential benefits for Ireland in adopting a more deliberate and strategic approach to supporting the development of cluster organisations and how they operate within the national enterprise policy landscape.

IDENTIFICATION OF CLUSTERS

Many models in Ireland and internationally illustrate the emergence of cluster organisations from networks of small and medium-sized companies, while others are linked to an anchor firm or university. Similarly, the precedents examined highlight that some cluster organisations emerge from existing local, regional or national strongholds that have organically developed over time.

The identification of clusters under a national cluster policy can be top-down, bottom-up or a combination of the two[6]. Countries will typically identify cluster programme recipients through one of several approaches, for example:

- Using a statistical method and/or mapping studies to identify existing concentrations and relationships between firms and other entities in a particular spatial context;
- A 'bottom-up' process of self-selection, such as a competitive call for proposals; or
- A more directive approach that selects areas of activity to establish, or further strengthen, cluster organisations based on strategic policy priorities and foresight exercises.

Statistical methods are typically used when the objective is to identify and support national economic drivers and

6 OECD (2007) Competitive Regional Clusters: National Policy Approaches.

enhance competitiveness within the existing industry structure. Alternatively, cluster programmes that maintain strict selection criteria are more likely to support clusters that demonstrate the highest opportunity for innovation and/or collaboration regardless of sector.

The process of self-selection requires cluster programmes to place strict demands on applicants and set criteria that combine objective data (regarding the strength of existing cluster organisations) and/or an assessment of the strategic ambition of the cluster, as well as their potential for innovation. The benefit of a self-selection approach based on identified selection criteria is that it supports the neutrality of the allocation of public funds. It limits the requirement for government to identify 'tomorrow's winners' and mitigates the risk that certain industries receive more support. However, this approach will favour established cluster organisations or industries that have already demonstrated a strong position of growth and may exclude some high-potential opportunities.

Based on the international examples, it is suggested that a National Cluster Policy and Framework for Ireland should consider a small number of clusters in areas of strength, strategic importance and emerging opportunities. It should also consider a method of selection that will focus on enterprise policy priorities linked to existing and emerging areas of strength and on driving specific enterprise development policy objectives.

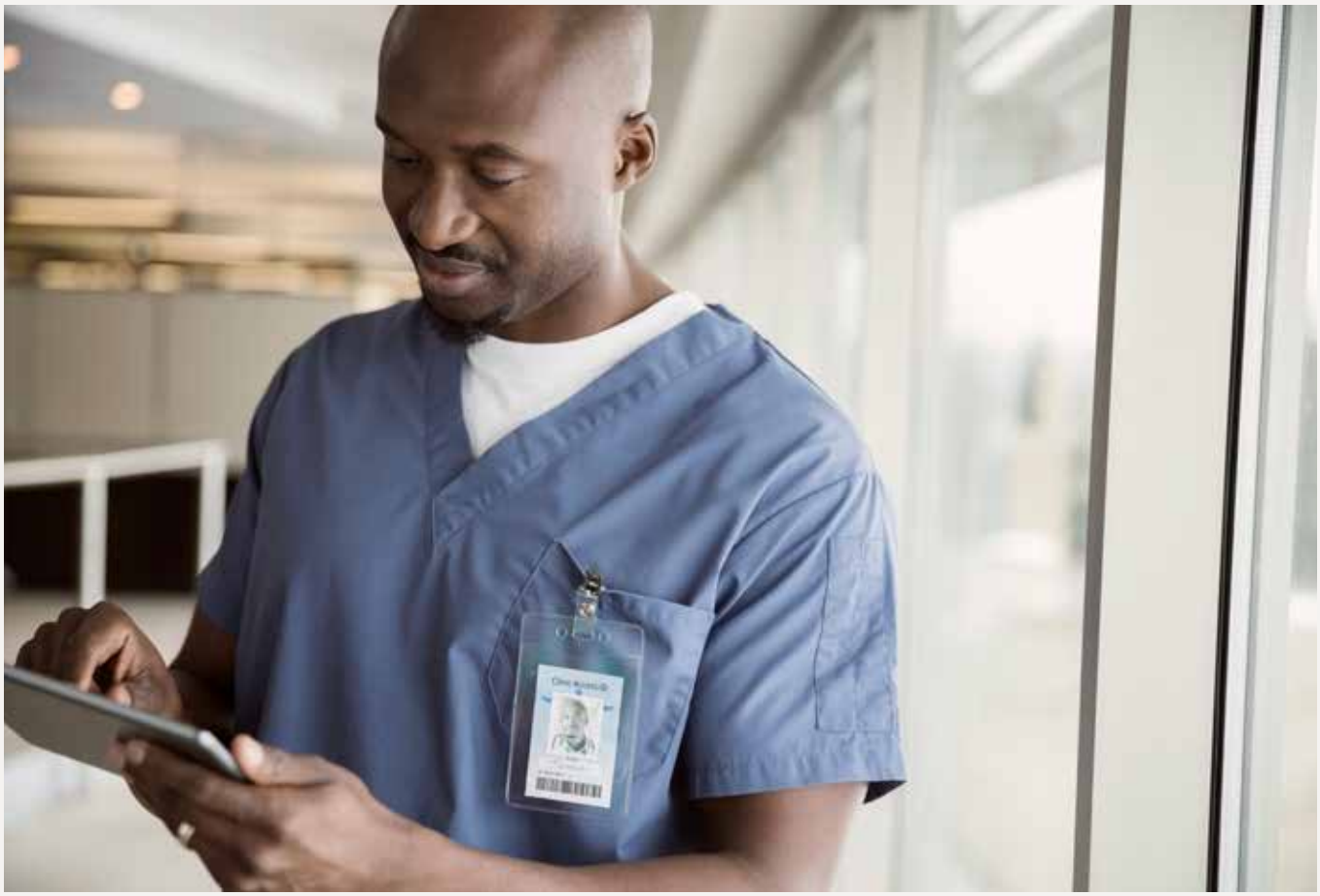
In taking a more strategic approach, and in the context of maximising impact, Ireland's cluster policy framework would by necessity be selective, based on national enterprise policy priorities. The development of a national clustering policy should include considerations on a methodology for the identification of sectors, activities, or areas of opportunity, which would benefit from deployment of a clustering approach. This would also guide the development of criteria to be met by a cluster funded under a national cluster programme. To support cluster identification, it may be useful to coordinate with respect to the National Research Prioritisation Exercise, where a review of prioritisation and priority areas is anticipated for 2023. Research prioritisation has a broad scope (economic and societal impact), as well as considering the Technology Readiness Level (TRL) spectrum. As such, the outcome of such an exercise may inform cluster identification (and vice versa).

SUPPORT FRAMEWORK

The financial and technical support packages provided to clusters may be considered through the following policy options:

- The establishment of a new National Cluster Programme; and
- Designation of clear lead responsibility for executing cluster policy including administering this new Cluster Programme.

National Cluster Programme | Based on the maturity of Ireland's cluster landscape, and the organic nature in which it has thus far developed, there would be significant merit in establishing an open and multi-layer cluster programme. This approach follows the Norwegian model which distinguishes between cluster organisations on different levels and provides different strands of support depending on the maturity and scope of the cluster.



The primary rationale underpinning this approach includes:

- A multi-layer cluster programme supports the existence of varying clusters and enables cluster organisations to be open to firms of all sizes and phases of development.
- It enables more targeted support to cluster organisations at varying stages of development and with different needs.
- The approach creates the opportunity for clusters with ambitions to develop and progress to the next level until they achieve scale, knowledge links and value-add of comparable cluster organisations of global significance.
- The new national programme could potentially continue the ideas and objectives of existing and/or preceding programmes (e.g., the RTCF and the REDF), but introduce additional layers to target, for example, cluster organisations with the largest potential for growth and a clear international orientation, within a common programme, in alignment with strategic policy priorities.

Stringent selection criteria would need to be identified to guide funding decisions. Selection criteria that emphasises the common ownership of stakeholders, active participation of members, commitment from knowledge institutes to align research agendas, annual evaluations of progress against cluster strategies and alignment with other policy domains, may be appropriate.

Even mature clusters require some level of financial support. However, independent evaluations of international cluster programmes identified that if cluster organisations are wholly reliant on continued public funding, the impact of the programme will decrease over time [7]. While both theory and the case studies identified highlight the benefit of leveraging public funds in the seeding and early development of clusters – particularly in regard to supporting cluster organisation operating costs (e.g., salaries, etc.) as well as funding some cluster activities (e.g., marketing) – all of the international cluster programmes examined require an element of public -private partnership.

Depending on the maturity of the cluster organisation, international cluster programmes will typically provide financial support to cover 20-50% of the cost of operational activities. As such, cluster organisations are required to be 50-80% privately funded through contributions of companies. Furthermore, annual budgets are typically available to fund specific technology, research and innovation and internationalisation projects.

Any future funding structure and approach should award long-term funding, within the prevailing EU State Aid Rules. This will provide cluster organisations with the opportunity to achieve their strategic objectives and reach international markets. However, longer-term funding must be regulated and evaluated to ensure cluster organisations are thoroughly assessed to receive continuous financial support. For example, successful cluster organisations may receive technical and financial support for up to ten years within the programme window, divided into three contract periods with assessments after three and six and a half years regarding the continuation of financing. Formulating routine appraisal, or review windows within the funding structure enables exit strategies for policy makers to 'de-commit' funding for underperforming or failing cluster organisations. Assessment could be driven by the cluster organisations' strategies initially proposed on establishment which state their objectives and targets to be achieved.

It may be appropriate at the initiation phase of the National Cluster Policy and funding structure calls to include some external cluster expert evaluators in the review of applications for funding support.

National Coordinating Structure | The selected cases studies emphasise the need for cooperation, not only within the clusters, but also among the various public and private economic and social stakeholders, for knowledge and technology to reach the market and ultimately to translate into innovation. Furthermore, international experience demonstrates that the brokering of close working relationships between cluster managers is essential in promoting knowledge exchange and shared learning for cross-cluster innovation projects.

Designated lead responsibility for implementation of national cluster policy, with a dedicated and appropriately resourced executive team, (perhaps utilising existing experience and expertise in clustering) would provide a national coordinating structure, for all cluster organisations operating within Ireland.

In addition to administration of financial supports to cluster organisations, the functions of this entity could include but not be limited to:

- Designing and conducting funding calls in alignment with policy priorities and in line with available funding streams.
- Providing programme management and financial oversight and governance of cluster funding schemes.
- Providing support and technical assistance to the cluster organisations supported/funded under the National Cluster Programme.
- Enabling strategic dialogue between government departments, industry, cluster managers, the further and higher education sector, research and innovation actors, and government agencies.
- Facilitating cluster-to-cluster cooperation and learning and experience exchange.
- Supporting cluster organisations in developing an international profile.
- Taking an active role in the promotion of cluster membership among companies by raising awareness of the benefits.
- Emphasising the importance of excellence in cluster management in delivering long-term sustainable success for a cluster and supporting competence development and professionalisation of cluster managers.
- Working with cluster organisations to achieve a valid label, for example Bronze, Silver or Gold under the European Cluster Excellence Initiative (ECEI).

7 Innovation Norway (2017) Evaluation of Norwegian Innovation Clusters.

- Assisting in the identification of strategic partners and preparation of funding proposals.
- Facilitating independent performance reviews of funded clusters.
- Supporting the monitoring and evaluation of cluster initiatives.
- Educating and working with the enterprise ecosystem across Ireland, regarding the differences between clusters and networks, industry associations, etc.
- Being the conduit to organisations seeking to pivot and move towards a cluster model and the process involved in same.

Note: The scale and operational budget for this team would need to be determined based on agreed remit and the proposed operating model.

Adequate and long-term funding will be required to support these actions. Based on international evidence, the return-on-investment for clusters requires a more long-term view. A ten-year plus horizon may be necessary to determine the success of a future National Cluster Policy and whether investment in the associated support framework represents value for money. Furthermore, building trust and confidence among companies regarding the benefits of cluster participation takes time. As such, it is essential to allow sufficient horizon time for cluster organisations to achieve the requisite critical mass of companies and to establish appropriate funding models to achieve long-term sustainability.

MONITORING AND EVALUATION

Many international policy makers consider evaluation of cluster policies to be a key area of focus. Specifically, interest lies in the evaluation of the cluster organisations supported by policies to determine:

- The extent to which cluster policy is being efficient and effective;
- How the policy should evolve in the future; and
- How public resources should be allocated/prioritised to support the policy agenda.

The direct outcomes of most cluster policies have significant intangible elements, making it difficult to establish causal relationships with firm-level or regional impacts (which are simultaneously affected by other factors and policies). Despite these challenges, international experience highlights numerous methods to document the impact of clusters. While there is no international best practice regarding the most effective ways to showcase the impact and value of clusters to prospective members, government and broader society, a number of policy monitoring and evaluation capacities and practices may be considered.

The Central Statistics Office (CSO) Input-Output table may be used as a starting point to calculate the direct, indirect and induced impact of a National Cluster Policy and Framework. These tables, as a tool, link microeconomic and macroeconomic analysis of the structure of the Irish economy and highlight the inter-industry flow that lie behind key aggregates.

Alternatively, the identification of a hybrid of quantitative and qualitative targets/key performance indicators (KPIs) by policy makers and measuring performance against these targets may be considered as an effective approach to measure the success of the National Cluster Policy in delivering on its objectives and determining if investment in the National Cluster Programme represents value for money. Options for statistical data analysis may include, but not be limited to measurement of increased participation of companies in Irish cluster organisations, as well as productivity growth, job growth, new patents, exports and number of SMEs active internationally of participating versus non-participating companies. In tandem, qualitative surveys of cluster members and showcasing success stories may be one of the most effective ways to highlight the impact and value of clusters.

Regardless of the approach selected to monitor and review any future policy, it is important to recognise the challenges to understanding the full range of impacts of the policy. Additionally, there may be difficulties benchmarking the Irish performance against international comparators due to the variance in policy architecture across different jurisdictions.

In terms of the monitoring and evaluation of cluster organisation, the policy may also consider the utilisation of existing international best practice models for recognition of cluster excellence. For example, the European Commission ECEI established the European Secretariat for Cluster Analysis (ESCA) in 2009. The ESCA is focused on strengthening cluster management excellence and awards a bronze, silver and gold label to cluster organisations that meet the criteria corresponding to each quality level. For the policy to integrate this model, cluster organisations will work towards these standards which will attract international partners and obtain international recognition for the Irish cluster landscape.

Section 1 – Setting the Direction for Clusters and Clustering in Ireland

THE STRATEGIC CONTEXT

The Irish economy has consistently been one of the strongest performers in the European Union over the past decade. The composition of the Irish economy is notable for its diverse sectoral mix, the potent combination of multinational and indigenous companies, and its 'openness' to global markets – particularly in relation to exports. Furthermore, Ireland's enterprises, particularly those that are foreign owned, are embedded in global value chains.

Ireland's economy has seen a strong rebound since the COVID-19 pandemic. Employment is at a record level and well ahead of the 2024 target set in the Government's Economic Recovery Plan. GDP increased by 13.5% for the year 2021, and with 8.1% growth forecast for 2022[8]. Despite global economic challenges, Ireland continues to be at the forefront of the post-pandemic recovery in Europe.

The country's economic model is based on being pro-enterprise, having an export-oriented open economy, supporting entrepreneurship and innovation and being an attractive competitive location for international investment. The vision outlined in 'Enterprise 2025 Renewed', Ireland's enterprise policy, is for Ireland to be the best place to succeed in business - delivering sustainable employment and higher standards of living for all.

A strategic review of Ireland's current economic landscape indicates that the traditional competitive advantages appear to be under strain, with the low tax environment under increasing political pressure, particularly with changes relating to the OECD's Base Erosion and Profit Shifting (BEPS) actions[9]. Furthermore, megatrends such as automation, digitisation, decarbonisation and changing demographics, will influence significant structural shifts in the Irish workforce with increasing bottlenecks occurring regarding the supply of certain skills and occupations.

2022 has brought about seismic global economic challenges. Sentiment regarding the prospect of recession has worsened as disruption to global supply chains has risen and the prospect for inflation moved from transitory to more persistent and significant[10]. This has given rise to competitiveness challenges for Ireland arising from significant increases in cost of living.

Although Ireland's enterprise sector remains highly resilient, enterprises face challenges in responding to disruptive trends and opportunities accelerated by the pandemic and the increasing urgency to decarbonise. The Department of Enterprise, Trade and Employment is developing a White Paper on Enterprise to ensure that enterprise policy in Ireland adapts to meet these challenges, while simultaneously protecting the core elements which make Ireland's economy so attractive for investors, companies and workers. This is intended to ensure a resilient and sustainable Irish economy emerges.

Ireland's Economic Recovery Plan 2021 identified that strong and effective clusters have a key role to play in achieving national enterprise development objectives including maximising impact from Research, Development and Innovation (RDI) investment, strategic sectoral development, balanced regional development, addressing the productivity gap in the SME sector, boosting competitiveness and innovation, and supporting the green and digital transition. Further leveraging the potential from clustering in Ireland through the development of a coherent National Cluster Policy – as a significant element of our existing innovation and business support system – represents a key opportunity to drive industry competitiveness and contribute to greater economic development among multinationals and SMEs.

8 ESRI Quarterly Economic Commentary Autumn 2022. https://www.esri.ie/system/files/publications/QEC2022AUT_0.pdf
9 OECD BEPS and Irish Corporation Tax https://data.oireachtas.ie/ie/oireachtas/parliamentaryBudgetOffice/2022/2022-03-04_oecd-beps-and-irish-corporation-tax_en.pdf
10 Dublin Economic Monitor (2022) Issue 29, June 2022.

POLICY CONTEXT INTERNATIONALLY AND IN IRELAND

The 1990's saw the emergence of cluster policies across Europe. Initially, many jurisdictions drew heavily on Porter's cluster principles and methodology[4,25] for mapping trading clusters and adapting it to the needs and challenges of the relative jurisdiction. Interest in the cluster concept and cluster-based policies began in Ireland around this time with the publication of the 1992 Culliton report [11]. The Culliton report highlighted the importance of a competitive business environment for the development of enterprise and recommended the promotion of clusters following Porter's (1990) approach[4] – highlighting the need to build clusters based on existing local strengths.

Since the early 1990's, European cluster policy has evolved considerably. Cluster policy and programmes including those focused on the growth and development of formal cluster support organisations have become prevalent in economic development policy and practice within many industrialised countries internationally. There is increasing evidence of the concept of clusters and clustering featuring across the current suite of national enterprise policy documentation in Ireland, with the concept identified as a means to achieve certain objectives, including but not limited to:

- Capturing the benefits of Ireland's distinctive enterprise mix;
- Attracting and further embedding foreign owned companies;
- Stimulating the emergence and scaling of more innovative Irish owned enterprises;
- Tapping into opportunities emerging at the boundaries of existing sectors; and
- Taking advantage of convergence, maximising spill over effects, driving innovation, addressing the productivity gap.

Note: A summary of the key relevant national and international enterprise and economic policies featuring the cluster concept is outlined below.

These developments are encouraging and signal that Ireland is becoming increasingly aligned to the European policy landscape. However, although the opportunity and potential benefits of greater levels of clustering are widely acknowledged in Ireland's economic, social and environmental development dialogue, and there has been significant policy focus on collaborative industry academic research and innovation over many years[12], Ireland has yet to develop a national approach to embedding clustering within economic development policy and practice.

In the last ten years a number of Irish State agencies, local economic and enterprise development organisations across the ecosystem began concerted efforts to support clusters. For example, IDA Ireland began to support the clustering agenda in the early 2000's, reporting that *'developing clusters of excellence where companies, business service providers, and those in education and research network together to create a climate of innovation and entrepreneurship is a key area of IDA activity'* [13]. Similarly, Enterprise Ireland also began to support the cluster concept in the early 2000's. These actors have provided supports to clusters in line with their individual policy agendas – be it supporting cluster organisations as instruments for business competitiveness, tackling regional disparities, or promoting internationalisation. However, the emerging cluster organisation landscape is relatively nascent and, in some cases, fragmented. Ireland's Economic Recovery Plan commits to the development of an overarching National Clustering Policy and Enabling Framework to ensure strong impact from existing and future clusters in Ireland.[3]

The evidence gathered and presented in this report supports clustering and cluster organisation development as a strong policy lever to foster cooperation processes within and across sectors to innovate, develop competitive advantages and advance in international markets. Furthermore, clusters can be used as an organising principle to align a number of functional policies such as: business attraction; export promotion; market information and disclosure; specialised physical infrastructure; education and workforce training; science and technology infrastructure; setting standards; environmental stewardship; and natural resource protection. Government policies to strengthen the cluster landscape and promote joint actions with other national policies have potential to improve the innovative and business environment for cluster members.

11 Moore McDowell (1992) The Culliton Report: A Critical Response

12 In Ireland, there has been a strong focus on promoting collaborative innovation and industry-academic linkages between enterprise for over thirty years. Ireland began to invest in Research, Development and Innovation (RDI) in the early 2000's with the establishment of Science Foundation Ireland (SFI). Since then, collaborative RDI has been promoted through the establishment of Centres for Science, Engineering and Technology (CSETs) which have evolved into the SFI research centres currently in the ecosystem.

13 IDA Ireland (2003) Annual Report 2003

STRATEGIC POLICY LANDSCAPE

- **Ireland's Economic Recovery Plan 2021** [3] recognises that, while Ireland's current enterprise support framework promotes collaboration, clustering and linkages between enterprises and Higher Education Institutions through a range of initiatives, there is a need for an overarching framework. This framework must maximise the potential of clustering as a policy to deliver national enterprise policy objectives and support economic recovery, enterprise competitiveness and resilience and the green and digital transition.
- **Enterprise 2025 Renewed** [1] states that our enterprise policy should consider alternative options to stimulate clustering activities of scale and international visibility that builds on existing initiatives and harnesses diversity in sectors and foreign and Irish owned enterprises. An increased emphasis on collaboration, clustering and connections will aspire to strengthen resilience and to encourage sustainable growth throughout the regions.
- **Future Jobs Ireland (2019)** [2] noted that participation in clusters enables easier collaboration among SMEs and strengthens their absorptive capacity through promoting best practice and knowledge sharing. In this regard, it is asserted that clusters established through the Regional Innovation and Technology Programme will further strengthen the capability of the Institutes of Technology/Technological Universities in a measured way, creating centres of excellence to drive high-levels of entrepreneurship and spinouts across the regions.
- The publication of the **National Social Enterprise Policy for Ireland 2019-2022** [14] fulfils a commitment in the Action Plan for Rural Development and Future Jobs Ireland, recognising the importance and contribution of social enterprises to several key socio-economic objectives of the European Union, including high quality employment, job creation, social cohesion, access to services, social and environmental innovation, promotion of entrepreneurial culture and local and regional development.
- Under the European Union's **Social Economy Action Plan**,[15] the European Commission has committed to supporting Member States and stakeholders to boost the social economy and social innovation in rural areas through the future EU network for the Common Agricultural Policy and further integrate the Clusters of Social and Ecological Innovation (CSEI).
- **Ireland's Smart Specialisation Strategy**[16] is an innovation policy concept where the goal is to increase regional enterprise innovation, thereby resulting in growth and success by assisting and supporting regions to concentrate on their respective assets. The Department of Enterprise, Trade and Employment has recently launched an updated Smart Specialisation Strategy for Ireland, until the year 2027. It includes consultation at a regional level, including through updated Regional Enterprise Plans to 2024 (REPs), which will allow for a local and regional insight to innovation priorities. Ireland's approach to smart specialisation is demonstrated in Ireland's research and innovation strategy, Impact 2030, which has been developed by the Department of Further and Higher Education, Research, Innovation and Science.
- **Impact 2030, Ireland's Research and Innovation Strategy**[17] seeks to progress objectives shared across the Irish Research and Innovation system such as maximising its impact on public policymaking and implementation, and nurturing and attracting talent. Specifically, it acknowledges the use of clustering initiatives to drive innovation and competitive advantage. Strengthening links between SMEs, multinationals, public research performing organisations and others will be an important focus for the research funding and enterprise agencies under this Strategy, to realise technology, innovation and skills spillovers.
- The development of a National Clustering Policy is cited by the **National Development Plan 2021 – 2030**[18] as being a significant step in promoting the emergence and further growth of large-scale, self-sustaining, business-led clusters, whose scale and influence in an international context can help strengthen the performance of enterprises in Ireland.
- The **SME Growth Plan**[19] recognised the need for coordinated supports for clusters in Ireland, which will enhance SMEs ability to grow and internationalise while also improving firms' organisational agility as they learn from best practice on emerging challenges, including the transition to the low carbon economy through a specific call for climate clusters.
- Likewise, the **Climate Action Plan**[20], the Government's action plan to achieve a 51% reduction in the State's overall greenhouse gas emissions by 2030, recognises clusters as having a role in ensuring the achievement of this objective.

14 Department of Rural and Community Development (2019) National Social Enterprise Policy for Ireland 2019 - 2022
15 European Union (2021) Social Economy Action Plan
16 Department of Enterprise, Trade and Employment (2022) National Smart Specialisation Strategy for Innovation
17 Department for Further and Higher Education, Research, Innovation and Science (2022) Impact 2023: Ireland's Research and Innovation Strategy
18 Department of Public Expenditure, NDP Delivery and Reform (2021) National Development Plan 2021 - 2023
19 Department of Enterprise, Trade and Employment (2021) Report of the SME Taskforce: National SME and Entrepreneurship Growth Plan
20 Department of the Environment, Climate and Communications (2021) Climate Action Plan 2021

STRATEGIC POLICY LANDSCAPE

- In terms of supporting employment in rural Ireland, through **Our Rural Future** [21] there is a commitment to develop an overarching Clustering Policy and Framework Programme to drive effective clustering and connections amongst SMEs, multinational corporations and the third-level sector to boost competitiveness and innovation throughout the regions.
- At an EU level, clustering has been recognised as an effective policy instrument for many years. In 2020, the European Commission released **'European Panorama of Clusters and Industrial Change'** [22]. This report outlines that industrial clusters are responsible for a significant share of European jobs, SME growth and specialisation within regions. This report analyses cluster strength across 51 exporting industry sectors in Europe and identifies 2,950 regional industrial clusters, which account for almost every fourth job in Europe (61.8 million jobs or 23.4% of total employment) and about half of employment in exporting industries (50.3%).
- The **2020 New Industrial Strategy: Building a Stronger Single Market for Europe's Recovery** [23] outlines a roadmap for how the EU's globally leading industries can take the lead in relation to both the twin green and digital evolutions. In relation to clustering, this document outlines that strategic needs can chiefly affect the shortage of vibrant start-up communities. With a combined budget in 2021, totaling €61 million under the Single Market Programme, the European Cluster Collaboration Platform and Enterprise Europe Network will implement strengthened measures to support SMEs in tackling disruptions and vulnerabilities or diversify by linking them to new partners on both a local and cross-border basis in order to strengthen SME resilience.
- In 2020, the European Commission released **'European Panorama of Clusters and Industrial Change European Expert Group on Clusters'** [24] which reaffirms that clusters have the potential to accelerate twin green and digital transitions, build resilience and boost recovery. This report outlines that clusters demonstrated the capacity to drive change and make European value chains more resilient during COVID-19. In this regard, the report stated that such networks quickly reach European firms, especially SMEs, and improve their innovation potential, technological uptake, skills and internationalisation.

21 Department of Rural and Community Development (2021) Our Rural Future: Rural Development Policy 2021-2025
22 European Commission (2020) European panorama of clusters and industrial change
23 European Commission (2020) Updating the 2020 New Industrial Strategy: Building a Stronger Single Market for Europe's Recovery
24 European Commission (2020) European Expert Group on Clusters Recommendation Report

THE CLUSTER CONCEPT

The concept of clusters has been widely examined since its emergence over thirty years ago [4]. Clusters are distinct from geographical concentrations of industries, networks, industry associations, research centres, enterprise centres and innovation hubs. All of these individual concepts consist of co-located and/or linked industries, government, academia, finance and institutions for collaboration, and facilitate industrial transformation to influence economic growth. Although each of these concepts complements the other within the enterprise landscape, there are important characteristics that distinguish clusters from these groups. It is also important to note that the cluster concept or clustering is not synonymous with cluster organisations, cluster initiatives or cluster programmes, which aim to activate clustering.

Clusters are *widely acknowledged as a type of activity-specific system, situated within broader regional innovation systems, where interaction between actors supports quicker diffusion and absorption of knowledge, more effective innovation and efficient solutions to a range of other localised drivers of competitiveness* [25] such as skills and specialised infrastructure to promote industry academic linkages. By coordinating and steering activities designed to strengthen relationships between cluster stakeholders and promote collaborative actions around shared opportunities and challenges, a cluster enhances competitiveness for local industries and draws investment to the region.

Cluster organisations traditionally adhere to an operational framework that encourages collaboration between industry, academia and government, known as the triple helix model, in order to promote innovation, attract talent and ensure a solid international presence in priority sectors. Both theory and practice suggest that cluster organisations benefit from adherence to this model. Evidence suggests that the traditional triple helix model is being expanded to a quadruple helix organisation model, i.e., encouraging companies, knowledge/education institutions, public partners and civil society, or social actors to take an active part.

DEFINITIONS

Although used widely in policy discourse in Ireland over many years, due to the absence of an agreed, clear and consistent definition, the term 'cluster' is used in different ways to describe many different types of organisations and may be a 'misnomer' in many contexts.

The 1998 Porter model is well established as the genesis for the most commonly used definitions of clusters. According to Michael Porter *"clusters are geographic concentrations of interconnected companies and institutions in a particular field"* [26] that compete and collaborate at the same time. While clusters were originally described and defined in these terms, many academic, economic and development policy agencies have adapted their own definitions of clusters.

Consultation and discussion with the Department of Enterprise, Trade and Employment National Cluster Policy and Framework Development Steering Group led to the identification of the following working definition for clusters. These definitions consider the many definitions found in the literature about clusters and clustering and interprets them relative to the Irish context.

Cluster

Clusters are geographic interactive alliances of interconnected enterprises, research centres and associated institutions in particular fields that compete, cooperate and face common challenges and opportunities.

25 Wilson, J. Wise, E. Smith, M (2022) Evidencing the benefits of cluster policies: towards a generalised framework of effects.
26 Michael E. Porter (1998) Clusters and the New Economics of Competition

Cluster Organisation

Cluster organisations are formal institutions that are established to facilitate increased interaction and cooperation between participants in an existing cluster or an emerging concentration of enterprises in a particular sector/activity. They are responsible for organising, facilitating, managing, and leading the complex efforts required to increase the growth and competitiveness of a cluster. A cluster organisation is based on an organised partnership between participants in a cluster, often with public development agencies as an important contributor.[27]

Cluster organisations are the focal point for cluster development. The cluster organisation acts as the coordinating body of the unique activities identified by the cluster to match the specific challenges it faces. Cluster organisations strengthen member companies at an individual and at a collective level. They will typically focus their activities towards:

- Building an identity, strategy and brand for the cluster;
- Enhancing innovation through collaboration between members across innovation gaps and joint R&I projects; and
- Business development among member firms (export promotion, commercial cooperation and joint purchasing).

The factors that underpin the development of successful cluster organisations include: critical mass; related variety; geographic proximity of the relevant actors; cooperation; and competitive rivalry.

Cluster Initiative

Cluster initiatives are collaborative activities by a group of companies, public sector entities, and other related institutions with the objective to improve the competitiveness of a group of interlinked economic actors in a specific geographic region.

Cluster initiatives focus on boosting productivity, enhancing competiveness, maximising efficiency and driving innovation. They can create, maintain, or grow the competitiveness of a cluster by strengthening linkages among its members or facilitating collective action to address a cluster-specific challenge. Typically, cluster initiatives are self-organised, follow a bottom-up approach and are managed by cluster organisations. Common activities include:

- Networking;
- Skills Development;
- Research, Development and Innovation (RDI);
- Internationalisation; and
- Business Development.

27 Note: The choice of legal and organisational form depends on the goals of the cluster. Possible legal forms for a cluster organisation include: Association (non-profit or for-profit); Private limited company (Ltd.); Public-private partnership; and a cooperative agreement.

Cluster Policies

Cluster policies are an expression of national commitment, composed of a set of specific government policy interventions that aim to strengthen existing clusters and/or facilitate the emergence of new ones.

Modern cluster policies aim to put in place a favourable business ecosystem for innovation and entrepreneurship in which new opportunities can emerge and thus support the development of new industrial value chains and 'emerging industries'. 'They should follow a systemic approach that combines different policies, programmes and instruments'.[28]

Cluster Programme

Cluster programmes establish a framework that enables implementation of cluster initiatives, allocation of funding, creating organisational responsibilities and defining the specific conditions to increase the competitiveness of the national or regional economy.[6]

A **Cluster Programme** is typically a partnership between cluster organisations and public agencies that offers different funding schemes, instruments and approaches to develop a cluster organisation in terms of its cluster management, cluster members, the organisation itself or the framework conditions in which it operates.

Cluster programmes should be designed based on the specific context under which they operate. Depending on the age, economic performance, financial sources, subsidies, etc. of a cluster, it can be categorised at different stages of development, i.e., emerging, growth, maturity, decline or renaissance. Furthermore, the importance of the cluster organisation, in particular the cluster manager leading the complex efforts to support the competitiveness of the cluster, needs to be considered when establishing a cluster development programme.

28 European Cluster Collaboration Platform (2022) Cluster Definitions: Cluster policies.

NETWORKS

Networks can be described as alliances between firms which work together towards a common economic goal.

While clusters and networks can complement each other, it is important to recognise that networks are distinct from clusters. Key distinctions include:

- Networks link and connect businesses to support the diffusion of knowledge and information to support a common goal. In contrast, clusters additionally promote the development, enterprise-research collaboration, investment in RDI, skills development and internationalisation of indigenous enterprise.
- Networks can be established between firms within a cluster but may also exist outside clusters.
- Clusters refer to interconnected companies and institutions in a particular field and typically operate across narrow sector lines. Additionally, cluster organisations typically have a shared or synergistic or mutually reinforcing agenda or focus. Networks may be sector specific, but also may also develop among firms that are interconnected due to geographical proximity.

RESEARCH CENTRES

Irish research centres [29] have provided the foundation for effective and productive academic and industrial research partnerships over many years. Research centres are structured units established with the purpose of bringing various disciplines and industrial partners together and successfully promoting innovation at the boundaries of industry through collaborative research. These units typically form formal associations with Higher Education Institutes (HEIs) to enable interaction between faculty, scholars, students, and industry to enhance research opportunities, academic excellence, real-world problem solving and knowledge creation and dissemination. Initiatives such as Knowledge Transfer Ireland actively support links between academic research and industry, and the commercialisation of academic research outputs.

Industry academic collaboration (including through research and technology centres and partnering with further and higher education institutes), fulfil the 'academia' role within the triple or quadruple helix organisation model for clusters. These stakeholders can provide the innovation arm to clusters by facilitating partnership with SMEs and industry on targeted R&D and providing access to facilities.

Since the early 2000's, Ireland has invested in the development of a connected ecosystem for collaborative RDI with the establishment of:

- **Science Foundation Ireland (SFI) Research Centres |** The SFI Research Centres Programme was launched in 2012 to deliver a network of world-leading, large-scale research centres that will provide major economic impact for Ireland. The network consists of 16 Research Centres, partnered with 17 national HEIs. A key focus of SFI research centres is to increase the level of industrial and commercial investment in RDI activities with existing Ireland-based companies, and furthermore to attract large Foreign Direct Investments in corporate RDI laboratories. They also aim to transfer knowledge, expertise and technology, through licences, to MNCs and SMEs based in Ireland.
- **Enterprise Ireland (EI) Technology Gateways |** The Technology Gateway Programme (TGP) was established by Enterprise Ireland to provide business development resources to the Institutes of Technology (IoTs) to help them interact with industry on a local, regional and national basis. The TGP supports a network of 15 Technology Gateways across nine IoTs and TUs, with each Gateway founded on technology themes which have been endorsed by industry and charged with delivering technical solutions to the near-term needs of industry. The Gateways provide IoTs and TUs with dedicated resources who work closely with industry to identify and articulate their problems in a manner which allow the Institute's research base to address them. This is achieved by targeting the industry sectors relevant to the core research capabilities of the group.
- **Technology Centres |** The Technology Centre programme is a joint initiative between Enterprise Ireland and IDA Ireland. It allows Irish companies and multinationals to work together on market focused strategic RDI projects in collaboration with research institutions. The ten Technology Centres in the programme are resourced by highly qualified researchers who provide a unique ecosystem for collaboration in areas identified by industry, as being strategically important.

29 In Ireland, there has been a strong focus on promoting collaborative innovation and industry-academic linkages between enterprise for over thirty years. In the early 2000's, Ireland began to invest in Research, Development and Innovation (RDI) with the establishment of Science Foundation Ireland (SFI). Since then, collaborative RDI has been promoted through the establishment of Centres for Science, Engineering and Technology (CSETs) which have evolved into the SFI research centres currently in the ecosystem.

BENEFITS OF CLUSTERS

Porter identified many theoretical benefits of clustering resulting from the cooperative dynamics that emerge among the companies, HEIs, research centres, training organisations, government bodies and other actors that make up a cluster. His work on clusters (1990, 1998)[4,25] highlights how clustering supports companies to operate more productively, be more innovative and achieve better access to employees, suppliers, more specialised information and specialised research institutions. Furthermore, his research, among others, highlights how participating companies broker 'complementarities' with other cluster participants, thereby being able to experiment more efficiently and at a lower cost.

There is now a well-researched and evidence-based correlation between clusters, innovation, competitiveness and economic development. Many empirical studies illustrate the positive effect clustering has on innovation, productivity (especially among small firms), on regional development and on economic growth.[24] For larger or multinational companies, clusters provide significant opportunities for cooperation on the talent and skills agenda, vertical integration of their supply chain within the local ecosystem, to build local inputs into their systems and strengthen the voice for industry to lobby specific sectoral needs.

Clusters contribute to employment, job creation, market resilience and innovation.[21] Furthermore, clusters are a key instrument to support companies access global markets through connectivity and partnerships formed between different cluster organisations and cluster members across the world.

Cluster organisations function as collaborative platforms in which participating enterprises gain access to knowledge and collaboration with research institutions and other enterprises, as well as public sector bodies. They play an important role as drivers of growth and innovation nationally, regionally and locally.

High-performing cluster organisations play a significant role in increasing competitiveness by delivering innovation, competitiveness and productivity in national and international markets within traded industries. Specific notable benefits of successful clusters include, but are not limited to:

- Companies and other cluster members typically operate with a higher level of efficiency, drawing on more specialised assets and suppliers with shorter reaction times than they would working in isolation.
- Companies and research institutions can achieve greater levels of innovation with knowledge spillovers and more targeted research.
- Companies active in cluster organisations are more likely to innovate compared with similar companies who don't participate in cluster organisations.
- SMEs active in cluster organisations are more likely to have international activities.
- The level of business formation tends to be higher in clusters as there is a reduced cost of failure as entrepreneurs can fall back on local employment opportunities in the many other companies in the same field that are operating within these clusters.

Empirical evidence illustrates that clustering can stimulate higher productivity, internationalisation, innovation and entrepreneurship, across industry and knowledge institutions, with both regional and national economic benefits [30]. The growth stimulated by cluster organisations can be attributed to:

- Knowledge spillovers facilitating the sharing of marketing opportunities and technologies across the value chain;
- A changing labour market, specifically the opening the labour markets, which leads to higher wages, specialised training, skills development and job security as more opportunities are available; and
- Access for firms to intermediate supplier industries of materials and components, finance, marketing and business services.

The evidence gathered clearly illustrates the benefits of clustering as a tool for sectoral and economic development, enhancing business performance and enhancing innovation. As such, economic prosperity can be achieved by a strong cluster landscape and supporting framework of a National Cluster Policy. The benefit of Ireland's policy position being developed at a national level include:

- Coordinate the cluster landscape to drive the vision of cluster development, and maximise impact;
- Establish a cohesive cluster specific infrastructure that will enable specialisation of clusters;
- Strengthen the existing network structures and ensure there is a coordinated approach regarding quality criteria and funding allocations;
- Promote national and all-island network creation;
- Stimulate connectivity with international players by facilitating access to global platforms and partnership databases;
- Encourage collaboration across all stakeholders across an ecosystem through targeted activities, investments and initiatives;
- Increase the co-location of players by helping to mobilise firms and local stakeholders on cluster specialisation;
- Be central in developing integrated strategies such as inward investments, training and innovation, driving policy measures and increasing synergies across the landscape; and
- Provide information and advice to groups that are seeking to move towards the development of a cluster organisation in specific industry segments that align with national policy.

30 *Jonathan Potter (2022)* Presentation to the Department of Enterprise, Trade and Employment.

CLUSTER POLICY VISION FOR IRELAND

Clusters have been widely recognised as an effective policy instrument for many years. Strong and effective clusters may be an effective tool in Ireland achieving several national enterprise policy objectives, including maximising impact from RDI investment; balanced regional development; increasing SME productivity; enhancing the ability of high potential SMEs to scale and for MNCs to achieve stronger partnerships with supply chain contributors; boosting competitiveness and innovation; and supporting the green and digital transition.

A national cluster policy has been demonstrated in several other jurisdictions as being a key enabler for a coherent and coordinated approach to clustering. The key issue for Irish policy makers is to consider how Ireland can seek to best harness the potential of a coordinated national approach to clustering to enhance enterprise development and the economic gains that arise, as committed to in the Government's Economic Recovery Plan.

This report aims to assist the development of a national clustering policy and framework by offering:

- Clear definitions and a vision for clustering in Ireland;
- A comprehensive understanding of the existing cluster landscape;
- A synthesis of stakeholder views and expert opinion from an extensive consultation process, nationally and internationally; and
- A review of cluster policy in leading jurisdictions internationally with learnings and examples informing a set of policy options for consideration in the development of a National Cluster Policy.

The Department of Enterprise, Trade and Employment seeks to ensure a strong impact from existing and future clusters in Ireland. It is envisaged that the National Clustering Policy will establish a cohesive and strategic national approach to enabling cluster development and leverage the potential of clusters as a policy tool that can help to deliver enterprise policy objectives. This includes enhancing the visibility of Irish businesses in international markets, improving Ireland's attractiveness for new business investment, strengthening SME productivity, enterprise competitiveness and resilience and as a driver of green and digital transition. In addition, many international jurisdictions are integrating cluster policies into smart specialisation strategies by using clusters as a tool to implement RIS3. Therefore, opportunities exist for a National Clustering Policy and Framework to develop Ireland's sectoral comparative strengths, while concurrently finding new opportunities for growth.

Consultation with national and international stakeholders, as well as discussion with the Department of Enterprise, Trade and Employment National Cluster Policy and Framework Development Steering Group has led to the identification of the following broad, working vision for clusters and clustering in Ireland:

VISION FOR CLUSTERING IN IRELAND

The **vision for clusters and cluster policy in Ireland** is to develop a centrally coordinated concentrated ecosystem of excellent clusters and supportive cluster organisations that are internationally competitive and have a positive impact on national financial, social and knowledge economies and sustainable development. Furthermore, it is intended that a future cluster policy will be in full alignment with the national enterprise policy and will bring added value to Ireland's existing enterprise support framework.

While there are several key areas that require consideration in the development of emerging policy options, it is suggested that critical success factors for the policy be considered in the context of two distinct lenses:

- The relative performance of cluster organisations, particularly in the context of amplifying connectivity and collaboration between cluster members; and
- The role that clusters play in diversifying the Irish economy, improving national competitiveness and supporting the implementation of the wider enterprise policy agenda.

Section 2 – International Case Studies

INTRODUCTION

The 1990's saw the emergence of cluster policies across many international jurisdictions. Over the past three decades, cluster-based policy has become a common feature in both economic development policy and practice across EU Member States and the wider international landscape. International examples show how an efficient cluster policy can tangibly grow economic activity and develop a strong indigenous population of competitive and innovative enterprises.

Examining the experiences of international jurisdictions provides valuable learning and insights for Ireland and its unique and specific context. Recognising the merits of learning from other models and experiences in order to inform future policy direction, six countries with dedicated cluster policies and programmes in place were identified for detailed examination. A number of cluster programmes in small advanced economies, as well as regions financing cluster-centred economic development were identified as leading examples of cluster policy development.

Information was gathered via primary research, facilitated by one-to-one consultations with representatives from the international authorities responsible for overseeing the relevant cluster policy or programme. Consultations focused on gathering a robust understanding of the relevant policy architecture as well as the associated support framework.

APPROACH TO CASE STUDY SELECTION

The approach for this study involved an extensive consultation process with a number of key stakeholder groups considered relevant to the Irish context. As part of this process, key stakeholders identified 18 credible exemplar models for international cluster policies and programmes. In order to gather the sufficient level of detail required to support a robust options appraisal, the long list of 18 credible examples was reduced to a short-list of case studies for further investigation.

The initial short-listing process evaluated each of the 18 identified examples against the following high-level criteria:

- **Scale** – both in terms of population size and geographic jurisdiction.
- **Policy context** – taking into consideration the comparative strategic and policy context.
- **Citations** – taking into consideration which case studies were repeatedly cited by stakeholders.
- **Exemplary status** – the level of international recognition associated with relative case studies.

Applying these criteria, a short-list of nine case studies was confirmed.

Once the short-listed case studies had been identified, a targeted data gathering and consultation process was undertaken to develop a full understanding of the context, cluster policy and cluster programme under consideration. Summary reports were developed for each of the short-listed case studies. These summary reports were structured to enable comparative analysis and facilitate a more detailed options appraisal.

The nine case studies were compared and evaluated in an objective way. This was achieved by scoring each option in a rational manner against evaluation criteria. The six highest scoring case studies were recommended for detailed analysis. The case studies ultimately selected as the best comparisons for Ireland were: Upper Austria; The Basque Country, Spain; Catalonia, Spain; Denmark; Flanders, Belgium; and Norway.

UPPER AUSTRIA, AUSTRIA

Austria was an early mover in policy to support regional cluster organisations. Austria has numerous high-performing clusters and networks in technological and economic fields of strength that enhance the national and international competitiveness of their cluster companies, especially SMEs, through innovation and cooperation. Austria's National Cluster Policy, the National Cluster Platform (NCP), supported by the Austrian Federal Ministry for Digital and Economic Affairs provides the framework for each of Austria's nine federal territories to develop individual cluster programmes. Regional cluster programmes are intended to support the National Cluster Policy and strive to have a complementary effect. The region of Upper Austria has supported a competitive economy through strategic programmes focused on innovation since the 2000's. The government agency Business Upper Austria supports the cluster programme *'Clusterland' Oberösterreich*.

The NCP represents the central interaction and cooperation platform for Austrian cluster stakeholders including cluster institutions, cluster members and cluster experts. The main objective of the NCP is to provide a platform whereby federal and regional cluster stakeholders develop joint initiatives focused on Research, Technology and Innovation (RTI). It is intended that the establishment of linkages between cluster stakeholders will contribute to the successful interaction of science, research and business and hence strengthen the innovation, internationalisation and growth in domestic companies.

The NCP is open to cluster organisations and cluster networks, supporting organisations and public institutions. It supports stakeholders across industry, academia and government. Some of these beneficiaries include: SMEs; research organisations; academic institutions; start-ups; business associations; technology centres; cluster organisations; and NGOs. The NCP is funded entirely by the Austrian Federal government. However, funding for Austrian clusters is provided by different government agencies at different levels of government including the EU.

As of 2019, the Austrian cluster landscape of high-performing clusters and networks in technological and economic areas features over 70 clusters and networks with more than 7,500 cluster members (75% SME) and around 850,000 employees. The overarching goals of these clusters and networks is supporting and enhancing the national and international competitiveness of member companies through innovation, research and cooperation. The cluster organisations and cluster networks must operate as a non-profit and on an open-membership structure.

EVOLUTION OF UPPER AUSTRIA CLUSTER POLICY

Upper Austria's cluster policy was established with a focus on ensuring competitiveness, strengthening innovation, achieving socio-economic prosperity and attaining economic growth. Furthermore, the policy approach was designed to support industrial restructuring, regional development and was integrated with strategic regional development plans.

Following the introduction of the cluster concept in 1998, there have been four distinct periods of evolution for cluster policy in Upper Austria. The periods of evolution and their main features are outlined below:[31]

- **Upper Austria 2000+ (1998 – 2004) |** The first evolution aligned with the first strategic programme in 1998 when the cluster concept was introduced to the region. The objectives of the programme focused on identification and establishment of clusters and cluster initiatives, enhancing the economic impact of clusters, and supporting the regions RDI. At this time, Clusters were supported by public funding and approximately €20 million was allocated to support the seeding of clusters.
- **Innovative Upper Austria 2010 (2005 – 2010) and Innovative Upper Austria 2010 Plus (2011 – 2013) |** The next period aligned with the second and third strategic programmes focused on research, technology and innovation. Clusters were perceived as key to strengthen regional innovation and competitiveness. Therefore, *'Clusterland' Oberösterreich*, the Upper Austrian Cluster Programme, was established to further develop and strengthen maturing clusters. The goal of the programme was to strengthen existing clusters, and to facilitate internationalisation, technology advancement and cross-cluster spillovers. Industrial priorities were also set up to develop other sectors and vertical networks to assist clusters in innovation. During this period, clusters were financially supported by both public funding and private funding through membership fees.
- **Innovative Upper Austria 2020 (2014 – 2019) |** After three strategic programmes, a strategic economic and research programme, *Innovative Upper Austria 2020*, was developed. This cluster policy highlights independent and mature clusters, building on the strengths of existing clusters in line with the 'smart specialisation' concept. The process involved an analysis of Upper Austria's technical core competencies and critical mass to identify established regional clusters focus on regional sector specialisation.
- **Upper Vision 2030 (2020 – 2030) |** Upper Vision 2030 is Upper Austria's current cluster programme. The programme aims to promote the development of products, services and technologies that will generate more founding, research, technology-orientated and exporting companies in Upper Austria. It is focused on new domains which will influence future competitiveness including sustainable development, and digital transformation and mobility and is delivered using a more flexible approach which required cluster organisations to prepare annual strategies.

CLUSTER PROGRAMME

The federal regional development agency, *Business Upper Austria*, is responsible for overseeing the implementation of cluster activities, policy and the local cluster programme, *'Clusterland' Oberösterreich*. Within Business Upper Austria,

31 *A. Konstantynova (2016)* Regional Cluster Policy and Economic Development: Case study of the Basque Country and Upper Austria

the Department for Cluster and Cooperation is responsible for administration of the cluster programme, as well as the provision of expertise to cluster organisations to increase competitiveness of cluster members, enhance innovation and promote cooperation. Specifically, the scope of services provided to cluster organisations by Department include, but are not limited to:

- Conduct market analysis, identify current and future trends, identify business development opportunities and alert cluster organisations to potential funding opportunities.
- Organise seminars, workshops and networking events to facilitate cluster-to-cluster cooperation and learning and experience exchange.
- Maintain and provide access to a 'partner database' to support cluster organisations connect with domestic and international partners for innovative cooperation projects. Furthermore, the Department for Cluster and Cooperation plays a role in brokering connections between strategic partners and supports relationship building to strengthen connections. Specific areas of focus include supporting local cluster organisations to connect with:
  - National, European and International networks, for example, the European region Danube-Vltava (ERDV) and Enterprise Europe Network (EEN).
  - Academic partners and research organisations, for example, the lightweight technology platform (A2LT), Initiative Smart Plastics, and Initiative Connected Mobility (ICM).
  - Strategic supports for the assembly of funding applications.
- Drive marketing and PR activities to increase the visibility of cluster organisations and success stories nationally and internationally.

The Department of Cluster and Cooperation employs approximately 70 people. Furthermore, the Department employs all cluster managers, who sit centrally in the department on one floor. This model has proven to be essential in the exchange of ideas for cross-cluster innovation projects. Although the cluster managers in Upper Austria have a range of responsibility, their main role is building trust with companies. Therefore, Cluster managers must have considerable industry expertise to demonstrate value to cluster participants.

'Clusterland' Oberösterreich currently supports nine cluster organisations. These cluster organisations were selected to align existing regional strengths. The specified sectors were identified by GDP contribution of the sector, critical mass, engagement in innovation activities, and an assessment of the linkages across the regional value chain.

The role of cluster organisations is to support RDI activities through collaboration and some internationalisation activities. *'Clusterland'* cluster organisations do not engage in lobbying, training and skills. Business Upper Austria have identified the critical mass for cluster organisations as requiring a minimum of 100 relevant companies within the value chain to support a cluster in a specific industry.

The cluster organisations supported by the cluster programme are not legal entities. Instead, cluster organisations are effectively departments within the regional development agency (Business Upper Austria). By way of governance, an advisory board made up of representatives from large companies, SMEs and academia are appointed to each cluster.

FUNDING STRUCTURE

The Department of Cluster and Cooperation is allocated a lump sum of approximately €2 million per year to fund cluster organisation operational costs. The €2 million is distributed between the nine cluster organisations, with greater levels of funding directed towards more immature cluster organisations or those operating in less profitable sectors.

'Clusterland' supports cluster initiatives through public, private partnerships (PPP) initially up to 90%. While the State will provide a weighted upfront investment for cluster initiatives, State support is reduced over a period of ten years to leverage greater levels of private funding. After ten years, mature clusters typically achieve self-financing at a rate of circa. 30:70 State to private funds. The funding model for mature cluster organisations will include:

- Annual membership fees;
- Specific services sold to members, for example, project management services on cooperative innovation projects; and
- Match funding for EU projects.

The future prospect of PPP in Upper Austria is to reach 110% private funding. The benefit to increasing the overall profitability of cluster organisations includes enabling profits to be shared among cluster members, providing cluster organisations with the capacity to strive for larger innovation projects and to participate in more sophisticated collaborative activities with cluster members.

As of year-end 2021, 813 regional cluster-cooperation projects (59 being EU funded) with 2,992 participating companies have been supported through Upper Austrian cluster programmes. It is considered imperative for the success of the cluster initiative that these cluster members engage in collective innovative activities and collaborate on projects. Therefore, a key measure of success is the number of cluster partners/members across the value chain engaged in the clustering activities.

EVALUATION

Several KPIs are used to evaluate the success of *'Clusterland'* and the cluster organisations funded through the programme. The focus of the identified KPIs relates to the structure of cluster organisations, level of cooperation, and professional services discharged. Specific KPIs include, but are not limited to:

- Number of participating partners;
- Percentage of SME within cluster organisations;
- Average annual partner fee within cluster organisations;
- Number of partners from Upper Austria/other Austrian regions/abroad;
- Number of producing partner companies/service suppliers/RDI bodies and educational institutions;
- Number of new partner companies within period/number of leaving partners within period;
- Average RDI quota within cluster organisations;
- Number of press reports in professional journals/in-print media about cluster organisations;
- Number of events since establishment of cluster organisations;
- Number of participants attending events since establishment of cluster organisations;
- Number of hosting delegations from abroad;
- Project volume of cooperation projects since establishment of the cluster organisations;
- Funding volume of cooperation projects since establishment of the cluster organisations;
- Percentage of technology-orientated cooperation projects since establishment of the cluster organisations; and
- Number of ongoing national or international co-funded cooperation projects.

Furthermore, *'Clusterland'* also measures customer satisfaction through a partner survey. The objective of the customer satisfaction survey is to evaluate the:

- Customer satisfaction/customer retention index;
- Awareness of offered services;
- Quality of offered services and the customer service provided; and
- The ideas and demands for further services.

BASQUE, SPAIN

Since the 1970's the Basque Country has succeeded in achieving substantial industrial restructuring from an economy rooted in heavy industry[32]. Central to this successful transformation strategy was close cooperation among all levels of government and between public and private sectors, as well as a shared ambition to achieve balanced social and economic development.

Following a period of economic decline in the region resulting from the loss of its traditional industry competitive advantage, the Basque Country began to recognise the need to develop new, specialised and sustainable advantages in order to compete in international markets. Thus, the Basque Country sought to develop targeted, cluster-based industrial policies, which would allow government to support dynamics of local competitiveness.

According to the Basque Institute of Competitiveness, the 1980's were *"defined by the creation of the new regional administration alongside the need to promote substantial industrial restructuring"*. This *"evolved in the 1990's into a strategy built around clusters and geared to improving efficiency, fostering non-RDI-based diversification, and promoting internationalisation"*. That then evolved in the 2000's *"into a sustained focus on innovation and science-driven industrial diversification"*.

Since the early 1990's, the Basque Country, whose economy is predominantly made up of small companies, has used cluster policies as one of the main instruments to promote cooperation for competitiveness among its industrial bases. The region was one of the first locations globally to focus on clustering as part of its comprehensive government industrial policy[33]. With over 30 years of clustering efforts, it stands out as an example of best practice internationally, with a rich landscape of clusters and clustering activities. The region's approach of working with clusters has been widely recognised as an important ingredient for the competitiveness success of the region, whose economic fortunes has been transformed since the 1980's.

EVOLUTION OF BASQUE CLUSTER POLICY

The Basque Country was an early pioneer in cluster policy. For the past 25 years, clusters have been one of the basic pillars of economic development and the ongoing policy focus by the Basque Government. From the outset, a long-term approach was considered in order to *"cluster the economy in a permanent and dynamic way"*. This approach involved going beyond provision of direct supports to clusters and actively engaging industry in an open dialogue to develop buy-in regarding the benefits of clustering.

Cluster policy was first introduced to the region in 1990. The Basque Country clustering policy and cluster support programme seeks to improve the economic competitiveness of its members through cooperation. It is particularly focused on strengthening cooperation between industry and research, technology development and innovation (RTDI) actors as well as increasing competitiveness and scale of SMEs. The stability of the approach over three decades has meant that cluster associations were embedded in the institutional architecture, and Basque cluster policy has become an important international reference point.

Although the Basque cluster policy approach has remained relatively stable over the course of its 25-year history, the policy has evolved, particularly following developments made in the European Commission's Smart Specialisation Strategy. This resulted in more stringent conditions for funding recipients and the introduction of *ex-ante* evaluation of action plans presented by cluster organisations.

There have been three distinct iterations in the Basque cluster policy over time. The periods of evolution and their main features are outlined below: [34]

1991, the Emergence of the Basque Cluster Policy | The Basque Country's policy emerged in 1991 under an umbrella "competitiveness strategy" that combined economic and social policies. The new *General Framework for Industrial Policy* defined ten different policy areas that had to be linked to industry, including an explicit 'cluster policy as a key pillar.

At the outset, the Basque Government hired Michael Porter's company, Monitor Group, to prepare a cluster map for the region. This study identified the existence of various natural clusters, which served as a basis for shared reflection by the government and the business community. As such, the original policy drew heavily on the Porter model but was adapted to the specific needs and challenges of the local context.[35]

To promote a long-term and sustainable approach to clustering, the decision was made not to merely provide government administered support to the clusters identified in the statistical exercise. Instead, the policy sought to engage industry leaders from the outset to develop interest in working long-term under a cluster philosophy. Furthermore, the policy sought to build on existing industry association dynamics, seeking to broaden their focus towards cluster collaboration, while in some cases, the policy led directly to the creation of new cluster organisations.

Through this experimental approach, a concrete policy instrument emerged that financed support for cluster organisations to act as catalysts, improving the global competitiveness of their members by means of strengthened cooperation in a triple helix approach.

The cooperative activities initially supported by the Basque Cluster Programme (also established in 1991) were focused primarily on technology, quality and value chain efficiency, and were geared to supporting SME development by strengthening linkages with larger companies (and other key players). Following a decade of implementing the cluster policy, there were a group of ten Basque cluster organisations with a critical mass of members and stable revenue streams.

32 *Orkestra Basque Institute of Competitiveness (2021)* Industrial Strategy for the Long Term
33 *Orkestra Basque Institute of Competitiveness (2021)* Long-Term Regional Strategy for Inclusive Competitiveness: The Basque Country Case, 2008-2020
34 *Smith, M., Wilson, J. Wise, E. (2019)* Continuous Policy Development and Learning: Clusters in the Basque Country. European Foundation for Cluster Excellence.
35 *Konstantynova, A. (2017)* Basque Country cluster policy: the road of 25 years

2000 – 2014, Cluster Policy Consolidation and Innovation | Under successive Governments during the 2000's the cluster programme became consolidated as a key pillar of the Basque Country competitiveness strategy. The main policy instrument funded cluster organisations to up to 50% of their costs, and a maximum of €240,000 a year, and had a total budget of around €2 million.

Around this stable funding mechanism, there were several innovations in the policy itself and in the institutional mechanisms surrounding the policy. For example, policy innovations included requiring cluster organisations to establish explicit strategic planning processes (three-to-four-year strategic plans and annual action plans) that were focused on enhancing the sophistication of cooperation.

During the 2008-2012 period, cluster policy was expanded to include new associations, referred to as *pre-clusters*. These were organisations that wanted to operate under a cluster philosophy but did not possess the critical mass of members and stable revenue streams required to be determined a cluster organisation.

At the same time, the new opportunities for potential growth at the intersections between clusters began to be recognised, and there were some attempts to promote greater collaboration among clusters. This included representatives from each of the thematic areas within the Industry Department (including technology, internationalisation, etc.) to engage closely with cluster organisations with the intention of embedding cluster organisations as a source of on-the-ground intelligence to inform the Government's competitiveness policies. The scheduling of structured and systematic meetings between cluster managers, key government ministers and the civil servants responsible for programmes related to competitiveness also created a space for systematically sharing strategic information on the main sectors of the Basque economy and emerging global trends.

In 2006, the Basque Institute of Competitiveness (Orkestra) was founded to undertake research supporting the competitiveness of the Basque Country. This initiative was established as a public-private entity based at Deusto University. Orkestra quickly became a key tool in supporting the cluster policy by providing independent, analytical expertise.

Note: In 2004 and 2005, two new cluster organisations were incorporated into the Basque cluster programme. Moreover, from 2009 the programme was extended to ten new pre-clusters organisations with the potential and desire to work with a cluster philosophy.

From 2014, New Institutional Frameworks for Cluster Policy | From 2014, several strategic influences prompted changes to the Basque cluster policy. In summary, these changes included:

- The European Commission's promotion of 'smart specialisation strategies' encouraging regions to design and implement explicit strategies premised on prioritising specific economic activities for research and innovation investment; and
- Responsibility for the Basque cluster policy transferred to the Basque Business Development Agency, SPRI. This agency already had responsibility for implementing the Government's other business support programmes oriented to technology, innovation and internationalisation.

As a result of these changes, the current cluster policy is closely linked with the Basque Science Technology and Innovation (STI) Plans and is aligned with the RIS3 smart specialisation initiative.

The new cluster programme team, as a first step, undertook a review of the overall efficiency of the policy, which was now spreading its resources (around €3 million) across more than 20 cluster and pre-cluster organisations. Based on the analysis of existing clusters and associations, concrete changes were made in the policy between 2014 and 2016, including more stringent conditions on which organisations and activities were eligible for funding, and the introduction of ex-ante evaluation of action plans. Organisations that did not meet the new criteria were offered support to explore how they could integrate their activities with others. This gave rise to reflection among the cluster organisations and resulted in convergence and reconfiguration in some of them.

The overall vision of the policy was also adjusted in line with the development of the Basque Country's smart specialisation strategy to make explicit a dual role for cluster organisations as:

1. Instruments for business competitiveness, facilitating cooperation among their members; and
2. Instruments for public policy, allies with government in fostering regional development and structural transformation.

The changes were supported by new structures internally within SPRI, through which a larger team of programme managers from different areas of SPRI dedicated a small part of their time to working with clusters, alongside their work on other programmes. Each cluster organisation has a dedicated "cluster link" who sits on their board and acts as first point of call, connecting into other parts of SPRI.

An annual 'Basque Cluster Day' was also established to bring together cluster organisations, policy makers from different areas, and other stakeholders. This supported greater inter-cluster discussions and the emergence of working groups oriented to tackling common and cross-cutting policy challenges such as technological foresight and skills gaps.

At the same time, due to the decisive role that the monitoring and evaluation of cluster policy can and should play – not only as an accountability mechanism, but also as a form of communication, collective intelligence and learning between SPRI, Basque Government and cluster associations, more rigorous monitoring and evaluation of the cluster policy was introduced.

CLUSTER PROGRAMME

By region, the Basque Country has one of the highest concentrations of cluster organisations across Spain. There are approximately 22 clusters and pre-clusters, which are based on a concentration of small and medium-sized companies, institutions and universities that share an interest in a specific economic or strategic sector. The maturity of the

cluster organisations ranges from newly established to those established in the early to mid-1990's.

The Basque Business Development Agency, SPRI, is responsible for overseeing the implementation of cluster activities, policy and the local cluster programme. The Basque cluster programme provides funding for cooperation activities within cluster organisations including cross-cluster cooperation, and joint internationalisation projects. Additionally, the cluster programme provides technical expertise to cluster organisations, typically by assigning an expert to accompany a cluster organisation during its first year, to ensure they can reach their full potential. Specific technical assistance may include the provision of:

- Infrastructure including access to co-working spaces, offices, incubation and accelerator spaces, research centres, technology parks, etc.;
- Support for hard skill development: knowledge transfer, intellectual property, entrepreneurship, export advice, market intelligence;
- Support for soft skills development: coaching, management training, upskilling/reskilling; and
- Support for networking and partnership building (at national and/or international level).

To gain access to the Basque cluster programme, a cluster organisation needs to have a Strategic Cluster Plan and a Cluster Action Plan, as well as a sufficient critical mass. This is understood as at least 30 companies affiliated (of which 60% should be SMEs), with profits that account for over 1% of the Basque Country's GDP.

The cluster organisations supported by the Basque cluster programme must be not-for-profit legal entities. Associated full members of Basque cluster organisations pay a yearly member fee. However, several companies (around 10-15%) are allowed to participate in some selected activities before deciding to become full members.

Detailed requirements for recognition as a cluster organisation to gain access to cluster programme under the Basque Cluster Policy are detailed below:

Fit with the cluster concept for the purpose of the policy	Fulfilment of minimum criteria (pass/fail)	Approval of Strategic Plan

• The principal mission is to improve the competitiveness of its members by means of cooperation, meeting the needs of the different stakeholders, while also fulfilling the requirements of Basque Government policies.
• The organisation groups together large firms, SMEs, science and technology stakeholders and other organisations such as educational and training institutions.
• Form a complete value chain that encompasses at least the entire Basque Country and targets an end market or a segment of that market.
• The organisation operates in strategic areas of internationalisation, technological innovation and business innovation talent.
• The organisation is aligned with the specialisation priorities and/or opportunity niches contained in the RIS3.
• The stimulus organisation is a not-for-profit legal entity.
	• Critical mass of members and % of SMEs.
	• Scope:
	  • Presence of members from different links in the value chain(s).
	• Geographic area covered:
	  • Basque Country as a minimum with members from all historic territories.
	• Minimum size
	  • Turnover/GDP > 1%
	  • Jobs %/total
	  • Exports %/total.
	• Presence of economic driver firms, SMEs (especially small firms) and science/tech stakeholders.
	• Positive evaluation of the strategy by the Basque Government, need for stimulus and capacity of the organisation.
		• The Strategic Plan must identify common challenges, responses to which are proposed based on cooperation.
		• In strategic areas of internationalisation, technological innovation, business innovation, and others such as education and training.
		• Representing an ambitious plan with a suitable level of participation in its preparation.
		• Reflecting on the positioning of the group with regard to national priorities.
		Note: The strategic reflection must provide a clear response to the elements required of the stimulus organisation and the member firms.

FUNDING STRUCTURE

The Basque Country's cluster policy is complemented by two key funding mechanisms:

- An annual budget for **competitiveness policies** provides funding for specific Technology RDI and internationalisation projects. The budget for Competitiveness Policies is approximately €150 million for Technology RDI projects and €20 million for Internationalisation Projects.
- The **Cluster Support Programme** and **Annual Action Plans** fund cooperation activities within cluster organisation, cross-cluster cooperation, and joint internationalisation projects.
- The Cluster Support Programme operates an annual budget of approximately €4 million (approximately €2.5 million for facilitating cooperating within cluster and cross-cluster; and €1.5 million for cooperation in joint Internationalisation Projects). Financial support is allocated to cluster organisations annually through competitive calls. The allocation of public funding to clusters is reviewed every four years and represents, on average 20%, of the supported clusters' budgets (between 10-50% depending on size, dynamism and maturity).

  The current financial support provided to cluster organisations is dependent on:

  - The alignment between the cluster organisation's mission/concept and the cluster policy;
  - The submission of an approved strategic action plan. The strategic plan must provide a clear response to the elements required of the cluster organisation and the member firms as a whole; and
  - Fulfilment of key indicators/entry criteria, including, but not limited to membership numbers, critical mass of SMEs (%), and levels of private funding.

  The government will also fund joint Internationalisation projects (typically fund between 50-70% the cost of the initiative). The Annual Action Plan guides decisions regarding which initiatives will receive funding.

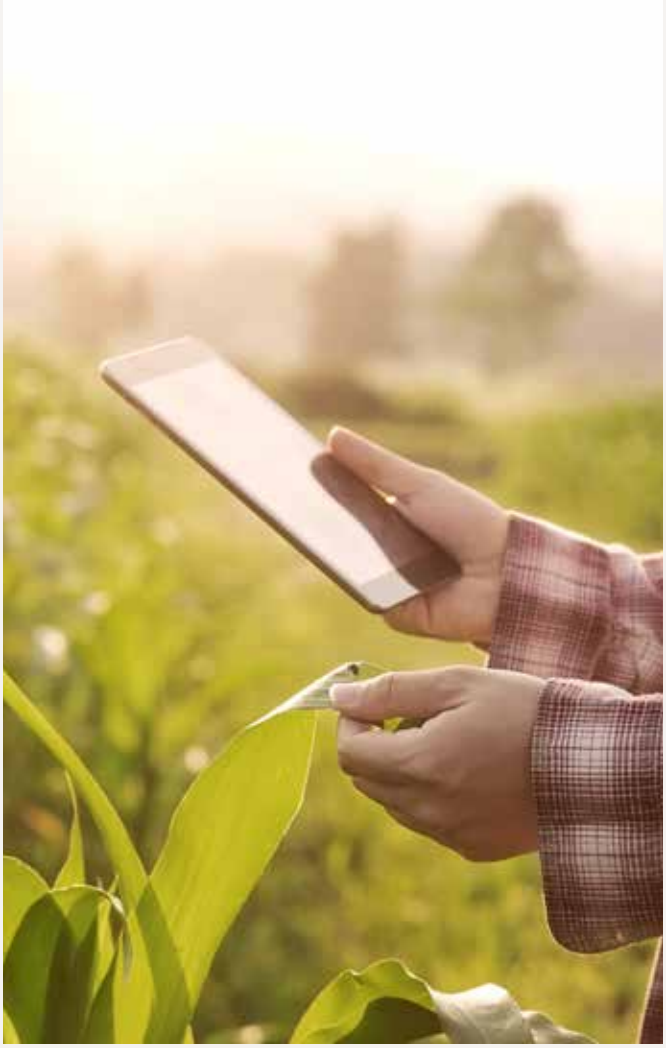
EVALUATION

The Basque Country made its first efforts to evaluate the efficiency of their policies in 1998 and found that cluster policy helped prioritising public resources and most importantly increased inter-firm relations. Further Basque cluster studies completed by Orkestra revealed that the analysed cluster management organisations had facilitated collaboration, generated trust and helped to share knowledge and experiences.[36] Furthermore, these policy evaluations have demonstrated that:

- Clusters have an essential role in the dialogue and cooperation among public and private agents in strategic areas;
- Cluster policy has facilitated a better adjustment of the public policies to the businesses' needs to promote competitiveness, although the different characteristics of the thematic priorities require different approaches for different clusters;
- A greater diversification and balance of the sectoral structure of the Basque economy has been also related to the cluster policy actions;
- Members of clusters obtain better results in the areas of innovation, quality, environment and international presence than those that do not belong to a cluster; and
- Despite the Basque country practicing in cluster policy development for over 30 years, improved collaboration between clusters is still required.

More recently, SPRI developed a new evaluation tool to provide strategic information for cluster organisations and policy makers based on the 'voice of users'. This involved fielding a survey, which was co-designed with cluster organisations, to all members of cluster organisations. This approach generates benchmarked analysis that supports the identification of measures and modifications to the policy approach according to the evolving needs of the region. As such, evaluation provides an important input to annual discussions between policy makers and cluster organisations around their planning.

Note: SPRI leveraged the support of Orkestra and international engagement with TCI Network in the development of the 'voice of users' evaluation mechanism.



36 *Orkestra (2009)* A New Step in Cluster Policy Evaluation in the Basque Country.

CATALONIA, SPAIN

Starting in 1992, Catalonia was a pioneer region in cluster policy together with several other regions and has since become a global leader. The main aim of the Catalan policy has always been the improvement of business competitiveness, using clusters as a tool and never as an end in themselves.

With 25 years of experience in cluster policy, Catalonia is now considered a cluster 'hotspot'[37]. As well as having a high concentration of high-performing clusters, the region has attracted key international players such as the TCI Network - the global cluster practitioners' network, the European Foundation for Cluster Excellence and leading knowledge institutions.

SMEs dominate the Catalan regional economy, representing approximately 99% of total firms [38]. As the Catalan economy is primarily composed of SMEs, clusters have enabled economies of scale in understanding strategic challenges and implementing collaborative projects. Furthermore, clusters have facilitated economies of scope, in situations where producing two or more goods together results in a lower marginal cost than producing them separately, in creating connections across sectors within the region.

EVOLUTION OF CATALAN CLUSTER POLICY

Catalonia was one of the first regions in the world to adopt a policy approach aimed at boosting regional competitiveness through clusters and clustering. Since 1992, Catalonia has become a global leader in the field.

Although some aspects of the Catalan policy have evolved over time, a number of distinct elements have remained within the policy architecture for over 30 years, including:

- Removing barriers to productivity and supporting mechanisms that promote cooperation among companies;
- Supporting services and strategy-driven projects; and
- The requirement for public-private partnerships [39].

Early policy iterations identified the requirement for the creation of specific units in the Catalan government administration with responsibility for cluster policy. As such, ACCIÓ, the public agency for the competitiveness of Catalan enterprise, attached to the Ministry of Business and Employment of the Generalitat (Government) of Catalonia was established in 2010. ACCIÓ aims to promote the competitiveness and growth of the Catalan business fabric by promoting innovation, internationalisation and by attracting investment.

Other elements of the cluster policy have evolved over time. Initially the scope of the policy was local, however the geographic reach has increased to support cluster organisations reach a higher critical mass of companies. Additionally, through subsequent iterations of the policy, Catalonia has gradually promoted the institutionalisation and professionalisation of its cluster organisations. Moreover, the Catalan approach has become more structured, implementing the Catalonia Cluster Programme since 2013, and it is being used as a testbed for innovative concepts such as the work on cross-sectoral collaboration or shared value.

Today, cluster policy is viewed as a policy lever that complements the achievement of national priorities, such as the Green and Digital Agendas. By supporting the Digital Agenda or technological capital, the Spanish government are supporting Catalonia in further developing their competitive advantage over other jurisdictions pursing similar clustering activities, while also ensuring clusters are working towards greater sustainability through green and digital transformation activities. Furthermore, Smart Specialisation is a key policy of interest to boost regional enterprise innovation, and contribute to growth and prosperity by enabling regions to focus on their strengths.

So far, the regional authorities have tried to remain close to and in constant dialogue with cluster organisations in order to build an environment of mutual trust to allow competitiveness to thrive. The cornerstone of Catalan cluster policy has always focused on having specialised clusters. Critical mass is fundamental to achieving impact, but it needs to be coupled with the right degree of specialisation so as not to lose focus. The result is a continuous policy for almost 30 years that has not experienced radical revolutions but has experienced steady evolution.

The Catalan policy initially focused on eight cluster organisations that were important for wealth creation in the region. Over time, this figure has expanded considerably. Currently there are 25 cluster organisations in Catalonia's Cluster Programme, incorporating over 2,300 members with a combined turnover of €69 billion. The cluster organisations currently supported by the Catalan Cluster Programme are aligned with the Catalan RIS3, smart specialisation priorities.

CLUSTER PROGRAMME

While cluster policies were first introduced in Catalonia in 1992, the Catalonia Cluster Programme was mobilised in 2013 to provide a structured framework to the cluster work undertaken in the region. Traditionally, the Catalonia Cluster Programme was a single-layer programme, i.e., all clusters had access to all services subject to fulfilling certain access criteria. However, over time, it was determined that a flexible, multi-layer programme to accommodate a greater diversity of cluster organisations, could increase the added value of the programme.

Catalan cluster organisations operate autonomously, and each sets its own strategic objectives in response to the specific challenges for their sector. However, for a cluster to become member of the Catalan cluster programme, a cluster organisation needs to be aligned with the Catalan cluster policy and meet 16 qualifying criteria. The main admission criteria to the programme are:

37 *Acció Catalonia Trade & Investment (2022)* Why catalonia: strong cluster policy
38 *Joan Martí Estévez* (2022) Presentation at National Stakeholder Event
39 In Catalonia, cluster initiatives may be launched by public administration, but they are later developed through private leadership.

- **Formal and Object** - Legally established not-for-profit entity whose aim is to foster the competitiveness of companies, which is independent from other organisations;
- **Scope and Critical Mass** – Minimum of 60 member firms in Catalonia or 30 members for clusters <3 years old, €200 million aggregate turnover, €500 million of potential critical mass, minimum regional scope of Catalonia;
- **Strategy and Governance** – Strategic analysis and annual action plan in place, robust governance, an executive board made up of 70% private companies with minimum one environment actor; and
- **Professionalisation** – European Cluster Excellence Initiative (ECEI) Bronze Label or higher, one cluster manager (located in Catalonia) and one additional WTE.

Cluster support is resourced by a central team of 11 staff in the ACCIÓ Business Strategy Unit. The team provides day-to-day assistance to the clusters belonging to the Catalonia Cluster Programme, performing key activities including but not limited to: cluster analysis; cluster initiation; cluster development; cluster manager training; knowledge sharing; and connecting clusters. The central team has an overall operational budget of €100,000 per annum.

The average annual budget for Catalan cluster organisations is a €300,000 (funded through grants, membership fees and services). However, funding can reach up to €1 million annual budget for the highest funded clusters.

FUNDING STRUCTURE

Catalan cluster organisations are typically publicly activated and are driven by the private sector. Competitive funding is available to Catalan cluster organisations through two funding streams:

- Co-financing of operations based on a business plan; and
- Cluster initiatives including RDI, internationalisation and training projects.

The Catalan cluster programme operates a budget of approximately €700,000 per annum plus €200,000 to fund travel, events and expenses for programmes/training.

EVALUATION

The Catalonia Cluster Programme includes a formal evaluation carried out at two levels:

- **Evaluation of Cluster Organisations' Teams |** A yearly survey is sent to cluster managers, project managers, and governance boards to gather both quantitative data (including membership, budget, number of projects, finance structure, etc.) as well as qualitative measures (including strategic alignment, teams' satisfaction and level of governance support).
- **Cluster Members |** A survey is fielded every two years collecting quantitative metrics (including turnover and exports) and qualitative measures (including satisfaction with the cluster agenda and outcomes of the cluster). A control group is also delivered to compare member firms' metrics (turnover, EBITDA, productivity, etc.) with their non-member peers.

The results of this formal evaluation process are key not only as a tool for strategic reinforcement, but also as a consistent baseline for accountability.

DENMARK

The Danish government and its regions have a joint ambition to strengthen growth and knowledge-based development throughout Denmark.[40] Clusters and innovation networks are identified as playing an important role in relation to achieving these ambitions.

The Danish cluster policy has a national focus on strengthening innovation in several of Denmark's business and technology areas for a period of four years. It is managed at a national level and seeks to coordinate policy across six ministries, five regions and other municipalities with a focus on international collaboration. Initially Denmark's National Cluster Policy was supervised by a national "Cluster Forum", which was established to ensure a coordinated approach of national, regional and local policy makers and government institutions that support clusters and networks. Today, the national coordination approach is achieved by ongoing coordination between two ministries – the Danish Agency for Science, Technology and Innovation and the Ministry of Industry, Business and Financial Affairs – and a series of regular meetings among Danish cluster organisations.

A range of different evaluation schemes and publications have sought to document and analyse the performance and impact of Danish clusters over the past decade. Several reports have been commissioned to evaluate the economic value add to companies who participate in Danish clusters[41,42,43]. The studies have illustrated that companies who are active in clusters are:

- Four times more likely to innovate compared to similar companies who are not involved in cluster activities;
- Obtain productivity growth that is 3.6% higher than similar companies not involved in cluster activities; and
- Typically, only 5.6% of Danish SMEs are active internationally. By comparison, 14% of SMEs who participate in clusters are active in international activities.

In 2019, a report was commissioned to review the Danish Research and Innovation System[44] to assess how Denmark can adjust its efforts to enhance knowledge-based innovation based on international best practice and to provide concrete recommendations for a future development of public policy efforts in this area. This report concluded that clusters are one of the best tools Denmark has in terms of helping SMEs and companies and it is one of the cheapest tools to fostering engagement.

EVOLUTION OF DANISH CLUSTER POLICY

Denmark has supported clusters through various programmes for almost 20 years. In 2013, Denmark initiated its first overarching network and cluster strategy, aiming to provide a framework for innovation and growth in innovation networks and clusters. The primary aim of the policy is to strengthen and harness the power of innovation. Initially the policy also focused on enhancing productivity and competitiveness of enterprise, particularly SMEs.

Since this time, the Danish policy has undergone several iterations. Although positive results had been achieved through the initial policy intervention, it was determined that Denmark could leverage greater value from its cluster landscape. In particular, opportunities were identified for Danish cluster organisations to become more professional, more competent in serving enterprises, and in becoming more international. Furthermore, there was an identified need to address challenges of a scattered and sometimes overlapping landscape covering more than 40 cluster organisations in a relatively small geographic area. While the policy architecture was initially designed to provide a framework for innovation and growth in innovation networks and clusters, subsequent policies [45] have evolved to focus on:

- Strengthening their cluster landscape;
- Establishing a coordinating body for cluster management;
- Creating a clear narrative outlining the role of cluster organisations;
- Delivering strategic guidance to support clusters in Denmark; and
- Building an innovation structure integrated into the business and innovation system.

In 2016, Denmark launched Cluster Strategy 2.0 – Denmark's Cluster and Network Policy 2016-2018.[44] Its vision was for Denmark to have strong and professional clusters that create high value for enterprises and society in innovation, knowledge provision, solutions for societal challenges, international collaboration and attractions of investments. Furthermore, this strategy aimed to deliver:

- A number of Danish cluster organisations that are impactful and contribute to the positioning and development of Danish areas of strength at an international level.
- An additional number of professional cluster organisations that can support sectoral renewal and innovation as well as regional development potential throughout the country in coordination and cooperation with leading clusters.
- New emerging growth areas that can provide a future platform for growth.

40 *Merete Daniel Nielsen (2022)* Presentation at the National Stakeholder Event.
41 *Cluster Excellence Denmark (2016)* Viden & Vækst til danske virksomheder
42 *Uddannelses- og Forskningsministeriet and Styrelsen for Institutioner og Uddannelsesstøtte (2017)* Analysis of effects of companies' participation in the most important Danish clusters and innovation networks 2017;
43 *Danish Ministry of Higher Education and Science and Danish Agency for Science, Technology and Innovation (2014)* Analysis of the Danish Research and Innovation System: A compendium of excellent systemic and econometric impact assessment
44 *European Commission (2019)* Peer Review of the Danish R&I System – Ten steps, and a leap forward: taking Danish innovation to the next level.
45 *Ministry of Higher Education and Science and Danish Agency for Science Technology and Innovation (2016)* Cluster Strategy 2.0 – Denmark's Cluster and Network Policy 2016-2018 and Innovation power: Danish clusters for knowledge and business 2021-2024.

A key feature of Denmark's policy journey was the recent intensive reform and consolidation process.[45] The objective of this reform was to significantly reduce the number of cluster organisations across the landscape, focus on prioritised Danish strongholds and a few emerging industries in priority areas.

In 2018, the major reform to revolutionise the Danish cluster programme was initiated. Over the next two years, Denmark consolidated its landscape from 180 cluster organisations and innovation networks to 14 national clusters to achieve a high level of competitiveness, build scale and create significant impact. These national clusters are aligned with the first national Smart Specialisation Strategy for Denmark, building on both existing and emerging areas of strengths across the Danish economy. The clusters operate at a national level with regional representation across Denmark to ensure regional development and innovation is maintained. This approach sought to achieve Denmark's aim of accomplishing world-renowned clusters that were the leading force of innovation in its focus area.

The process for reform began with a detailed analysis of the entire Danish business and innovation support system. It was revealed that the system comprised more than 250 stakeholders including 60+ cluster-like organisations. Recognising the scale and complexity of new challenges for companies on the horizon (including green transition and digitalisation) a high-level committee gave the recommendations that fewer, but stronger cluster organisations of significant scale were required. Ultimately, the committee concluded that the number of clusters supported by public funding should be limited to ten national clusters covering selected Danish strongholds and two-four emerging areas clusters. The Danish Board for Business Promotion under the Ministry of Industry, Business and Financial Affairs (MIBFA) was tasked with selecting the relevant Danish strongholds and emerging industries for the future, while the Ministry of Higher Education and Science (MHES) chose the best clusters within the strongholds to operate cluster activities complex consolidation of cluster organisations within its landscape.

It took two years with a facilitated consolidation to move from 40 cluster organisations with around 50-200 members per cluster to 14 'superclusters' engaging up to 200-500 member companies per cluster. Some consolidation processes were complicated involving the merger of four to five independent cluster organisations into one new unit. Others were simpler with one cluster organisation in a clear position to take the lead, or in other cases, the mergers had already taken place.[46]

The national support organisation, Cluster Excellence Denmark, played a central role in the consolidation process. Based on previous experiences on the hardship of securing constructive and real mergers between cluster organisations, Cluster Excellence Denmark developed a new tool to analyse the performance of cluster organisations and inform strategies. The tool analysed KPIs including: membership; finance model; staff; activities strategy; and legal setup.

The impact of the recent reform and consolidation process is that the Danish cluster landscape is simpler and stronger. Furthermore, Danish cluster organisations (superclusters) can gain more visibility and political momentum than ever before. The reform fundamentally transformed the previous successful cluster programmes turning them into a national multilayer programme, Innovation power: Danish clusters for knowledge and business 2021-2024, which was launched on the 1st of January 2021.

CLUSTER PROGRAMME

Innovation power: Danish clusters for knowledge and business 2021-2024 is the current cluster programme in Denmark. The current cluster programme supported by the Ministry of Higher Education and Research and the Danish Board of Business Development. The call was an open competitive process for both the ten identified strongholds and for other emerging areas. To keep continuity and secure the wide company involvement, it was expected that only one cluster organisation per stronghold would apply. For the first time, the strategic decision was made to initiate a multi-layer cluster programme. However, in practice, there is little difference between the support the two types of cluster organisations receive. They are treated as one community and can use the services from the national support organisation on an equal basis.

In 2010, the Danish government established its support organisation, *Cluster Excellence Denmark*, as the national coordinating body and support service for clusters and innovation networks. Cluster Excellence Denmark provides expertise to cluster organisations to ensure they can reach their potential across these areas in order to drive world-class sustainable growth and innovation. Its goal is to support Danish cluster organisations in establishing a strong Danish and international profile through the delivery of strategic guidance and support focused on professionalisation, competence development and internationalisation.

Cluster Excellence Denmark is privately owned and is supported by the Danish Agency for Higher Education and Science along with the Danish Business Authority. The two agencies form a steering group for Cluster Excellence Denmark to set the direction and prioritise the activities.

Cluster Excellence Denmark has two locations in Denmark and is managed by a team of five people. This team helps Danish cluster organisations regarding project management, cluster strategy, internationalisation, communication and cluster analysis. Currently, the main areas of activities are: strategic dialogue with the cluster managers and government agencies (Ministry of Higher Education and Research and the Danish Board of Business Development); competence development (via workshops); webinar and experience exchange; and internationalisation. In addition, Cluster Excellence Denmark provides effective support to foster collaboration between large enterprises and indigenous SMEs, facilitate matchmaking within clusters and enable participating entrepreneurs to become familiar with each other's strengths and business models.

46 *ACCIÓ, ecoplus, The Business Agency of Lower Austria and Cluster Excellence Denmark (2022)* Dilemmas of Mature Cluster Programmes: Experiences from Catalonia, Lower Austria and Denmark

Cluster Excellence Denmark defines cluster organisations using the following classification criteria:

- Cluster organisations aim to build knowledge bridges between companies and knowledge institutions and to create innovation and growth within a group of companies with shared interests;
- Cluster organisations must have a triple helix organisation i.e. companies, knowledge institutions and public partners/civil society stakeholders must take an active part;
- Cluster organisations must be formally established legal entities. The majority of Danish cluster organisations are associations (non-profit or for-profit), however, some are hosted by another legal entity, such as a university;
- Cluster organisations must have at least one whole-time equivalent cluster manager employed. Furthermore, the cluster organisation must have sufficient resources to offer services and activities to the members;
- There must be a minimum of 20 committed participants from private companies; and
- Cluster organisations must have a valid label; Bronze, Silver or Gold (or be in process) of the European Cluster Excellence Initiative (ECEI).

Note: A case study illustrating one of Denmark's high-performing cluster organisations is illustrated below.

The strength of the cluster organisations and its members are dependent on the cluster acting as a neutral platform to facilitate collaboration, boost partnerships and accelerate knowledge. As such, the Danish cluster programme requires cluster organisations to act as neutral cooperation platforms, which are open and available to all types of relevant businesses and entrepreneurs all over the country. This is true for all 14 of the national cluster organisations (ten stronghold and four emerging) currently receiving funding in Denmark.

FUNDING STRUCTURE

The national cluster programme is co-funded by two agencies, the Ministry of Higher Education and Research and the Danish Board of Business Development. The programme, covering 2021-2024 has a total financing of DKK 640m (circa. €86 million). Although the call is a joint call, each of the two agencies fund different activities. While the Danish Board of Business Development supports more business-oriented activities, the Danish Ministry of Higher Education and Research supports, in turn, more knowledge-based activities.

The expected annual grant for the cluster organisations is between DKK 4-20 million (circa. €2 million - €2.6 million). This public funding supports cluster organisation operating costs (salaries, etc.), as well as cluster activities.

For cluster organisations to benefit from grant funding, they are required to maintain a joint dialogue with the grantors and provide annual status updates regarding the funded activities. The progress and performance of the cluster organisation is measured against the strategic goals and indicators set out during the application stages.

EVALUATION

Evaluation is a prerequisite for any public investment in Denmark. Since the introduction of a cluster programme in Denmark, a range of evaluation schemes and publications have sought to document and analyse the performance and impact of clusters. The Danish system primarily relies on objective data (statistics, quantitative analysis) to make informed decisions related to cluster support. Cluster Excellence Denmark analyses the performance of cluster organisations based on a number of KPIs including: membership; finance model; staff; activities strategy; and legal setup. Furthermore, to quantify the impact on innovation, productivity and internationalisation activities, Danish companies participating in Danish cluster organisations are routinely asked about the effect of cluster initiatives to their performance.

CLEAN, DENMARK

OVERVIEW

Established in 2006, CLEAN is a non-profit entity and Denmark's leading green and environmental cluster organisation composing of members from the entire cleantech sector. The cluster supports and focuses on a range of thematic areas, including energy, environment, smart city and internationalisation.

The vision of the CLEAN cluster is to achieve world-leading recognition for the Danish companies within the cleantech sector. The cluster's vision is driven through its main objective which is to support the green transition to create growth, innovation and increase turnovers for their member companies. The cluster pursues this objective by developing, testing and implementing new green solutions in strong partnerships to solve societal challenges related to climate and environment.

CLEAN was formed as a result of a merger between the two national cluster organisations, Lean Energy Cluster and Copenhagen Cleantech Cluster. It was established with the purpose of accelerating the green and sustainable transition by embracing the entire value chain and capitalising on the growth opportunities for the Danish cleantech sector.

CLEAN is a membership-led cluster with members from the public and private sector and knowledge institutions. The cluster membership currently sits at approximately 223 cluster members, with over 85% of the membership base consisting of SMEs and start-ups.

The membership composition is made up of several organisational types, which include start-ups, SMEs, large companies, research organisations, knowledge institutions, technology centres, civil society and municipalities.

ACTIVITIES

The CLEAN cluster provide a range of support services in pursuing its vision of positioning Danish companies within the cleantech sector as world leaders, including:

- **Internationalisation Support |** CLEAN prides itself as a politically and technologically neutral platform providing opportunities for collaboration, knowledge sharing and partnerships at an international level to domestic and foreign players in the cleantech space. CLEAN assists its members throughout internationalisation projects by providing support in:
- International cluster cooperation;
- International urban innovation;
- International innovation cooperation; and
- Seeking funding for internationalisation projects.

CLEAN also supports stakeholders from foreign countries by sharing information on the Danish cleantech market, establishing connections with key players in Denmark and providing opportunities to engage on projects. CLEAN provides its members with access to the European Internal Market optimising the potential for internationalisation and facilitating engagement with international business opportunities.

CLEAN is a member of the International Cleantech Network (ICN), an organisation consisting of 19 of the world's leading cleantech cluster organisations. Thus, CLEAN's SME members have access to ICN Solutions for international business opportunities, obtain international visibility and access international funding.

- **Project Development |** CLEAN supports projects in cleantech areas, including water, waste, energy efficiency, climate adaptation and green building, etc., by working with the cluster partners to identify, initiate and develop the projects. The cluster assists and guides members in project administration tasks by providing support with application preparation, project management, financial management, reporting and documentation.

  The cluster drives the project development process from start to finish, adopts the role as a coordinator between the members working on the project with the client and negotiates project financing options with financial institutions. In the initial stages of project development, using its knowledge of the ecosystem the cluster can offer a non-binding search and referral to national and international partners (industry, knowledge institutions and public bodies) relevant to the project.

CLEAN, DENMARK

The CLEAN cluster stimulates the uptake of projects which often lead to the successful closing of deals and implementation of cleantech solutions in Denmark and on an international level. Furthermore, the cluster can ensure the professional dissemination and implementation of project results using its channels and network, while also providing platforms to give projects an international springboard.

- **Competence Development |** The CLEAN cluster provides support services for the development of competencies and talent of its members' workforces. It provides upskilling and reskilling opportunities to build the skills of the workforce within the cleantech sector and employs initiatives to attract talent to the sector.
- **Business Development |** CLEAN helps industry players such as start-ups and SMEs develop their business and build the foundations for scalability by promoting professional workshops relevant to the cleantech sector, that use industry experts and experienced business developers.
- **Support RDI |** The cluster operates on a unique innovation model turning societal challenges into new business opportunities. These demand-driven innovation platforms enable sustainable solutions for the benefit of their members and the wider society.

  CLEAN supports research, development and innovation to drive the cluster towards generating green growth in Denmark. CLEAN has an online ecosystem 'Cleantech Connect' where Danish companies can access business opportunities within specific academic areas in Denmark and international markets. Members who create a profile on this platform are exposed to many opportunities, including those for innovative environmental technology.
- **Networking |** The cluster delivers networking opportunities aimed at forming connections and stimulating cooperation between key players across the cleantech value chain. CLEAN adopts the triple helix approach, thus its members lie across the three domains; public sector; private sector; and research institutions. The cluster facilitates networking through webinars, conferences, events, and workshops.

  CLEAN also provides SME members with access to five exclusive networks that convene monthly to discuss experiences and share insights on export support, soft funding and other companies' solutions, etc. These networks allow members exclusive access to upcoming national and international activities, and give members the chance to support opportunities that would create innovation for their company.

  The networks align with specific areas relevant to the CLEAN cluster, and are as follows:

  - Water Tech Boost (water in the technosphere);
  - Circular Tech Boost (circular economy and resources);
  - Nature Tech Boost (nature technologies, biodiversity and natural quality);
  - Climate Adaptation Tech Boost (field of climate adaption, i.e., water); and
  - Air Tech Boost (air technologies and solutions).
- **Platform for Partnerships |** With CLEAN promoting a neutral platform, they encourage players within the cleantech sector at home and abroad to enter partnerships. This happens across industry boundaries, as well as across the public and private sectors. Having built a strong base of partners, the cluster captures all relevant players across the ecosystem and facilitates partnerships between them.

  The 'Cleantech Connect' platform also allows members to create a profile in which they can connect with companies and talk with experts. The platform promotes the member's visibility in the ecosystem paving the way to partnerships. Additionally, as CLEAN is a member of the ICN, ICN solutions enables CLEAN's members to connect with international cleantech stakeholders, expand their networks and participate in online co-creation innovation processes with new business partners.
- **Matchmaking |** CLEAN facilitates and promotes B2B matchmaking events for its members. CLEAN drives matchmaking initiatives to connect the ecosystem of the cleantech sector by providing cluster members with participation opportunities in matchmaking meetings to establish contacts, develop relationships and diversify their network with other members and international players. These matchmaking opportunities enable discussions around potential cooperation and collaboration activities for members to initiate joint-projects, business opportunities and partnerships with other partners.

CLEAN, DENMARK

- **Access to Funding |** CLEAN supports its members in navigating the avenues for financial support. The cluster holds funding courses to assist members in learning about the various funding support available, developing a funding strategy, completing a strong funding application and accessing appropriate funding streams.

FUNDING

As one of Denmark's 13 national clusters, the cluster is publicly funded. When initiating the cluster, in 2010 - 2015, the cluster attracted €20 million in public investment for programming and in turn created over 1,000 jobs during that period. The cluster has since established an association with a fee-paying membership and robust governance model. Membership fees make up 8.5% of their total annual €7 million budget. The membership fees for joining the cluster are as follows:

Number of employees	Annual fee (DKK)	Annual fee (EUR)
Start-up (up to 5 years)	0	0
1-9	2,000	268.95
10-19	3,000	403.43
20-49	5,000	537.91
50-199	15,000	2,017.15
200-499	20,000	2,689.54
500-999	30,000	4,034.31

When developing innovation projects, CLEAN members utilise soft funding administered through various programmes such as the Innovation Fund (Innobooster) and Environmental Technology Development and Demonstration Program (MUDP - Miljøteknologisk Udviklings- og Demonstrationsprogram), Grand Solutions Program and Horizon Europe.

MATURITY

Since its inception, the CLEAN cluster has grown to over 200 members and is known globally as a world-leading cluster in the cleantech sector. As a mature cluster, it has a management team of 21 to 30 people providing professionalisation and management services. The team have in-depth knowledge of the players in the cluster's focus area and can guide members to national and international partners that are relevant to an innovation project. Additionally, the current secretariat of the ICN is led by and composed of the CLEAN cluster employees, highlighting their capability and competency operating the networks support services. Further demonstrating its maturity is the cluster's recognition and label as a gold cluster according to the standards for cluster excellence adopted by the European Commission.

SUCCESS FACTORS

Denmark's areas of strengths | The CLEAN cluster is focused on the green transition and environmental sustainability which has become increasingly important to countries worldwide in recent years. There is a direct correlation between the positive environmental impact of CLEAN's outputs with the UN's Sustainable Development Goals. The cluster is successfully driven by international pursuits.

Global recognition | CLEAN is recognised globally as a leading cluster in the cleantech sector. The following points demonstrate its significance in the clustering landscape:

- Under the European Secretariat for Cluster Analysis, the CLEAN cluster was awarded the ECEI gold label 'Excel in Cluster Excellence' for achieving and maintaining certain levels of excellence in its structure, governance, financing, strategy, services and recognition. The CLEAN cluster operates at a high level of professionalism and employs sophisticated cluster management which is understood on a global level.
- As a member of the ICN, the CLEAN cluster is recognised as one of the world's leading cleantech cluster organisations. The cluster works alongside notable cluster organisations across the global cluster landscape demonstrating its strong position in an international context.

CLEAN, DENMARK

Membership financial contribution | Experts in the field of clustering outline the importance of membership fees in a cluster's finance model. They suggest that the financial contribution and investment from members into the cluster organisation demonstrates the value gained by members from engaging in the cluster activities.

As previously described, the cluster obtains approximately €595,000 (8.5% of its annual budget) from membership fees annually which highlights that its members view the CLEAN cluster as a meaningful and promising investment for their business.

BREADTH OF ACTIVITIES

The range of activities supported by the cluster puts CLEAN in an attractive position for current and potential members. The engagement from its members in the activities demonstrates its success in attracting and retaining members through the value-added activities. The services supported by the cluster not only provide value for its members but drive the cluster towards its strategic objectives and vision.

FLANDERS, BELGIUM

The Flemish government's executive agency, Flanders Innovation and Entrepreneurship (VLAIO) is a one-stop-shop contact point for entrepreneurs in Flanders. Its role is to encourage and support innovation and entrepreneurship and contribute to a favourable business climate in the region. The VLAIO will achieve its mission through partnership with enterprise, Flanders District of Creativity (Flanders DC, a non-profit organisation founded by the Flemish government to make the Flemish economy more competitive through creativity, entrepreneurship and further internationalisation) and through its cluster policy.

Supporting research and innovation, notably open innovation, are key priorities of the region of Flanders. The region aims to create an *"innovation-driven economy in which creativity, innovation and entrepreneurship are key"*. As such, the government in Flanders has invested intensively in the development of a connected ecosystem for RDI in high-tech areas since the 1990's. Central to this investment programme, was the development of the region's strategic research centres, which have been instrumental in bringing various disciplines together and successfully promoting innovation at the boundaries of industry.

The Flanders cluster programme goes beyond the usual standard of financial support for cluster management by channeling State support for RDI and innovations projects through cluster organisations. It contributes not only to a vibrant culture of collaboration among clusters covering the entire value chain, but also to the identification of new growth potential and new markets. The key to the success of the programme is that the cluster organisation acts as the funding agency for the cluster participants and that cluster participants can discuss the theme of the call in-depth with industry stakeholders.

Furthermore, Flanders' Smart Specialisation Strategy is centred on ten priority investment domains that are being aligned in synergy with the four Flanders' Strategic Research Centres, as well as six Flanders Specialisation Clusters.

EVOLUTION OF FLEMISH CLUSTER POLICY

The Flanders cluster policy approach is centred on using cluster organisations as facilitators and platforms for the development of RDI and innovation projects. In practice, this involves entrusting the cluster organisations to channel public funding for RDI projects to industry. The rationale underpinning this approach is that cluster organisations are seen as having the greatest understanding of the needs of various cluster stakeholders.

In 2016, the Flemish government approved the resolution that defines the support for the innovation clusters in Flanders. The goal of the cluster policy is to unlock unused economic potential and to increase competitiveness growth among Flemish companies through active and sustainable collaboration between stakeholders. The initial goal of the policy was to encourage private, public and academic players to engage in open innovation in two types of partnerships:

- **Spearhead clusters**, large-scale and ambitious cluster organisations that will develop and implement an ambitious long-term strategy and competitiveness programme for the Flanders strategic domains, i.e., the select strategic domains where Flanders aims to continue expanding and strengthening its leading position in the long-term; and
- **Innovative business networks**, small-scale initiatives with a support time horizon of three years to organise a collaboration dynamic in a specific domain that could lead to the increased competitiveness of companies. It was determined that a three years' horizon provided sufficient time for business networks to professionalise and develop a compelling roadmap for growth.

  Within innovative business networks, collaboration initiatives are usually smaller, bottom-up initiatives, receiving support for a three-year period to organise a collaboration dynamic in a specific domain that could lead to the increased competitiveness of companies. Despite their smaller scale, innovation business networks are expected to implement concrete action plans, with visible economic benefits for the participating companies. Participating companies will collaborate on mutual initiatives within the networks.

  The conditions and targets for innovative business networks are less strict than for spearhead clusters. The aim is to lower the threshold for open innovation. The participating companies have more room to experiment and test different courses of action. Similar to the financing model for spearhead clusters, innovation business networks are required to invest equal amounts of funding as government funding.

Spearhead Clusters (x6 total)	Innovative Business Networks (x20 total)
Cluster organisation as facilitator **Removal of obstacles for growth** **Activities along the innovation spectrum (all TRL-levels)** **Initiate collaboration inside and outside cluster**	
Strategic domain	Bottom-up
Ambitious, large scale	Smaller scale
Long-term vision – intermediate results	Short-term results
Triple helix (companies, knowledge institutes, government)	All relevant actors, focus on businesses
Contract based on company programmes	Contract based on action plan
Commitment of all partners in cluster programme	
Maximum €500,000 per year funding over maximum ten-year duration	Maximum €150,000 per year funding over a maximum three-year duration
50% private investment	50% private investment

Similar to many other European jurisdictions, the Flanders cluster policy has evolved over time. Initially, the policy focused on the development of strong local clusters. However, over time, the policy developed to take a more significant focus on internationalising clusters.

In 2020, the Flanders Cluster Policy was reviewed, to optimise it for the coming years. The aim of the renewed policy is to sharpen its objectives in terms of impact, with a particular focus on the internationalisation and involvement of small businesses. Following a recent review of the overall efficiency of the Flanders Cluster Policy, it was determined that the impact of innovation networks was smaller. Therefore, from 2022, the Flemish government have decided to withdraw support from innovation business networks and develop a cluster programme focused solely on spearhead clusters.

The Policy Memorandum 'Economy' 2019-2024 (Beleidsnota Economie 2019-2024) [47] confirms the role of the Flanders Cluster Policy and the functioning of the six spearhead clusters as a showcase for industrial innovation policy. These spearhead clusters focus on innovative solutions and technological breakthroughs that are necessary to realise the energy transition and will contribute to a climate resilient society in Flanders.

CLUSTER PROGRAMME

VLAIO is responsible for drafting and implementing the cluster policy. The agency is also responsible for funding the cluster organisations and administering supports.

The Flanders cluster programme puts companies 'in the driver's seat' and has a strong focus on active collaboration in all activities. However, a number of criteria govern access to the Flanders cluster programme funding. Funding agreement is based on execution of a 'Cluster Pact' and the identification of KPIs for follow up. Furthermore, financial support for cluster projects requires a minimum of three companies to be involved. The government will fund up to 50% of resources earmarked to deliver projects provided there is clear (financial) commitment from all participating companies from the outset.

A specific tool for spearhead clusters is the 'Cluster Pact', an annually updated partnership agreement between government, cluster organisations (spearhead clusters) and knowledge and research institutes. Cluster Pacts are clearly written agreements about the cluster strategy and its potential collaboration partners. The plans illustrate how government supports (both financial and non-financial) will be used to support competitive plans. Key features of the Cluster Pact include:

- Commitment from government for earmarked project resources;
- Identification of restrictive regulations or other barriers for realisation of economic added value;
- Additional non-financial commitment from government;
- Commitment from companies to participate in cluster initiatives;
- Commitment from knowledge institutes to align research agendas;
- Front-office role for VLAIO;
- Contribution and collaboration in transition priorities of Flemish Government (smart specialisation); and
- Alignment with other policy domains.

Cluster organisations are given significant levels of autonomy in the administration of grant funding. The cluster organisations are entrusted to support innovation projects in areas identified by cluster participants without further guidance from the government. The projects selected are managed by industry and supported by Flemish RDI institutions and universities.

Flanders' policymakers made the conscious choice to support innovation without being in the driver's seat. The

47 Government of Flanders (2019) Beleidsnota 2019-2024 Economie, Wetenschapsbeleid en Innovatie

cluster organisations are entrusted to support innovation projects in areas identified by cluster participants without further guidance from the government. As such, cluster organisations adhere to a bottom-up approach, and are created and driven by businesses. Despite the bottom-up approach to the establishment of Flemish cluster organisations, the government takes an active role in the promotion of cluster membership by raising awareness of the benefits of clusters.

The Flanders cluster programme has evidently been initiated with the endpoint in mind and has identified a clear timeframe for support, which is between three and ten years. Clear (financial) commitment from companies is required from the outset. The Flanders cluster programme supports both local and international cluster-to-cluster cooperation. The programme includes a specified budget for projects in which multiple clusters cooperate. Additionally, VLAIO supports consultation between fellow clusters through tailored supports and grants all cluster organisations access to the 'VLAIO Network'. VLAIO account managers organise quarterly meetings in which the various cluster managers share best practices, practical advice and learnings.

FUNDING STRUCTURE

The State support provided is two-fold:

1. Financial support to cluster organisations (facilitators) to initiate, facilitate and follow-up active collaborations, as well as funding 50% of the operational cost of the cluster; and
2. In-kind support from the government including: appointing key account managers (0.5 WTE for spearhead clusters and 0.2 WTE for innovative business networks); and support to initiate inter-cluster projects and financing, training and peer learning.

Spearhead clusters receive funding for up to ten years to develop and implement their competitiveness programme. They receive up to €500,000 in operating resources per year, if the participating companies and organisations contribute the same amount. In addition, €95 million is made available each year for individual research and innovation projects that are launched via the clusters to strengthen the competitiveness of their members.

Financial support for cluster projects requires a minimum of three companies to be involved. The government will fund up to 50% of resources earmarked to deliver projects. Details of the five-step funding procedure is outlined below:

Flanders cluster programme five-step funding procedure:	
1	Identification of the main theme of the call for proposals at a brainstorming meeting with industry and through subsequent discussion with RDI institutions and universities.
2	Identification of project opportunities, e.g., how to replace salt in specific meat products, and agreement on a call for proposals.
3	Launch of a pre-call to check whether the identified theme generates interest from enough cluster participants.
4	Request for full proposals from consortia consisting of cluster participants (each project consortium must include at least five cluster participants, and the average is ten project participants). The call for proposals is open to all cluster participants.
5	Evaluation of full proposals on a competitive basis, performed by an international panel of experts.

NORWAY

Since the mid-1990's, Norwegian industrial policy has been focused on furthering national objectives regarding welfare, employment, and elevating Norway as an attractive location for enterprise. Shortly after, the concept of clusters appeared in the Norwegian enterprise policy landscape.

With over 20 years of clustering efforts, Norway has an extensive landscape of cluster organisations at varying levels of development across a range of industries.[48] The Norwegian Innovation Clusters (NIC) cluster programme, supported through the collaboration of Innovation Norway, the Industrial Development Corporation of Norway (SIVA) and the Research Council of Norway, is carried out at a national level. The aim of NIC is to set up and strengthen cooperative innovation projects in business clusters focusing on increasing companies' ability to innovate and their competitiveness.

The NIC cluster programme has grown to become an important industry policy instrument over the past two decades. Knowledge, research and innovation are of crucial importance to Norwegian companies' competitive ability, in both established industries and new companies and sectors. In this context, Norway is focused on developing a fruitful collaboration between education, research and industry, and making conditions suitable for new companies to be formed.

Like other jurisdictions examined, Innovation Norway have sought to document and analyse the performance and impact of Norwegian clusters since the introduction of a formal policy and programme. A recent independent report published by Samfunnsøkonomisk (Economics, Norway) concludes that the economic benefits achieved by the Norwegian cluster programme exceed the cost. Specifically, it identifies that the cluster programme contributes to increased productivity for all industries because of cluster participation. However, it does acknowledge that it is challenging to determine to what degree higher growth among cluster participants contribute to higher value added in the overall economy.

EVOLUTION OF NORWEGIAN CLUSTER POLICY

The concept of public contribution towards the development of clusters was first introduced in Norway in a 2002 report by the Ministry of Trade and Industry. It stated that *'developing clusters seems to be of great importance for value creation and the localisation of foreign businesses in Norway. It is therefore desirable to contribute to the development of both new and existing clusters and business environments in Norway*'. The ideas referenced in the 2002 report led to the establishment of the *Arena – Innovation in Networks* programme in 2002 and, subsequently, the *Norwegian Centres of Expertise (NCE)* programme in 2006.[6]

The current National Cluster Programme, the NIC programme, was launched in 2014. This programme aims to increase growth by promoting and improving collaboration activities in the cluster organisations. The NIC programme continued the basic ideas and objectives of the two preceding programmes (Arena and Norwegian Centres of Expertise) but included Arena and NCE as levels in a common cluster programme. The NIC programme introduced a third layer in the Global Centres of Excellence (GCE) programme.

The change in the programme structure came as a result from 2011 evaluations of the Arena and the NCE programmes. These evaluations recommended that the two existing cluster programmes should be continued and scaled up. Furthermore, the evaluation of NCE suggested that a stronger and more formal link between Arena and NCE would contribute to a significant simplification and improvement in selecting new NCE projects. A subsequent review concluded that there was a need for a third level in the range of network programmes and suggested that the Global Centre of Excellence programme should also be introduced.

The rationale underpinning this change was that industry clusters with ambitions to develop better knowledge dynamics will normally start at Level 1 (Arena), then qualify for Level 2 (NCE), but that the network development should not end there. Hence, the introduction of Level 3 (GCE) to support cluster organisations with greater scale, increased knowledge links and links to established global partners.

Today, cluster programmes are a central pillar of Norwegian innovation policy. More recently, Norway has adopted an approach in line with smart specialisation despite not being a member of the EU.

CLUSTER PROGRAMME

The NIC cluster programme is organised by Innovation Norway, in joint effort with SIVA and the Research Council of Norway. The programme operates through three sub-level programmes to strengthen collaboration and sustain innovation in cluster organisations at different phases of maturity.

There are three main programmes grouped under the NIC policy, namely:

- The **Arena – Innovation in Networks** programme was established in 2002. The Arena programme is national and free of any regional or sectoral constraints. Its objective is to strengthen the capability of regional business environments for innovation and value creation through stronger and more dynamic interaction between industry, the public sector and knowledge providers. Arena targets newly established and/or immature collaboration initiatives that provide a good potential for further growth. Arena cluster organisations can be relatively small and primarily have a regional position or be larger with a national position. The programme can be split into two sub-programmes: Arena - regional clusters in an early phase (three-year programme); and Arena Pro - regional and national clusters (five-year programme).
- The **Norwegian Centres of Expertise (NCE)** programme was established in 2006. The objective of this programme was to strengthen innovation activity in the clusters with the largest potential for growth and a clear international orientation in Norway. NCE is intended

48 *Cluster Excellence Denmark (2022)* The Danish Clusters: Cluster History

to focus, improve and accelerate cluster organisations with a well-established national position and further national and international growth potential. Successful cluster projects receive technical and financial support for up to ten years[49], divided into three contract periods with assessments after three and six and a half years regarding the continuation of financing. NCE clusters may apply for participation at the next level (GCE) during the project period.

- **Global Centres of Excellence (GCE)** was established in 2014 with the establishment of NIC. GCE is intended to increase value creation and attractiveness in clusters with a considerable potential for growth in both national and international markets by targeting well-established and well-functioning cluster organisations with a global value chain. Due to State aid rules, GCE does not offer financial support for cluster development (operational activities) and thus there are no formal limitations on maximum time horizon for the projects. However, the current programme limits GCE projects to a maximum of ten years.

The objectives for cluster organisations funded by the individual programmes under the NIC are summarised below:

	Arena – Innovation in Networks	Norwegian Centres of Expertise (NCE)	Global Centres of Excellence (GCE)
IMPACT TARGETS			
Value creation	Increased ability for innovation	Increased value creation within the cluster	Increased value creation and attractiveness and a position within global value chains
OUTPUT TARGETS			
Innovation skills	Increased innovation collaboration and innovation activity	Increased innovation activity through systematic collaboration between firms and RDI institutions	Increased innovation activity with a significant impact within radical innovation processes
Internationalisation	New or enhanced relationships with international partners	Increased collaboration with international partners	Increased strategic collaboration with leading international partners
Access to competence	Better access to relevant competence	Better access to relevant competence through strategic collaboration with educational institutions	Better access to relevant competence through strategic cooperation with leading national and international educational institutions
Attractiveness and visibility	Increased regional recognition as an innovative and sustainable environment	Increased recognition as a nationally important environment for innovation and growth	Increased recognition as a hub or node in a global innovation system
Interaction and collaboration	Increased dialogue and collaboration internally and externally	Increased targeted collaboration internally and externally	Increased strategic collaboration internally and externally

49 *Note: NCE offers financial and professional support to cluster projects with a duration of five years. If the cluster organisation is recruited directly into NCE (not following an Arena project), it may apply for a second contract period of five years. If the cluster organisation started as an Arena project, the years in Arena are deducted, so that the project period does not exceed ten years. A status assessment is conducted after two years, and after seven years.*

The NIC cluster programme is a national programme that currently supports 39 cluster organisations. Participants are selected through annual competitions based on technical selection criteria. That is, all new cluster projects, at all levels, are assessed according to national criteria and procedures. There are no restrictions on who can apply for admission in the cluster programme, however, applicants for all levels must meet a set of requirements to gain access to the programme. The entry criteria include:

- Legal entity of the applicant (cluster organisation);
- Defined partnership between stakeholders in the cluster organisation;
- Existence of a Board representing the partnership and an operational management of the cluster organisation;
- The project proposal must be in accordance with the purpose of the programme and the specific call for proposals; and
- Application should be a result of a joint/collaborative process with participation from stakeholders in the partnership.

FUNDING STRUCTURE

Innovation Norway is responsible for administrating grants and contracts to the cluster organisations. The NIC mainly finances up to 50% of the total cost of eligible activities. Member companies fund the remaining cost, either through membership fees or project funding. Financial grants are differentiated for the three programmes and will typically adhere to the following limits:

- The **Arena – Innovation in Networks** can co-finance activities in process management, analysis and strategy processes, network building, communication initiatives, early-phase idea and project development and learning initiatives. The financing can cover up to 50% of the costs of a project, normally NOK 2 to 3 million (~€200,000 to €300,000) per annum. Professional assistance is also offered.
- The **Norwegian Centres of Expertise (NCE)** programme offers support up to ten years. The grant per project is normally between NOK 4 to 6 million (~€400,000 to €600,000) per year.
- **Global Centres of Excellence (GCE)** programme offers financial support for up to ten years. The grant per project is typically between NOK 8 to 10 million (~€800,000 to €1 million) per year. GCE offers financial support to increase and enhance knowledge, innovation and cluster-to-cluster collaboration.

Furthermore, competitive funding is available to Norwegian cluster organisations for cluster projects relating to:

- Developing expertise for enhanced innovation capacity and growth at SMEs;
- Positioning of Norwegian companies in international markets; and
- Developing new business opportunities across sectors and technologies.

Norwegian cluster organisations can also benefit from funding for cluster initiatives through:

- Regional Authorities;
- The Research Council of Norway; and
- The EU for European cluster collaboration projects.

KEY LEARNINGS FOR THE IRISH CONTEXT

The review of international cluster policies and programmes highlights several key learnings to inform the future policy direction of an Irish National Cluster Policy and Framework. Key takeaways from this exercise include, but are not limited to:

- **Adapted to local context |** While cluster policies are increasingly prevalent across international jurisdictions, each location has its unique set of economic opportunities and challenges. Hence, policies are closely aligned with local and national conditions and are delivered in ways that are consistent with the realities of the location. For example, as the Catalan economy is primarily composed of SMEs, the cluster policy has been designed to enable economies of scale in understanding strategic challenges and implementing collaborative projects.
- **No standard policy approach |** There is no 'international best practice' standard or 'one size fits all' policy approach or cluster model. The evidence gathered to date clearly indicates that there is no single model for clusters or clustering. Review of international jurisdictions illustrates that cluster policies across Europe are wide-ranging, but they also have common traits. These include, but are not limited to:
  - The establishment of an overarching and cohesive cluster policy as one of the main instruments to promote cooperation for competitiveness;
  - Clear commitment from companies to participate in cluster initiatives; and
  - European funding is leveraged to finance cluster initiatives.
- **Clusters promote cooperation and competitiveness |** Different cluster programmes are designed to serve different purposes. However, in all cases, the jurisdiction has established an overarching and cohesive cluster policy as one of the main instruments to promote cooperation for competitiveness.
- **Evolution of policy approach |** Cluster policies and programmes aim to boost the competitiveness of a given territory. During the lifespan of a policy, there will usually be different stages. The prominence of a policy fluctuates in the political agenda and ultimately it will evolve. The evidence suggests that while some programmes require minor adjustments (as seen in the Catalan experience), other policies, such as in Denmark, have undertaken more profound changes to be successful.
- **Cost effectiveness |** International examples show how an efficient cluster policy can tangibly grow economic activity and develop a strong indigenous population of competitive and innovative enterprises. Across all case studies examined, clusters are effective tools for organising the implementation of many public policies and public investments directed at economic development including business attraction, export promotion, market information and discourse, development of specialised infrastructure and natural resource protection. Furthermore, not withstanding the challenges in measuring the impact of cluster policies, several jurisdictions have concluded that clusters are one of the best, and cost-effective, tools in terms of helping companies, fostering engagement, increasing productivity and driving competitiveness.
- **Common foundations |** Most national and regional cluster programmes launched in the 1990's and 2000's and were inspired by the theories of Michael Porter. Following the acceptance of the cluster concept within the policy framework, the identification, development and upgrading/professionalising of cluster organisations became a key priority for governments.
- **Internationalising SMEs |** Recognising the potential for cluster organisations to support SMEs accessing international markets, many cluster policies and programmes include the internationalisation of cluster organisations in subsequent policy iterations.
- **Integration with Smart Specialisation |** Many jurisdictions are integrating cluster policies into smart specialisation strategies by using clusters as a tool to implement RIS3. Strategic selection of few regional strongholds has, in general, proven to be successful. Similarly, there is increasing evidence that cluster policies are being used as vehicles to respond to new challenges such as the twin transition, globalisation, societal challenges and/or embedding resilience.
- **Tailored support |** It is clear that the cluster ecosystems are different in different locations at different times. There is clear variance across the case studies examined regarding the policy choice to supporting clusters. For example, some jurisdictions adopt a multi-layer approach to provide targeted supports to both mature and emerging clusters. The cluster ecosystem, regional settings, policy objectives and resource availability appear to be key factors that ultimately influence this policy decision.
- **Regional development supported by national cluster programmes |** The review highlighted a number of distinct approaches for the development of national cluster policies and programmes. Some countries, such as Austria, Belgium and Spain, have put in place a national cluster platform or programme, but implement cluster policies at a regional level. Other countries operate clusters at a national level but focus on a strategic selection of a few regional strongholds. Irrespective of the choice to run national or regional, competitive or non-competitive calls, the overarching trend is towards developing national clusters of scale.
- **Focus on high-performing cluster organisations |** Cluster policies at a national level often target the top clusters or clusters of key strategic importance, while the regional level funds emerging cluster activities.
- **Seeding cluster organisations |** None of the cluster programmes examined focus on the establishment of new cluster organisations. However, it is anecdotally understood that these 'establishment' programmes do exist at regional levels. In contrast, the cluster

programmes examined are focused on existing cluster organisations and supporting them to enable better national and regional development. The result of this distinction is that cluster organisations typically have a strong industrial rationale, have a public to private funding model and are therefore more sustainable.

- **Strategic domains |** The case studies suggest policy makers are increasingly focusing on a considered and well-selected group of cluster organisations to ensure cluster programmes are targeting an appropriate portfolio. However, for this approach to be achievable, the specific characteristics and qualifying criteria of cluster organisations must be clearly defined. Furthermore, strategic domains of national/regional importance must be agreed.
- **Horizon time for funding |** The cluster policies examined typically see clusters as having a more long-term return-on-investment. The horizon time for most cluster programmes exceeds three years, with the majority having a five-to-ten-year funding window. However, funding programmes are typically divided into specified contract periods with assessments against set KPIs to determine the continuation of financing.
- **Legal structure |** There is variance across the case studies examined regarding the optimal legal structure for cluster organisations. While there are many options for the establishment of cluster organisations, the Danish experience highlights variance in the performance of different archetypes and suggests that independent cluster organisations (both in terms of their legal structure and financial framework) deliver greater value. Analysis conducted by Cluster Excellence Denmark found that if a cluster organisation is hosted by one organisation, or is attached to departments within a development agency, there is a risk that the values and the strategy of the host organisation will become dominant over time. Their evidence base suggests that cluster organisations can better serve the whole ecosystem in a neutral and facilitating manner if they are independent associations (non-profit or for-profit). However, due to the linkage between the legal structure of a cluster organisation and the funding options available, policy decisions regarding the legal entity of cluster organisations will influence the methods of support provided by the cluster programme.
- **Cluster governance |** Strong cluster governance is essential to ensuring long-term success, facilitating decision making and enabling accountability. The international models examined will often require governance as an access criterion to the relevant cluster programme, typically determining the existence of robust governance within a cluster organisation based on the presence and composition of a Board. This is considered a critical success factor in meeting the needs of the different stakeholders and improving the competitiveness of cluster members by means of cooperation,
- **Financial model |** Even mature clusters require some level of financial support. However, cluster organisations that are set up based on a strong financial model which leverages private funding result in greater instances of long-term sustainability. All the cluster programmes examined require minimum levels of private funding. As such, the majority of successful cluster organisations will operate a funding model which leverages private funding generated through membership fees, services sold to members (projects funded, or part-funded by industry) and match funding for European projects (via Interreg or the Research and Innovation Framework Programmes).
- **Evaluation |** Identifying an optimal approach to measuring the impact of cluster policy remains a significant challenge. Although mature cluster programmes have an identified range of methods to document the impact of clusters (including statistical data analysis, qualitative surveys of cluster members and highlighting/showcasing success stories), there is no international best practice regarding the optimum KPIs, data sources or the most effective ways to showcase the impact and value of clusters to broader society.
- **Central coordinating structure |** Several of the jurisdictions reviewed have established a central agency with responsibility for executing cluster policy, funding cluster organisations and administering supports. In many of the case studies identified, this agency acts as the focal point or coordination body for cluster organisations operating within that jurisdiction. Further duties include, but are not limited to:
  - Provision of day-to-day assistance for cluster organisations belonging to the national cluster programme.
  - Provision of expertise to cluster organisations to ensure they can reach their potential.
  - Support local cluster organisations in developing an international profile.
  - Taking an active role in the promotion of cluster membership by raising awareness of the benefits.
  - Facilitating cluster-to-cluster cooperation and learning and experience exchange.
  - Enabling strategic dialogue between industry, cluster managers and government agencies.
  - Supporting competence development and professionalisation of cluster managers.
  - Assisting in the identification of strategic partners and assembly of funding applications.
  - Monitoring and evaluation of cluster initiatives.
- **National scope |** The majority of the jurisdictions examined are of a comparable scale to Ireland in terms of geographic jurisdiction and population size. In the context of cluster organisations which have a minimum regional scope, these cluster organisations would also have a national remit comparable to Ireland.

Section 3 – Stakeholder Consultation

INTRODUCTION – OVERVIEW OF CONSULTATION EXERCISE

As part of this engagement, an in-depth stakeholder consultation was undertaken to gather information and insights on the Irish cluster landscape, as well as key learnings and information relating to good practice examples of cluster policy.

The approach to stakeholder consultation was delivered through three methods:

1. **Design Thinking Workshop** – a workshop was held with the National Cluster Policy and Framework Development Steering Group to:
    - Establish a shared understanding and clear definitions of clusters, and related terminology as relevant in the Irish context; and
    - Develop a shared ambition for clustering and the cluster landscape in Ireland.
2. **Stakeholder Interviews** – a comprehensive stakeholder consultation process was undertaken with 43 individual stakeholders. The process engaged representatives from the National Cluster Policy and Framework Development Steering Group, government departments, State agencies, Higher Education Institutions, local government agencies, Irish cluster managers, international cluster experts and representatives from Irish enterprise. Interviews were held either one-to-one or in focus groups.
3. **National Stakeholder Event** – a national conference-style event, hosted by the Department of Enterprise, Trade and Employment and facilitated by Grant Thornton, was held in May 2022. This event sought to explore the evidence base gathered to date and to invite participants to share experience and knowledge in support of the development of a National Clustering Policy and Framework in Ireland. To facilitate this agenda, the event featured keynote presentations on international experiences and facilitated expert panel discussions on two key topics: maximising the economic impact from clustering in Ireland; and critical success factors for impactful cluster organisations.

STAKEHOLDER SOUNDINGS

The open engagement with stakeholders:

- Explored the current landscape for clusters in Ireland and internationally;
- Sought to define the cluster concept in the Irish context;
- Discussed the justification for nationally coordinated public support for clusters; and
- Explored the opportunities and challenges for a national cluster programme.

Synthesised stakeholder testimonial identified several key considerations in the context of developing policy options for a National Clustering Policy and Framework. The findings from the stakeholder consultation process were distilled and focused on the following headline themes:

- The policy challenge – key issues identified;
- Maximising the economic impact from clustering in Ireland; and
- The critical success factors for impactful cluster organisations

The outcome of this process, at a high level, is that there is strong interest in greater cohesion across the landscape and demand from stakeholders for a nationally coordinated support mechanism for clusters. While there are diverse perspectives regarding the critical success factors underpinning a successful cluster organisation, as well as the level of support required to ensure their success, the majority of stakeholders agree that there is potential for clustering to play a role in:

- Enhancing the visibility of Irish businesses in international markets;
- Improving Ireland's attractiveness for new international business investment;
- Strengthening SME productivity, enterprise competitiveness and resilience;
- Developing Ireland's sectoral strengths;
- Identifying and developing new areas of strength; and
- Acting as a driver of green and digital transition.

Stakeholders agreed that the concept of clustering needs to be defined, and there needs to be a clearer narrative on the benefits of clustering, and the rationale to participate in these initiatives. The purpose of cluster participation must also be clarified, highlighting how they:

- Enhance the ability of high potential SMEs to scale and internationalise;
- Enable MNCs to achieve stronger partnerships with supply chain contributors; and
- Enhance competitiveness and innovation.

THE POLICY CHALLENGE – KEY ISSUES IDENTIFIED

- **Definition of a cluster |** Despite the increasing awareness of the concept of clustering across Ireland, a critical problem cited by stakeholders was that the 'cluster' concept remains confusing and there is a lack of a shared understanding in the Irish context. Furthermore, in the absence of an agreed definition, potential members may be hesitant to join a cluster as they may already be a member of a business network or association which is calling itself a cluster. In this regard, the importance of this National Policy Framework providing leadership regarding an agreed definition was highlighted.
- **The current landscape |** Many stakeholders cited the current Irish clustering support structure as nascent, fragmented and underdeveloped. Additionally, many stakeholders considered the current cluster landscape including cluster organisations, government supports and enabling infrastructure to be confusing and complex. The funding instruments currently available to Irish cluster organisations are administered through a variety of national development agencies. Each of the cluster programmes has its own goals and objectives and is designed to achieve different outcomes. At a strategic level, it is challenging to build a consistent, clear message regarding ambitions for clusters in Ireland.

  Furthermore, many considered the development of clustering in Ireland to be organic in nature, with many cluster organisations having formed, or having resulted in considerable growth, concentrated skills and knowledge development through bottom-up grouping in the absence of the overarching national clustering policy.

  Despite the organic growth of clusters in Ireland to date, stakeholders shared the belief that the national support frameworks introduced by relevant agencies have significantly supported clustering in Ireland and shared that supports such as the Regional Technology Cluster Fund (RTCF) and Regional Enterprise Development Fund (REDF) have played a positive role in stimulating cluster activities.
- **Scale |** A significant issue identified is the need for ambition to scale Irish cluster organisations. It was asserted that most existing cluster organisations are operating at a local or regional level.

  In contrast, stakeholders pointed towards the scale of cluster organisations in Europe. It was also stated that an all-island approach to clustering would benefit the economy and the cluster landscape by taking advantage of scale.

  With the continued growth of, and cultural shift towards virtual work environments, the Irish cluster landscape could be offered as an opportunity to leverage a national approach through virtual and connected hubs in various regions. This shift is reducing the importance of proximity in the cluster concept for certain sectors which are not required to be located close to complementary industries. However, this may still be important to traditional sectors such as manufacturing and construction where proximity is a greater influence. Not only would this offer greater sharing of information, ideas and resources, it offers Irish cluster organisations the opportunity to leverage international cluster organisations and become part of those also.

  Additionally, stakeholders shared the belief that targeting cluster organisations on a national scale with regional chapters would be the most effective approach as it would ensure greater scale, access to a larger market base and may drive greater openness amongst industry and academia operating in these clusters.
- **Opportunity cost |** It was asserted that the Irish economy currently incurs an 'opportunity cost' from the lack of a strategic focus on clustering. In this regard, the importance of effective clusters, which generate benefits for their members and the economy was highlighted. In terms of national impact, the missing benefits referred to were economic growth through increased productivity and increased competitiveness. In particular, it was highlighted that:
  - Clustering as a policy tool could help to address the issue of low productivity SMEs in Ireland;
  - Clustering would increase the potential to market 'Ireland Inc.' internationally for Foreign Direct Investment, as a pull factor;
  - Clusters could add credibility and critical mass to sectors to market their products/services abroad; and
  - Awareness should be increased across industry of the benefits of clustering for businesses to ensure buy-in.
- **Buy-in and participation |** A key challenge for clustering in Ireland is persuading businesses and academia of the benefits of clustering. At present, some businesses may be apprehensive of engaging with cluster organisations as they would be partnering with competitors. In terms of building trust, the importance of building confidence through the professionalism of cluster organisations which are managed by capable cluster managers was cited, as well as the importance of communicating the tangible benefits of cluster participation to member companies.
- **Funding and inclusive supports |** Consideration will need to be given to where the responsibility for administration of cluster supports might lie and ensuring that all enterprises can participate in clusters, in particular having regard to individual agency's mandates.

  Similarly, a challenge facing any clustering policy is to what degree funding would be provided. A shared sentiment by interviewees was the need for cluster

organisations to be self-financed and self-operating. Should the State or agency funding be reduced or removed, there was a sense that cluster organisations would disappear. Funding is required at the start-up phase, as well as for ongoing maintenance supports.

As such, it was asserted by several stakeholders familiar with international cluster models that the most successful models see a larger proportion of funding provided through public streams with a smaller, but important portion be funded through industry streams. This is similar to the REDF and Border Enterprise Development Fund (BEDF) funding which sees 80% of funding through grants and the requirement of 20% match funding from industry or other non-public partners. It was highlighted that self-sustaining is not possible in certain sectors because a self-sustaining model would prevent smaller firms from gaining membership to the cluster organisations.

To achieve this, a key shift in mindset will be required around membership fees. Cluster development is typically publicly funded in the early stages of development (typically considered the initial one-to-three years) and needs to demonstrate value to the constituents through their programmes and services within a short timeframe. Once the constituents start seeing value, they start to pay for the services and government funding can decrease as per a sliding scale model.

- **Measuring impact |** It was asserted that clusters will have to be able to demonstrate their economic and social impact, while acknowledging that it could be difficult to attribute specific impacts for evaluation purposes.
- **Climate and sustainability |** Many stakeholders shared the belief that clusters and/or clustering represented a significant opportunity for the development, testing and implementation of new green solutions in strong partnerships to solve societal challenges related to climate and environment. It was asserted that cluster organisations could drive action to achieve Ireland's climate action targets and UN Sustainable Development Goals (SDGs) by uniting enterprises and assisting them in finding achievable measures in which they can reduce their carbon emissions. As such, clusters, as a policy pursuit, would be central tenet in Ireland's approach to delivering its sustainability agenda.

MAXIMISING THE ECONOMIC IMPACT FROM CLUSTERING IN IRELAND

- **Clear remit |** There was consensus regarding a pressing need for the National Cluster Policy to define the cluster organisations, including their purpose and critical success factors.
- **Commitment |** An integral step to achieving the maximum economic impact of clustering is a firm commitment to clustering in Ireland. By focusing on the economic rationale for clustering and the opportunities for cross-sectoral collaboration and innovation, a strong narrative will be developed to encourage clustering in Ireland.
- **Building scale |** Building clusters to scale is vital in optimising the economic impact of clustering. Clustering scale is dependent on the complexity of the sector's ecosystem, which can consist of start-ups, SMEs, multinational companies, academia and public stakeholders.

  In tandem with the scaling principle, the option to consolidate the landscape may be considered. For example, clusters that exist locally with a narrow local focus tend to have limited economic impact, whereas the reverse is true with sectoral and national clusters. The twin importance of appropriate scaling and consolidation were illustrated by international examples, including the Danish and Catalan experience.

  Furthermore, many stakeholders identified measures that could improve the impact of clusters. These included: being ambitious; having a clear remit for the role of cluster organisations; and the importance of internationalisation.
- **National vs. regional perspective |** There were mixed views regarding the need for a regional versus a national focus from cluster organisations. A number of stakeholders felt that for Ireland's cluster landscape to reach notable strength, policies should consider consolidation approaches that amalgamate existing cluster organisations and networks operating in similar focus areas and create national cluster organisations of scale. This would contribute to building the scalability and impact of Irish cluster organisations by allowing more opportunities for collaboration, cooperation and innovation across all relevant stakeholders in industry, academia and government agencies.

  However, many stakeholders warned against over-consolidation in the Irish landscape. The majority of concerns raised considered that a national approach may diminish mass collaboration within the landscape at a regional level leading to missed opportunities for innovation. Furthermore, many stakeholders highlighted that most cluster organisations in Ireland are still 'emerging' or in the early stages of development across multiple sectors – both established and emerging industries. By focusing on establishing clusters in nationally strategic sectors, opportunities to collaborate in other sectors may be lost. However, it is important to note that a balance needs to be found in terms of the sustainability of organisations, e.g., membership opportunities may be higher at a national level than at a local level where the number of firms, academic institutes and agencies are limited.
- **Integration into existing policies |** Many stakeholders believed that clustering can be considered in the context of, and integrated with, wider enterprise policies such as Ireland's Research and Innovation Smart Specialisation Strategy and broader EU policies. Aligning clusters with existing policies would open and perhaps consolidate opportunities for innovation within the industries.
- **Connectivity of other initiatives with clusters |** The national policy may outline and provide guidance on how external initiatives such as the European Enterprise

Network, Skillnet, European Digital Innovation Hubs and Digital Europe Programme can support clustering and play a role in providing collaborative instruments through existing resources. This would help leverage any existing networks and initiates currently ongoing in Ireland.

Furthermore, it was suggested that the development of a synergetic clustering ecosystem would support skill and resource development and enable greater alignment, connectivity and collaboration between cluster organisations and external initiatives. Presentations and open communication on challenges to a group of cluster managers by the aforementioned groups could support them to engage with industry sectors where relevant.

- **National Coordinating Body |** The majority of stakeholders felt that a National Coordinating Body providing centralised supports to enable the development of clusters is critical for success. The purpose of this national body is to coordinate clustering organisations, support cluster management training and coordinate international best practice to assist the cluster organisation grow and scale. Key international exemplars cited include ACCIÓ in Catalonia and Cluster Excellence Denmark. As part of the call for a national coordinating body, it was suggested that the development of a digital portal would further enhance the connectivity of cluster managers across the country, enabling better communication and cross-cluster collaboration.
- **Raising awareness |** Stakeholders highlighted the importance of raising awareness and creating an understanding of clustering in Ireland. By proactively promoting the beneficial impacts of clustering, clustering in Ireland will be strengthened in every aspect. Critical to any promotion associated with clustering are accessible and concise information materials. It was encouraged that terminology and definitions associated with clustering be clearly articulated and explained.
- **Education |** There is a need for a properly developed career pathway and accredited educational requirements for cluster managers. Cluster managers are crucial for any cluster. They play a significant role in developing the cluster and in connecting key players within the sector, both nationally and abroad. Cluster managers who 'sleep, eat and breathe clusters' may have the option to attain accredited educational qualifications in this field. Not only would this aid their role, it would also create and maintain a sense of security in their place of employment. Additional benefits would also be realised in retaining talent and developing future career opportunities in the cluster space.
- **Funding mechanisms |** The majority of stakeholders engaged shared their views regarding options for financing clusters. Many stakeholders felt that the range of funding tools and instruments used by various agencies have led to a fragmentation issue across the current cluster landscape. The national policy and framework could design a single funding instrument to support the development of cluster organisations according to their scale, which could be utilised by all public agencies.

  Many stakeholders endorsed the concept of a two-tier or multi-layer support structure – like those used in international cluster programmes including Flanders and Norway. This system would group clusters as either operating at a: 1) National Level; or 2) Regional Level. According to a clusters grouping, the support system would offer different levels of funding and funding assistance. This could potentially address the unique requirements of clusters, while addressing discrepancies in funding.
- **Length of funding |** There was widespread consensus that a three-year funding term is too short to adequately support cluster organisations develop beyond the 'emergence' phase. It was generally accepted that a medium to long-term period (or five to ten years) is required to facilitate cluster organisations to achieve the requisite critical mass of companies and establish appropriate funding models to achieve long-term sustainability. However, there is a recognition that reviews and meeting KPIs should be a requirement of bi-annual funding.

  Furthermore, many stakeholders acknowledged that all cluster organisations, even mature and high-performing operations, require some level of financial support. However, there was general endorsement of the principle that State support should be gradually reduced over time and cluster organisations should increasingly leverage private funds to achieve a level of financial sustainability.

  Funding models may include, but not be limited to membership fees and services sold to members. It was indicated that members investing in the cluster is a critical success factor and a meaningful step in developing a successful cluster as it shows that it is valued by members.

CRITICAL SUCCESS FACTORS FOR IMPACTFUL CLUSTER ORGANISATIONS

- **Clear definitions |** The majority of stakeholders felt that clear definitions are required for clusters, to ensure that there is a common understanding of the concept across Ireland. Stakeholders believed defining the scope of a cluster organisation was particularly important. Consultation with international experts suggested that the cluster organisations should operate in such a way as to:
  - Facilitate inter-cluster and cross-cluster collaboration.
  - Achieve efficiency in the sharing of resources and development of joint-innovation projects, etc.
  - Provide opportunities to enable change, development and progression of the industry through innovation, collaboration and cooperation.
  - Ensure sustainability and ongoing competitiveness for cluster participants into the future.
  - Create business opportunities to grow and exploit opportunities for diversification by utilising external drivers such as digital technologies.

  It was suggested that ongoing uncertainty around definitions, and hence the anticipated benefits of cluster participation, may act as a barrier to involvement and uptake.

- **Clear remit |** The role of cluster organisations needs to be clear in national policies. Thus, when national policies are being drafted, there may be a communication on the role that cluster organisations can play whether that be through communication, RDI or driving a particular strategy or target.
- **Focus |** For a country that is limited in size and scale, it is highly important to know the capabilities of the economy and to focus on the services available for provision that will yield the most growth and impact. Thus, targeting the creation of cluster organisations in an area with little appetite for cluster activities could pose certain risks and challenges. Instead, the focus can be on growing the existing capabilities and ecosystem.
- **Bottom-up approach |** It is difficult to have a top-down approach to clustering. Creating a cluster where the existing industry or members are not present in the ecosystem poses challenges for sustainable success. An example was provided where the Catalonia Pork Meat cluster emerged from the existing producers and secondary services in the region, which has led to its success to date.
- **Societal impact |** While commercial benefits are important to industry, there is a significant need to have a positive societal impact associated with clustering as members are made up of persons that require social benefits and are not as concerned about the commercial benefits. Additionally, it is critical to embed impact on the commercial side and build the profits in the social environment.
- **Strategy |** To achieve a successful and impactful cluster organisation, many stakeholders suggested the need to have a clear and current strategy in place. It was suggested that strategies developed by cluster organisations should be updated every three years at a minimum to ensure activities are aligned to the needs of its members.
- **Leadership and governance |** In order to ensure cluster organisations are impactful, the governance structure should have representatives from all areas of the triple or quadruple helix organisation model. However, it is essential that the majority of leadership is made of industry to ensure they are being industry-led.
- **Finance |** In terms of finance, cluster organisations should not rely solely on a single source of finance, and instead might look to diversify their sources, with a significant portion coming from membership, a small portion from grant funding or other institutional funds, and a portion coming from services provided by the cluster organisation.
- **Anchor firms |** There is a need for 'anchor firms' within cluster organisation in Ireland. By having anchor tenants, these firms would facilitate spillovers, enable networking opportunities and assist SMEs in overcoming strategic challenges such as skill gaps, to enhance innovation. Cyber Ireland was cited as a notable example demonstrating the impact of anchor firms within a cluster organisation.

Participating in a cluster organisation enables companies to operate more productively, be more innovative and achieve better access to employees, suppliers, more specialised information and specialised research institutions. Specifically, for larger, or multinational companies, clustering provides significant opportunities for vertical integration of their supply chain within the local ecosystem, and to build local inputs into their systems. Notwithstanding the challenges many large companies face regarding intellectual property (IP) considerations, clustering provides an opportunity for participating multinationals to broker 'complementarities' with other cluster participants, thereby being able to experiment more efficiently and at a lower cost.

Having 'anchor firms' within cluster organisations cultivates a strong environment where collaborative relationships between MNCs and SMEs can be fostered. To create this environment, the benefits of working together and the shared challenges can be clearly outlined to identify the reasons for coming together.

- **Professionalisation |** Many stakeholders highlighted the importance of professionalisation and capacity building of cluster managers, cluster practitioners and others who work in cluster related fields. Increased professionalisation contributes not only to the successful management of cluster organisations, but also enables cluster organisations to achieve a high level of competence through training, marketing and financial support. Furthermore, professionalisation of cluster managers and organisations create cluster organisations that attract engagement from all relevant players in the cluster ecosystem.
- **Evaluation |** To understand areas for improvement and areas that are successful, cluster organisations must routinely gather quantitative and qualitative data from their participating companies. However, it is crucial that a combination of feedback and international best practices are also considered when addressing areas for improvement.
- **Accreditation |** A number of stakeholders identified existing international best practice models for recognition of cluster excellence, for example, the European Secretariat for Cluster Analysis. Instead of Ireland developing its own model for evaluating cluster performance, opportunities should be explored to leverage existing, internationally recognised models.

STRATEGIC REVIEW OF IRELAND'S CLUSTER LANDSCAPE

The SWOT analysis (below) details the current landscape to generate an assessment of the strengths, weaknesses, opportunities and threats facing clusters and clustering in Ireland. It summarises the insights generated through consultation with the National Cluster Policy and Framework Development Steering Group and other key stakeholders, as well as desk-based secondary research.

S **Strengths**	• Established ecosystem; • Sectoral strengths; • Existing supports and knowledge base; • Emerging sectors; and • Research base.
W **Weaknesses**	• Lack of understanding; • Need for simplification; • Early stage supports; • Lack of positive signaling from government; and • Lack of coherence and strategic input across Government.
O **Opportunities**	• Increase collaboration between SMEs and MNCs; • Productivity and competitiveness; • All-Island Clusters • Decarbonisation; • Critical mass; • Internationalisation; • Academia (supporting the innovation arm of clusters); • MNC to MNC; • Regional development; • Scale to look outwards; • Existing network ecosystem; and • Potential to market Ireland on the international stage.
T **Threats**	• Lack of alignment to national and international policies; • Build trust among cluster members; • Confidence from entrepreneurs; • Limits our ability to achieve balanced regional investment; • Territorial aspect; and • Sustainability.

STRENGTHS

- **Established Ecosystem |** Ireland is home to a strong and diverse enterprise landscape, with a strong mix of both indigenous and multinational organisations.

  Since the early 1990's, international companies have been attracted to Ireland for a number of reasons, including the highly-skilled workforce and low-risk, pro-business environment. As a result, Ireland has become a leader across a number of areas, including first in the world for inward investment by quality and value and in the top 15 for most innovative countries in the world.[50]

- **Sectoral Strengths |** Ireland is home to several regions with sectoral strengths with the potential to benefit from scaling and growing existing clusters. These sectors include agriculture, bio-pharma, engineering, financial, ICT and medical.

Agriculture	Over 80% of agricultural land is covered in Ireland's signature rich and fertile green grass.	**Bio-Pharma**	Third largest exporter globally with over €80 billion in annual revenue.	**Engineering**	€7 billion generated annually and 42,000 directly employed.
Finance	Ireland is home to 430 financial service companies with an associated workforce of over 42,000.	**ICT**	A key driver of the Irish economy with over €35 billion in annual exports.	**Medical**	Second largest exporter of medical devices and technologies in Europe.

- **Existing Supports and Knowledge Base |** There are already a number of existing supports in Ireland for clusters and clustering provided by a variety of public bodies including Enterprise Ireland, InterTradeIreland, IDA Ireland and Knowledge Transfer Ireland.

  An example of these existing supports is the Technology Transfer Strengthening Initiative (TTSI) which was launched by the Department of Enterprise, Trade and Employment to maximise access to publicly funded research (in HEIs) by companies and entrepreneurs and to help facilitate the commercialisation of that research to deliver impact.[51]

  Like the TTSI programme, the Technology Gateway Programme offered by Enterprise Ireland works with Institutes of Technology, most of which have joined together to become Technological Universities (TUs), to interact with industry on a local, regional and national basis.

- **Emerging Sectors |** Ireland is positioned to exploit a number of very significant emerging industries and trends in areas such as technology, energy and Fintech as the economy is already home to some of the world leaders in these areas.

  Similarly, with the international agreements stemming from global meetings such as the Paris Climate Accords and most recently the COP26 UN Climate Change Conference in Glasgow, an increased focus and priority has been placed on innovation and activities in renewable and alternative energy. With Ireland's location, it is ideally situated to become a leader in more climate friendly energy production and usage.[52]

- **Research Base |** With a significant number of established university colleges and the creation of TUs which bring together the resources and expertise of institutes of technologies across the country, Ireland's research base continues to develop strength and capacity.

  Additionally, through interactions with public bodies such as Enterprise Ireland and Knowledge Transfer Ireland, the research activities between private business and public HEIs are seeing significant output in the form of IP and patents. For example, through the TTSI, 1,655 collaborative RDI projects with companies were live in December 2020.[53]

WEAKNESSES

- **Lack of understanding |** Several stakeholders highlighted that a critical success factor for the National Clustering Policy and Framework will be educating people on what a cluster is. Without the understanding of the definition and benefits of clusters, businesses may be less likely to engage, preventing the policy from realising its full potential.

  Additionally, while a number of businesses or groups might define themselves as a cluster in order to attract more engagement, they may in fact be more of a network, innovation centre or business hub, thus confusing the ecosystem even further. Without a clear definition for clusters and other similar types of groupings, confusion may continue with stakeholders across the ecosystem.

50 *IDA (2021)* Ireland's Innovation ambition
51 *Knowledge Transfer Ireland (2020)* https://www.knowledgetransferireland.com/Reports-Publications/Annual-Knowledge-Transfer-Survey-2020.pdf
52 *Forbes (2021)* 2021's Top Six Emerging Industries To Invest in
53 *Knowledge Transfer Ireland (2020)* https://www.knowledgetransferireland.com/Reports-Publications/Annual-Knowledge-Transfer-Survey-2020.pdf

- **Need for Simplification |** At present the ecosystem is complex and requires significant simplification and streamlining to improve engagement between existing clusters, and enable the development of future clusters. Bringing everyone together encourages collaboration between those who share the same vision. By looking at the existing landscape of research centres and technology centres, connections that already exist can be mapped and built upon. Stakeholders also noted the benefits of having a 'one stop shop', which uncertain companies could contact for all necessary information on clustering. This would increase the likelihood of them engaging with a cluster, or associated organisation.

  It was also suggested that by engaging a national structure to coordinate clusters nationally, the information asymmetries would diminish significantly for interested parties and as a result may increase their likelihood to get involved with a cluster. This in turn would result in positive outcomes for all involved.
- **Early Stage Supports |** There is a lack of funding and supports for early-stage clusters, which prevents clusters from attracting highly skilled talent, retaining skilled individuals, and ultimately realising growth. This funding gap is a critical barrier to setting up new clusters.
- **Lack of Positive Signaling from Government |** There is a perception that to date, Government needs to more directly signal that clusters/clustering is a core enterprise policy area. This should have the effect of better encouraging enterprise engagement in clusters and clustering.
- **Lack of Coherence and Strategic Input across Government |** There is no one central definition in government on what the clustering landscape should look like. There are multiple programmes in operation, and while those provided by Enterprise Ireland, IDA Ireland, InterTradeIreland and Local Enterprise Offices provide significant benefits to companies, the lack of national policy and co-ordination means the agencies may be pursuing different streams of clustering, rather than a unified approach which ensures cost-effectiveness and value for money.

OPPORTUNITIES

- **Increase Collaboration Between SMEs and MNCs |** A core objective of the National Clustering Policy and Framework should be to increase collaboration between SMEs with MNCs. At present, there are 270,557 SMEs employing 1.1 million people, the equivalent to 68.4% of private business employment in Ireland[54]. Research has demonstrated that SMEs grow 158% faster when they are part of a cluster.
- **Productivity and Competitiveness |** Ireland is seen as being a highly productive economy, particularly in innovative sectors such as bio-pharmaceuticals and technology. Research on clusters in the US showed that there was a positive relationship between employment growth in strong clusters and innovation through the form of patenting. There is an opportunity for Ireland to leverage its current productivity and activities to pursue increased innovation which would be supported by clusters.
- **All-Island Clusters |** Ireland's size means there is a significant opportunity to purse an all-island approach to clustering. This would also foster North-South collaboration in line with the objectives of the Government's Shared Island initiative. This opportunity was highlighted by a number of stakeholders as a key opportunity for the National Clustering Policy and Framework.
- **Decarbonisation |** Clustering could support the Enterprise Sector to meet their targets set under the Climate Action Plan of a circa 40% reduction by 2030. With many countries and regions having set net-zero greenhouse gas (GHG) emission targets looking out to 2050, the enterprise and industrial sectors will play a vital role in achieving these goals. According to the World Economic Forum (2020), the proximity of businesses in each cluster offers opportunities for systemic efficiencies, electrification, demand optimisation, and carbon capture, utilisation and storage (CCUS). These actions will improve efficiencies, reduce waste production such as heat and biogas, and offer opportunities to generate low-cost renewable electricity on-site via wind turbines and rooftop solar.[55]
- **Critical Mass |** Ireland's size means different clusters and networks are in close proximity. Research has shown that a critical mass of industry stakeholders can have significant benefits, and lead to clustering at a larger scale. Formalising clustering will encourage stakeholders to join clusters in their network, or start their own.
- **Internationalisation |** Ireland is regarded as a key location for international companies to locate and enter the European or EMEA markets. There is an opportunity to establish Ireland's reputation further as a leader on clustering, and demonstrate the benefits of increased collaboration, innovation, and supply chain improvements and efficiencies.
- **Academia Supporting the Innovation Arm of Clusters |** Ireland's academic environment is rich with a number of highly respected universities and the formation of new TUs. While they support different levels of business activities, through policy such as the Technology Transfer Strengthening Initiative or the through joint-research engagements, there is an opportunity to develop more formalised links between clusters and universities.
- **MNC to MNC |** While increased collaboration between SMEs and MNCs has a significantly positive benefit for both, those same benefits can be achieved in collaborations between MNCs and other MNCs.

  A National Clustering Policy would provide further opportunities for MNCs to engage with one another. Networking through clusters could offer the opportunity

54 *Local Jobs Alliance (2020)* Local Jobs Alliance Report May 20 2020
55 *World Economic Forum (2020)* Industrial Clusters can be a key lever for decarbonisation heres why

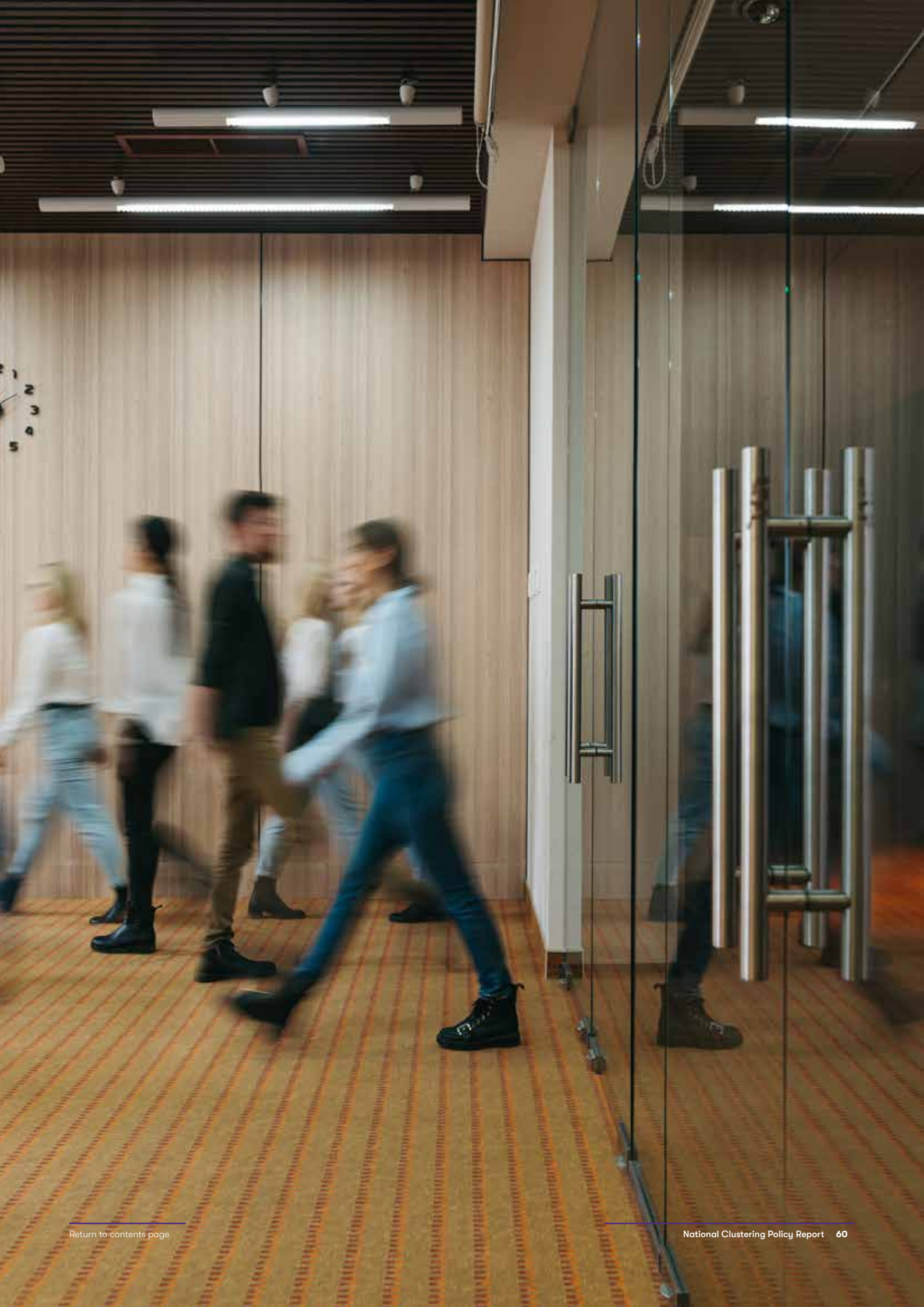
to increase efficiencies, better manage resources and the chance for greater joint business endeavors.

- **Regional Development |** National policies including the National Development Plan and Project Ireland 2040 call out the importance of balanced regional development, particularly for areas which have not received the same levels of investment as larger hubs such as Dublin and Cork. Clustering could offer more balanced regional development by providing the infrastructure for regional collaboration and innovation.
- **Scale to Look Outwards |** There is an opportunity to develop a communication point where Irish clusters can connect with European and International clusters. This could provide a forum for increased collaboration, promote indigenous clusters at an international level, and provide indigenous clusters the experience of operating at a multinational level. This would also foster a greater culture of internationalisation and globalisation across clusters.
- **Existing Network Ecosystem |** Ireland is home to a plethora of networks of varying sizes across all sectors and industries in the economy. These networks include trade associations, sector-based associations, professional bodies, chambers of commerce, and trade unions. With this existing ecosystem, Ireland can seek to convert some networks into clusters as *"networks and clusters are elements of a common spectrum with a blur between them rather than a sharp divide"*.[56]
- **Potential to Market Ireland on the International Stage |** A national clustering policy in Ireland may encourage the establishment, or development of, clusters of national significance based in regional locations that house an agglomeration of industry, thereby enhancing the attractiveness for international businesses to settle in Ireland.

THREATS

- **Lack of Alignment to National and International Policies |** There are a number of national and international policies on clustering, but no clear alignment between these. The absence of a National Clustering Policy and Framework in Ireland means clusters and networks are fragmented, and there is no agreed standard on the mechanisms to achieve their full potential.
- **Trust Among Cluster Members |** A successful cluster requires interaction between its members, and that interaction requires trust. Companies must feel confident sharing information with each other. Unimpeded information flows will encourage collaboration and efficiencies. Limited interaction will lead to companies working in silo and ultimately the breakdown of a cluster.
- **Confidence from Entrepreneurs |** Not only is trust between members essential, the level of confidence from entrepreneurs, whether they are SMEs or MNEs, is also critical. If an entrepreneur feels as though the Irish government are not fully committed to a clustering policy, they will be less likely to invest their capital in scaling up or pursuing a new revenue or production stream, ultimately limiting new jobs and preventing economic growth.
- **Sustainability |** A cluster needs to become sustainable, beyond government funding. This can take several years, and if funding is removed too soon a cluster could collapse. Income like membership fees can sustain a cluster, but these take time to establish as a sustainable source of income. Long-term sustainability of clusters must be a key factor in a new policy or framework.

56 *InterTradeIreland (2005)* Business Networks on the Island of Ireland



Section 4 – Mapping of the Current Cluster Landscape in Ireland

INTRODUCTION

This section sets out an analysis of Ireland's cluster activity up to March 2022. This is focused on the mapping of cluster organisations and State supports to inform a view on the current landscape in Ireland.

The mapping exercise primarily relied on primary research via the development and dissemination of a 'cluster organisation survey'. This survey was distributed to self-described cluster organisations identified as part of the initial landscape mapping exercise. The analysis was supported by secondary, desk-based research to generate a complete picture of the current cluster landscape in Ireland.

TOTAL NUMBER OF CLUSTER ORGANISATIONS

The mapping exercise identified 45 *self-identified* cluster organisations operating across the Irish landscape. While every effort was made to identify a full list of cluster organisations operating in Ireland, it is acknowledged that the mapping exercise is not all encompassing.

All 45 *self-identified* cluster organisations were invited to complete a cluster organisation survey. This survey aimed to gather insights across a number of areas including, but not limited to:

- Geographic location of cluster organisation;
- Sectoral focus of cluster organisation;
- The existence of a formal strategy/strategic plan;
- Scope of cluster organisation (local, regional, national, all-island);
- Critical mass of the cluster organisation (the number of current members as well as the relative % of SMEs, large organisations and academic/research and innovation partners);
- The management of the cluster organisation (including the recruitment of a cluster manager and management/ support team);
- Governance arrangements;
- Legal form;
- Funding model; and
- Cluster initiatives delivered by the cluster organisation.

A total of 33 cluster organisations responded to the cluster organisation survey. Based on the information gathered in the survey, desk research and testimony gathered during stakeholder consultations, it was concluded that there are a total of 19 cluster organisations operating in Ireland.

SUMMARY OF FINDINGS

The mapping of the current cluster landscape in Ireland identified a number of key considerations to developing policy options for a National Clustering Policy and Framework. The dominant themes identified by the mapping exercise are highlighted below.

Note: A detailed summary of the findings from the mapping exercise is included in the Appendix of this report.

- **Formal strategy/strategic plan |** Approximately 78% of cluster organisations reported having a formal strategy in place.
- **Maturity |** 89% of cluster organisations have been established for less than five years.
- **Scope |** 53% of cluster organisations reported to have a regional remit; 42% a national remit, and 5% having an All-Island (cross-border) remit.
- **Critical mass |** 52% of cluster organisations reported having a membership of less than 25, with 21% having an active membership of over 100. Most cluster organisations are significantly or exclusively focused on SME companies. Only 33% of survey respondents have large companies within their membership profile.
- **The management of the cluster organisation |** 63% of cluster organisations are staffed by only one full-time employee, while 16% had two or more full-time employees.
- **Legal form |** The majority of Irish cluster organisations are established with no legal basis (68%). This is followed by Non-Profit (5%), and Public Entity (5%).
- **Funding model |** 100% of cluster organisations reported as being in receipt or having received at least one form of State support.

CLUSTER SUPPORTS

Although there is no structured national cluster programme in Ireland, a number of grant funding streams have been made available to support clustering initiatives in Ireland.

The Action Plan for Jobs, introduced by government in 2012, was the first publication to set out actions that supported clusters. Of note, was the call for projects for the REDF, administered by Enterprise Ireland. The €100 million REDF supports the development and implementation of collaborative and innovative projects that can enable and sustain enterprise and employment growth in the regions. The overarching aim of the competitive fund is to co-finance the development and implementation of collaborative and innovative enterprise projects that can make a significant impact on enterprise development in the regions. In 2015, national action plans were translated into regional action plans for jobs, with specific initiatives to support cluster development, including the development of high-spec buildings linked to existing or emerging regional clusters.

Enterprise Ireland have administered three calls under the REDF since 2017. Each of the three calls under the REDF included a stream to support enterprise industry clustering initiatives. Funding allocation was up to 80% the cost of the initiative, with the balance of funding being a minimum of 20% provided by the applicant. Projects approved for funding including:

- IT@Cork - a cluster development initiative for the ICT sector in Cork;
- Emerald Aero - an aerospace cluster in the Mid-West; and
- Kerry SciTech - a not-for-profit member organisation showcasing the Kerry region as science, technology and engineering hotspot for talent, jobs and investment.

IDA Ireland have also integrated clusters within their recent development strategies. It has provided financial support for the development of Cyber Ireland and is collaborating closely with Enterprise Ireland on the identification and development of new cluster organisations in line with agency policy objectives.

A number of clusters were also successful in securing funding under the Border Enterprise Development Fund (BEDF) and Regional Enterprise Transition Scheme (RETS). The BEDF was a €17 million fund administrated by Enterprise Ireland, which provided support for collaborative, enterprise capability building projects, to advance entrepreneurship, productivity and innovation and improve the international competitiveness of enterprise in the Border Region in the context of Brexit and other market challenges. The aim the RETS is to provide funding supports to existing projects who received previous support under the REDF or BEDF and have plans to expand that activity and help existing enterprises in sectors and regions negatively affected by COVID-19, as well as a consequence of Brexit. A total of 24 projects secured funding of €9.4 million under the RETS.

Under Project Ireland 2040, the Government identified an ambition to build sectoral clusters of SMEs at regional level. This ambition was to be delivered through initiatives supporting the development of business-led clustering of competitive advantage. As such, the multi-annual fund for RTCF was announced in 2019 with an initial €2.75 million budget to be administered by Enterprise Ireland on behalf of the Department of Enterprise, Trade and Employment, and was open to the Institutes of Technology (IoTs) and Technological Universities (TUs). This is a government initiative which provides for regional technology clustering by partnering business-led clusters with third level institutes. The three-year plan aims to develop clusters at a national level by focusing on internationalisation, collaboration, innovation and productivity. The result of the scheme was 12 cluster organisations being established between 2020 and 2021. Due to its affiliation with academia, the scheme funds 100% of the salary of cluster managers (termed as Education and Outreach Managers) and costs associated with running the cluster.

At a European level, several funding mechanisms exist to support activities involving clusters including the European Regional Development Fund (ERDF).

Note: A non-exhaustive list of the State supports made available to support clustering initiatives in Ireland is summarised below.

STATE AID RULES

OVERVIEW

State aid rules determine the maximum level of public funding what can be given to any project and are expressed as a percentage of the total costs eligible for support. State aid is designed to regulate competitive market activity. Therefore, the rules do not generally apply to third level education bodies in areas such as blue-sky fundamental research or third level education. Operating aid (e.g., any support for running costs, ongoing expenditure and working capital) is generally prohibited under the State aid regulations. State aid proposals may fall under several exemptions including "De Minimis" aid, General Block Exemption Regulation (GBER) in order to achieve compliance with State aid rules.

- "De Minimis" aid, the small amounts of aid granted to one undertaking (irrespective of size or location), that is, less than €200,000 in any rolling three fiscal year period, are considered to be so small as to have no appreciable effect on competition or trade and, under the De Minimis regulation rule, these are exempt from the general ban on State aid.

- GBER allows Member States to bring specific categories of State aid into place without prior notification to, and approval from, the European Commission Provided that they are within the parameters set out in the GBER, including but not limited to: regional investment; aid to SMEs; and research, development and innovation. Article 27 outlines rules for aid for innovation clusters.

  Article 27 defines 'innovation clusters' as means structures or organised groups of independent parties (such as innovative start-ups, SMEs, as well as research and knowledge dissemination organisations, non-for-profit organisations and other related economic stakeholders) designed to stimulate innovative activity through promotion, sharing of facilities and exchange of knowledge and expertise and by contributing effectively to knowledge transfer, networking, information dissemination and collaboration among the undertakings and other organisations in the cluster.

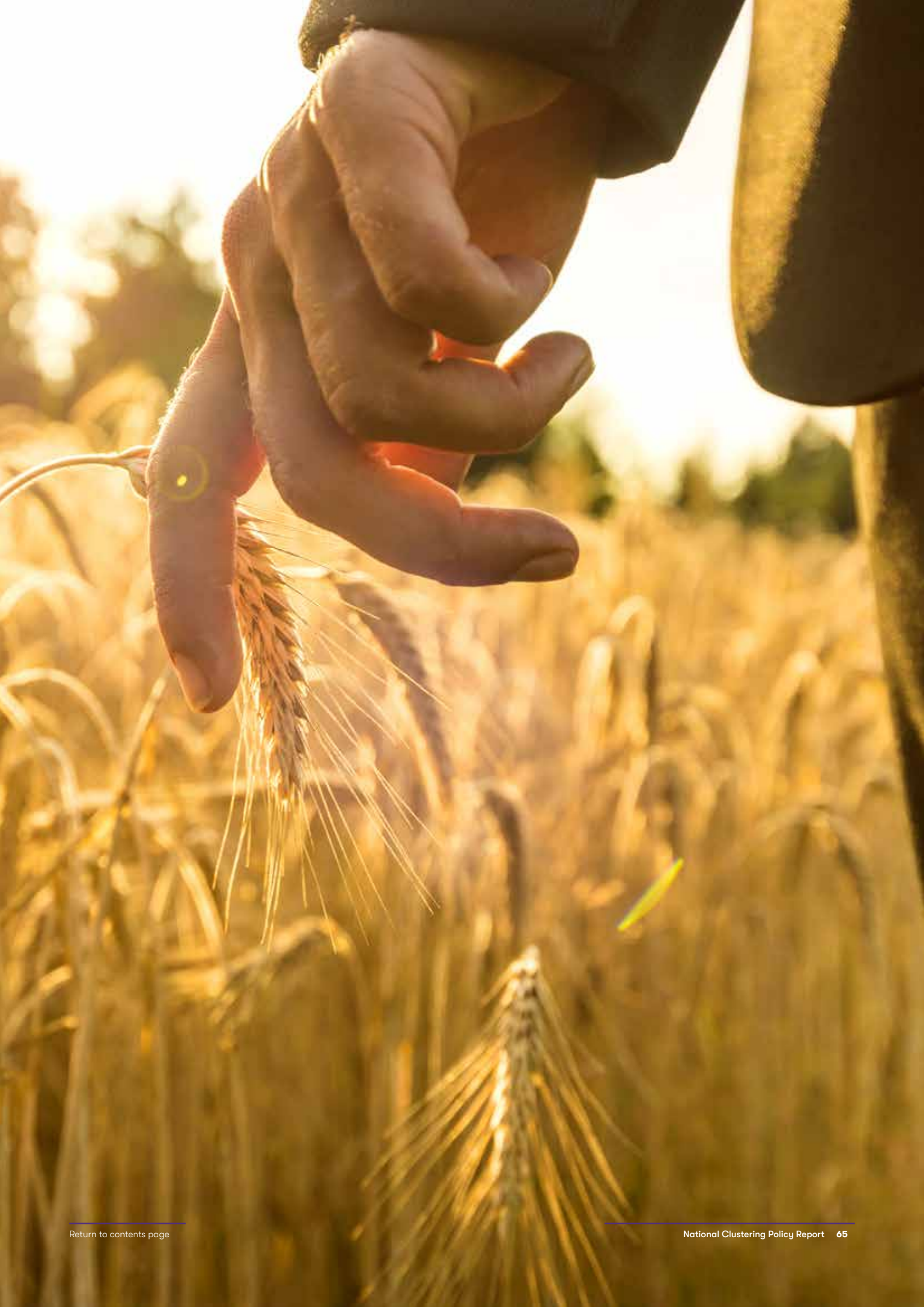
  Under Article 27, aid for innovation clusters shall not exceed 50% of the eligible costs and shall not exceed ten years. Furthermore, aid shall be granted exclusively to the legal entity operating the innovation cluster (cluster organisation). Due to the linkage between the legal structure of a cluster organisation and the funding options available, careful consideration is required regarding the mode of establishment for cluster organisations in Ireland.

  Note: Any future funding structure and approach should award long-term funding, within the prevailing State aid rules. This will provide cluster organisations with the opportunity to achieve their strategic objectives and reach international markets. However, longer-term funding must be regulated and evaluated to ensure cluster organisations are thoroughly assessed to receive continuous financial support.

Under State aid rules, cluster organisations may receive technical and financial support covering up to 50% of their eligible costs for up to ten years within the programme window. While this horizon time is permitted, international exemplars illustrate the importance of formulating routine appraisal, or review windows within the funding structure to enable exit strategies for policy makers to 'de-commit' funding for underperforming or failing cluster organisations.

The evidence internationally suggests that funding programmes should be divided into specified contract periods (typically every three to four years) with assessments against set KPIs to determine the continuation of financing. A number of options are available to drive assessment, for example, the Flemish 'cluster pact' model which utilises clear written agreements about the cluster strategy and its potential collaboration partners. The plans illustrate how government supports (both financial and non-financial) will be used to support competitive plans.

Name	Overview and Support Activities
Regional Technology Cluster Fund (RTCF)	The Regional Technology Cluster Fund is a multi-annual fund for regional technology clustering which supports the Government's initiative under Project Ireland 2040 to support the development of business-led clustering with the ambition of building sectoral clusters of SMEs at regional level. Funding is provided for forming clusters and development and implementation of a strategic work plan for the cluster. The objectives of this fund are to enhance connectivity with and engagement between enterprise and knowledge providers to drive productivity and competitiveness in and across regions. It supports 12 cluster organisations established around key sectors including: Furniture Manufacturing; Marine; Connected Health; Industry 4.0; Construction; Advanced Manufacturing; Cyber Security; Engineering; BioEconomy; MedTech; and AgriTech.
InterTradeIreland – Synergy	InterTradeIreland's Synergy programme aims to enable networks and clusters to utilise the power of cross-border collaboration to find solutions to solve common problems and identify opportunities which provide economic benefit in Ireland and Northern Ireland. The objectives of Synergy include: • Increase SME Productivity; • Assist industry and SMEs transition to the low-carbon economy; • Embrace Industry 4.0 technologies; and • Activate SMEs and relevant organisations to participate in cross-border clusters and networks. The programme primarily supports the BioEconomy, Advanced Manufacturing and Materials and Life Science sectors.
Regional Enterprise Development Fund (REDF)	The Regional Enterprise Development Fund was launched in May 2017 with the overarching aim of driving enterprise development and job creation in each region throughout Ireland. Administered by Enterprise Ireland, it supports new collaborative and innovative initiatives that can make a significant impact on enterprise development across regions, or nationally. The REDF has been an effective instrument of policy particularly as a complement to the Department's Regional Enterprise Plans where it has served as an enabler for projects emerging from that regional collaborative process. The funding is delivered over a three-year period. Each of the three REDF calls to date included a stream to support industry clustering to stimulate innovative activity through promotion, sharing of facilities and exchange of knowledge and expertise. A total of 11 projects across the three calls were approved funding under those specific streams.
Border Enterprise Development Fund (BEDF)	The Border Enterprise Development Fund is part of a €28 million economic stimulus package for the six border counties of Louth, Monaghan, Cavan, Sligo, Leitrim and Donegal. The BEDF is a €17 million fund which provides support for collaborative, enterprise capability building projects to advance entrepreneurship, productivity and innovation in the Border Region. The aim of the fund is to improve the international competitiveness of enterprise in the Border Region in the context of Brexit and other market challenges. This fund builds on other funding supports including the Regional Enterprise Development Fund and the Regional Technology Cluster Fund. A total of 11 projects have secured funding under this fund.
Regional Enterprise Transition Scheme (RETS)	The Regional Enterprise Transition Scheme (RETS) assists regional projects affected by the COVID-19 pandemic and by other regional challenges following the UK's departure from the EU. Administered by Enterprise Ireland, the scheme targets existing regional and community-based projects previously supported under the REDF and BEDF. The scheme seeks to help build additional resilience in regions and enable recipients to support enterprises and SMEs to respond to recent economic and market challenges, which also includes the transition to a low carbon economy, digital transformation and sustainability.



Section 5 – Policy Options for a National Clustering Policy and Framework

INTRODUCTION

Examination of the evidence base indicates several considerations to inform the future National Cluster Policy and Framework as follows:

- Defining the scope of the policy;
- Determining a clear and coherent policy approach;
- Identification of target clusters;
- Introduction of an appropriate support framework to support the National policy approach; and
- Monitoring and evaluation of the efficiency of the National Cluster Policy and Framework.

Adequate and long-term funding will be required to support these actions. Based on international evidence, the return-on-investment for clusters requires a more long-term view. A ten-year plus horizon may be necessary to determine the success of a future National Cluster Policy and whether investment in the associated support framework represents value for money. Furthermore, building trust and confidence among companies regarding the benefits of cluster participation takes time. As such, it is essential to allow a sufficient horizon time for cluster organisations to achieve the requisite critical mass of companies and establish appropriate funding models to achieve long-term sustainability.

DEFINING THE SCOPE OF THE POLICY

The international evidence suggests that cluster organisations are a critical factor in cluster policy and development. As defined below, cluster organisations can be effective tools to facilitate cooperation between industry and research, innovation, and technology development actors, as well as increasing the competitiveness and scale of SMEs. It is intended that this cooperation will stimulate the development of new technologies, generate and disseminate knowledge, drive higher productivity, and potentially secure new markets and business growth for participating businesses – ultimately to generate higher growth for the economy as a whole. Additionally, cluster organisations are increasingly driving social and ecological innovation. They are providing benefits to people across the wider economy, not just to company investors and owners.

Cluster Organisation

Cluster organisations are formal institutions that are established to facilitate increased interaction and cooperation between participants in an existing cluster or an emerging concentration of enterprises in a particular sector/activity. They are responsible for organising, facilitating, managing and leading the complex efforts required to increase the growth and competitiveness of a cluster. A cluster organisation is based on an organised partnership between participants in a cluster, often with public development agencies as an important contributor.

In order to delineate the Irish National Cluster Policies target group, the policy should articulate specific characteristics that support the definition of a cluster organisation. Factors which underpin the development of successful cluster organisations are as follows:

- **Governance |** Appropriate governance structures are a key factor in influencing the cluster's long-term success, facilitating strategic decision making, enabling accountability towards members and ensuring the sustainability of the organisation long-term. Trends for cluster organisations internationally are for cluster organisations to be governed by a Board with a composition balanced by industry, government and academia. Typically, there is a requirement for a majority (circa. 70%) from industry to ensure that both the strategy and activities of the cluster are adequately serving the needs of its members.

  The international models examined will often require governance as an access criterion to the relevant cluster programme, typically determining the existence of robust governance within a cluster organisation based on the presence and composition of a Board. This is considered a critical success factor in meeting the needs of the different stakeholders and improving the competitiveness of cluster members by means of cooperation.

- **Legal Structure |** The majority of cluster organisations are private organisations established as not-for-profit or for-profit legal entities. The benefit of legal independence is that it enables cluster organisations to determine their own strategy, agenda and implementation. This ensures that activities are aligned with the interests of members rather than the interests of a host organisation.

  However, requiring early-stage or seeding cluster organisations to hold legal entity status could create funding implications, and may reduce the viability of the seeding process. Due to the linkages between legal structure and State aid rules, flexibility may be required within the Irish National Cluster Policy and Framework in order to accommodate the variety of funding options available.

- **Funding Model |** Successful cluster organisations will typically operate a sustainable funding model which leverages private funding generated through membership fees, services sold to members, and projects funded, or part-funded, by industry. Funding includes State support administered through a cluster programme and funding under European Union (EU) programmes (such as, Interreg or the Research and Innovation Framework Programmes and the EDRF).

  International evidence highlights the benefits of making cluster organisations open to as many companies as possible. However, it is important to be able to easily discern which companies are active participants within the cluster. The introduction of membership fees is a useful tool to illustrate member dedication towards the cluster. It is suggested that all cluster organisations seeking access to a national programme set-up a membership fee. This can vary across different member types, so as not to prohibitive for some members.

- **Scale |** Scale, both in terms of the critical mass of companies and the geographical scope, is an important consideration in a cluster organisation.

  International evidence illustrates considerable variance regarding the minimum number of companies required to consider a cluster organisation to have sufficient critical mass. Several jurisdictions set different thresholds depending on the maturity of the cluster organisation. This approach may be most appropriate, with policy makers making a determination regarding the minimum critical mass of businesses for an emerging, growing or mature cluster organisation.

  It is understood that encouraging collaboration among MNCs and SMEs can garner significant benefits for Ireland's indigenous SME population including: investment; technological leadership and partnering; economies of scale; and enhanced opportunities for internationalisation. As such, the Basque model, which specifies a minimum critical mass of SME members (% of the total membership base) may also be useful to consider in the Irish context.

  The geographical scope of cluster organisations is another consideration in the context of scale. Based on the mapping of the Irish landscape, it is clear that there is an opportunity for the National Cluster Policy and Framework to increase the scope, or geographic reach, of Irish cluster organisations, specifically with a view to:

  - Support cluster organisations to reach a higher critical mass of companies and reduce fragmentation (e.g., multiple smaller cluster organisations competing for members).
  - Increase opportunities to connect regional SMEs with MNCs, and business with Higher Education Institutions, Further Education Institutes and relevant research performing organisations, etc.
  - Increase opportunities for internationalisation – particularly if cluster organisations are supported to operate on an all-island basis.

- **Related Variety |** The Porter model for a cluster specifies that members should collaborate, but also *compete*. Both theory and practice suggest that cluster organisations benefit from a triple or quadruple helix organisation, i.e., companies, knowledge/education institutions and public partners/civil society stakeholders all take an active part. As such, successful cluster organisations will typically involve a mix of complementary businesses in similar and related industries and associated institutions in particular fields.

- **Strategic Plan |** Cluster organisations aim to build knowledge bridges between companies and knowledge institutions and to stimulate innovation and growth among their members. The exercise of developing an *ex-ante* strategic cluster plan or action plan is critical to identifying how a cluster organisation intends to achieve these goals.

- **Cluster Management |** The breadth of activities delivered by successful cluster organisations, as well the expertise required to successfully support a cluster

organisation through the maturity lifecycle requires a unique and technical professional practice. For cluster organisations to achieve their full potential, they require adequate resourcing. International best practice indicates that cluster organisations require, at a minimum, one full-time cluster manager. In addition to a full time cluster manager, high-functioning, mature cluster organisations internationally will employ an appropriate support team including, but not limited to, the following roles:

- Project Officer;
- Marketing Lead;
- Finance Lead; and
- Admin Support.

Note: Opportunities to build connectivity between cluster managers and drive cross-cluster collaboration may be achieved through the proposed National Coordinating Structure approach (see policy option articulated in further detail below).

While it is important to clearly define the scope of the National Cluster Policy and Framework, strict definitions protecting the title 'cluster' within the Irish landscape may not be necessary. The Danish model demonstrates that flexibility in the definition of 'cluster', enables groups of companies and ecosystems across Denmark to also consider themselves clusters even though they are not part of the national, publicly funded Danish innovation and business support system and they are not a part of Cluster Excellence Denmark's target group.

POLICY APPROACH

Mapping the current landscape clearly indicated that there is increasing awareness of and interest in the concept of clustering across the island of Ireland. The current suite of national enterprise policy documentation illustrates increasing prevalence of the cluster concept, specifically identifying clustering as means to achieve certain objectives.

To date, State supports for cluster development have been predominantly focused on seeding rather than scaling clusters. Therefore, there is significant scope for the future national policy to build on the momentum achieved in developing Ireland's cluster landscape through programmes such as RTCF and the REDF, leveraging potential new sources of funding, e.g., the ERDF or Shared Island Fund. The international cluster policy journeys outlined in the case studies suggest that the development, as well as seeding new cluster organisations, and institutional-strengthening and professionalising of Irish cluster organisations should be the next area of focus for Irish policy makers.

In general, the strategic selection of a few regional and national strongholds has been the approach adopted in international cluster policies with many jurisdictions integrating cluster policies into smart specialisation strategies. In contrast, the cluster organisation landscape in Ireland has developed in a more ad hoc and 'bottom-up' way relative to the policy-driven and/or 'framework' approaches illustrated by the international case studies. To date, there has been little evidence that thematic or sectoral strategies have strongly guided the admission to Irish cluster programmes.

Many stakeholders have described the current cluster support landscape as confusing and complex. The funding instruments made available to Irish cluster organisations have been administered through a variety of national development agencies. Each of the cluster programmes has its own goals and objectives and is designed to achieve different outcomes. At a strategic level, it is challenging to build a consistent, clear message regarding Ireland's ambitions for clusters. Additionally, it is challenging for cluster organisations themselves to navigate this congested space. Furthermore, the scope of many of Ireland's existing cluster organisations is local. There is a significant opportunity for the National Cluster Policy and Framework to expand the geographic reach of Irish clusters and thereby support Irish cluster organisations to scale.

The mapping exercise conducted for this report, identified 19 cluster organisations and over 130 networks operating across Ireland. In the context of the criteria influencing the success of cluster organisations, a survey and analysis of the self-identified cluster organisations suggests that many may not be reaching their full potential.

As such, there is a clear need to make the system simpler and stronger. For Ireland to strengthen its current cluster landscape, there is a significant opportunity for a National Cluster Policy and Framework to be better aligned with national enterprise policy objectives and consider consolidation approaches that build on existing clusters and enabling infrastructure and amalgamate existing cluster organisations operating in similar focus areas, where possible.

The most recent iterations of the Basque cluster policy may provide direction on how enhanced cooperation across the ecosystem can be achieved. The introduction of more stringent conditions on which organisations and activities were eligible for funding, and the introduction of ex-ante evaluation of action plans naturally filtered the key opportunities for consolidation. Organisations that did not meet the new criteria were offered support to explore how they could integrate their activities with others. The international case study of Denmark's national cluster policy demonstrates how the national approach was refreshed to align more deliberately with national enterprise and economic priorities. This resulted in a reduction the number of cluster organisations across the landscape and enabled a refocus on prioritised Danish strongholds and a number of emerging industries in priority areas.

More fundamentally, it is clear from the analysis of the cluster landscape and clustering supports currently in place, that there are potential benefits for Ireland in adopting a more deliberate and strategic approach to supporting the development of cluster organisations and how they operate within the national enterprise policy landscape.

IDENTIFICATION OF CLUSTERS

Many models in Ireland and internationally illustrate the emergence of cluster organisations from networks of small and medium-sized companies, while others are linked to an anchor firm or university. Similarly, the precedents examined highlight that some cluster organisations emerge from existing local, regional or national strongholds that have organically developed over time.

The identification of clusters to support under a national cluster policy can be top-down, bottom-up or a combination of the two.5 Countries will typically identify cluster programme recipients through one of a number of approaches, for example:

- Using a statistical method and/or mapping studies to identify existing concentrations and relationships between firms and other entities in a particular spatial context;
- A 'bottom-up' process of self-selection, such as a competitive call for proposals; or
- A more directive approach that selects areas of activity to establish, or further strengthen, cluster organisations based on strategic policy priorities and foresight exercises.

Statistical methods are typically used when the objective is to identify and support national economic drivers and enhance competitiveness within the existing industry structure. Alternatively, cluster programmes that maintain strict selection criteria are more likely to support clusters that demonstrate the highest opportunity for innovation and/or collaboration regardless of sector.

The process of self-selection requires cluster programmes to place strict demands on applicants and set criteria that combine objective data (regarding the strength of existing cluster organisations) and/or an assessment of the strategic ambition of the cluster, as well as their potential for innovation. The benefit of a self-selection approach based on identified selection criteria is that it supports the neutrality of the allocation of public funds. It limits the requirement for Government to identify 'tomorrow's winners' and mitigates the risk that certain industries will be recipient of more support. However, this approach will favour established cluster organisations or industries that have so far demonstrated a strong position of growth and may exclude some high-potential opportunities.

Based on the international examples, it is suggested that a National Cluster Policy for Ireland should consider a small number of clusters in areas of strength, strategic importance and emerging opportunities. It should also consider a method of selection that will focus on enterprise policy priorities linked to existing and emerging areas of strength and on driving specific enterprise development policy objectives.

In taking a more strategic approach, and in the context of maximising impact, Ireland's cluster policy framework would by necessity be selective, based on national enterprise policy priorities. The development of a national clustering policy should include considerations for a methodology for the identification of sectors, activities, or areas of opportunity which would benefit from deployment of a clustering

approach, which would also guide the development of criteria to be met by a cluster funded under a national cluster programme. To support cluster identification, it may be useful to coordinate with respect to the National Research Prioritisation Exercise, where a review of prioritisation and priority areas is anticipated for 2023. Research prioritisation has a broad scope (economic and societal impact), as well as considering the Technology Readiness Level (TRL) spectrum. As such, the outcome of such an exercise may inform cluster identification (and vice versa).

SUPPORT FRAMEWORK

The financial and technical support packages provided to clusters may be considered through the following policy options:

- The establishment of a new National Cluster Programme; and
- Designation of clear lead responsibility for executing cluster policy including administering this new Cluster Programme

National Cluster Programme | Based on the maturity of Ireland's cluster landscape, and the organic nature in which it has developed, there would be significant merit in the establishment of an open and multi-layer cluster programme. This approach follows the Norwegian model which distinguishes between cluster organisations on different levels and provides different strands of support depending on the maturity and scope of the cluster.

The primary rationale underpinning this approach include:

- A multi-layer cluster programme supports the existence of varying clusters, and enables cluster organisations to be open to firms of all sizes and phases of development;
- It enables more targeted support to cluster organisations at varying stages of development, therefore with different needs;
- The approach creates the opportunity for clusters with ambitions to develop and progress to the next level until they achieve scale, knowledge links and value-add of comparable cluster organisations of global significance; and
- The new national programme could potentially continue the ideas and objectives of existing and/or preceding programmes (e.g., the RTCF and the REDF), but introduce additional layers to target, for example, cluster organisations with the largest potential for growth and a clear international orientation, within a common programme, in alignment with strategic policy priorities.

Stringent selection criteria would need to be identified to guide funding decisions. Selection criteria that emphasise the common ownership of stakeholders, active participation of members, commitment from knowledge institutes to align research agendas, annual evaluations of progress against cluster strategies and alignment with other policy domains may be appropriate.

It is clear that even mature clusters require some level of financial support. However, independent evaluations of international cluster programmes identified that if cluster organisations are wholly reliant on continued public funding, the impact of the programme will decrease over time.6 While both theory and the case studies identified highlight the benefit of leveraging public funds in the seeding and early development of clusters – particularly with regards to supporting cluster organisation operating costs (e.g. salaries, etc.) as well as funding some cluster activities (e.g. marketing) – all of the international cluster programmes examined require an element of public private partnership.

Depending on the maturity of the cluster organisation, international cluster programmes will typically provide financial support to cover 20-50% of the cost of operational activities. As such, cluster organisations are required to be 50-80% privately funded through contributions of companies. Furthermore, annual budgets are typically available to fund specific technology, research and innovation and internationalisation projects.

Any future funding structure and approach should award long-term funding, within the prevailing State aid rules. This will provide cluster organisations with the opportunity to achieve their strategic objectives and reach international markets. However, longer-term funding must be regulated and evaluated to ensure cluster organisations are thoroughly assessed to receive continuous financial support. For example, successful cluster organisations may receive technical and financial support for up to ten years within the programme window, divided into three contract periods with assessments after three and six and a half years regarding the continuation of financing. Formulating routine appraisal, or review windows within the funding structure enables exit strategies for policy makers to 'de-commit' funding for underperforming or failing cluster organisations. Assessment could be driven by the cluster organisations' strategies initially proposed on establishment which state their objectives and targets to be achieved.

It may be appropriate at the initiation phase of the National Cluster Policy and funding structure calls to include some external cluster expert evaluators in the review of applications for funding support.

National Coordinating Structure | The selected case studies emphasise the need for cooperation, not only within the clusters, but also among the various public and private economic and social stakeholders, for knowledge and technology to reach the market and ultimately to translate into innovation. Furthermore, international experience demonstrates that the brokering of close working relationships between cluster managers is essential in promoting knowledge exchange and shared learning for cross-cluster innovation projects.

Designated lead responsibility for implementation of national cluster policy, with a dedicated and appropriately resourced executive team (perhaps utilising existing experience and expertise in clustering) would provide a national coordinating structure for all cluster organisations operating within Ireland.

In addition to administration of financial supports to cluster organisations, the functions of this entity could include but not be limited to:

- Designing and conducting funding calls in alignment with policy priorities and in line with available funding streams.
- Programme management and financial oversight and governance of cluster funding schemes.
- Provision of support and technical assistance to the cluster organisations supported/funded under the National Cluster Programme.
- Enabling strategic dialogue between Government Departments, industry, cluster managers, the further and higher education sector, research and innovation stakeholders, and government agencies.
- Facilitating cluster-to-cluster cooperation and learning and experience exchange.
- Supporting cluster organisations in developing an international profile.
- Taking an active role in the promotion of cluster membership among companies by raising awareness of the benefits.
- Emphasising the importance of excellence in cluster management in delivering long-term sustainable success for a cluster and supporting competence development and professionalisation of cluster managers.
- Working with cluster organisations to achieve a valid label for example Bronze, Silver or Gold under the ECEI.
- Assisting in the identification of strategic partners and preparation of funding proposals.
- Facilitating independent performance reviews of funded clusters.
- Supporting the monitoring and evaluation of cluster initiatives.
- Educating and working with the enterprise ecosystem across Ireland, regarding the differences between clusters and networks, industry associations, etc., Being the conduit to organisations seeking to pivot and move towards a cluster model and the process involved in same.

Note: The scale and operational budget for this team would need to be determined based on agreed remit and proposed operating model.

MONITORING AND EVALUATION

Many international policy makers consider evaluation of cluster policies to be a key area of focus. Specifically, interest lies in the evaluation of the cluster organisations supported by policies to determine:

- The extent to which cluster policy is being efficient and effective;
- How the policy should evolve in the future; and
- How public resources should be allocated/prioritised to support the policy agenda.

The direct outcome of most cluster policies have significant intangible elements, making it difficult to establish causal relationships with firm-level or regional impacts (which are simultaneously affected by other factors and policies). Despite these challenges, international experience highlights numerous methods to document the impact of clusters. While there is no international best practice regarding the most effective ways to showcase the impact and value of clusters to prospective members, government and broader society, a number of policy monitoring and evaluation capacities and practices may be considered.

The Central Statistics Office (CSO) Input-Output table may be used as a starting point to calculate the direct, indirect and induced impact of a National Cluster Policy and Framework. These tables, as a tool, link microeconomic and macroeconomic analysis of the structure of the Irish economy and highlight the inter-industry flow that lie behind key aggregates.

Alternatively, the identification of a hybrid of quantitative and qualitative targets / KPIs by policy makers and measuring performance against these targets may be considered as an effective approach to measure the success of the National Cluster Policy in delivering on its objectives and determining if investment in the National Cluster Programme represents value for money. Options for statistical data analysis may include, but not be limited to: measurement of increased participation of companies in Irish cluster organisations, as well as productivity growth, job growth, new patents, exports and number of SMEs active internationally of participating versus non-participating companies. In tandem, qualitative surveys of cluster members and highlighting / showcasing success stories may be the most effective ways to showcase the impact and value of clusters.

Regardless of the approach selected to monitor and review any future policy, it is important to recognise the challenges understanding the full range of effects of the policy. Furthermore, there may be difficulties benchmarking the Irish performance against international comparators due to the variance in policy architecture across different jurisdictions.

In terms of the monitoring and evaluation of cluster organisation, the policy may also consider the utilisation of existing international best practice models for recognition of cluster excellence. For example, the European Commission ECEI established the European Secretariat for Cluster Analysis (ESCA) in 2009. The ESCA is focused on strengthening cluster management excellence and awards a bronze, silver and gold label to cluster organisations that meet the criteria corresponding to each quality level. For the policy to integrate this model, cluster organisations will work towards these standards which will attract international partners and obtain international recognition for the Irish cluster landscape.

Appendix – Analysis of Irish Cluster Organisations

A mapping exercise identified 45 self-described cluster organisations operating across the Island of Ireland. The information included in this table is self-reported by the organisations in question, gathered via the development and dissemination of a **'cluster organisation survey'**. The information gathered through the survey was supported by secondary, desk-based research to make an assessment of the current cluster landscape in Ireland. While every effort was made to identify a full list of cluster organisations operating in Ireland, it is acknowledged that the organisation's included in the cluster organisation survey is not all encompassing.

									Key		Functioning / funded clusters	
											Dormant / not in operation	
											Disbanded	
											No response but considered active	
No.	**Organisation**	**Classification**	**Sector/Area of Focus**	**Established**	**Legal Form**	**Strategy in Place**	**Location**	**Geographic Remit**	**Cluster Members**	**Management Team Staff No.**	**Support Programmes (EU)**	**Support Programmes (EU)**
1	Advanced Technologies in Manufacturing Cluster (ATIM)	RTCF Cluster organisation	Advanced Manufacturing; Information Technology Computing; Sustainability / Circular Economy; funded for Industry 4.0 cluster	2021	Linked to TU	Yes	Midlands Region, Ireland	Regional	25-50	1		RTCF
2	AgriTech Ireland	RTCF Cluster organisation	Agriculture; Engineering; Advanced Manufacturing; Information Technology Computing; Sustainability / Circular Economy	2021	No legal Entity	Yes	South-West Region, Ireland	National	10-25	1	SERVICE	RTCF / REDF
3	Border Region Manufacturing Cluster	RTCF Cluster organisation	Med Tech; Pharma; Electronics; Construction; Aerospace; Automotive; Power; Wood Products; Data Storage; Plastic	2021	No legal Entity	No	Border Region	Regional	10-25	1		RTCF
4	Circular Bio Economy Cluster South West	RTCF Cluster organisation	Sustainability / Circular Economy	2021	Linked to TU	Yes	South-West Region, Ireland	Regional	10-25	1	Horizon 2020	RTCF
5	Connected Health & Wellbeing Industry Cluster	RTCF Cluster organisation	Medical Devices; Information Technology Computing	2021	No legal Entity	Yes	Mid-East Region, Ireland	National	<10	1		RTCF; REDF
6	Construction Sector Cluster	RTCF Cluster organisation	Construction	2021	Public Entity	No	Dublin Region	National	10-25	1		RTCF
7	Cyber Ireland	RTCF Cluster organisation	Information Technology Computing	2019	No legal Entity	Yes	South-West Region, Ireland	National	100-150	3		RTCF, IDA,
8	Engineering South East	RTCF Cluster organisation	Engineering	2019	No legal Entity	Yes	South-East Region, Ireland	Regional	25-50	1		RTCF
9	IDEAM (Irish Digital Engineering and Advanced Manufacturing) Cluster	RTCF Cluster organisation	Advanced Manufacturing	2021	Linked to TU	Yes	Mid-West Region, Ireland	National	300+	2	Change2Twin I4MS	RTCF
10	Killybegs Marine Cluster	RTCF Cluster organisation	Marine; Tourism and Leisure; Sustainability / Circular Economy; Engineering; Food / Drink; Energy.	2021	No legal Entity	Yes	West Region, Ireland	Regional	10-25	1		RTCF
11	MedTech and Life Sciences Cluster	RTCF Cluster organisation	Digital Health (Lifesciences & Healthcare)	2021	No legal Entity	Yes	West Region, Ireland	National	10-25	1		RTCF
12	Wood and Furniture Manufacturing Cluster	RTCF Cluster organisation	Wood and Wood Products	2021	No legal Entity	No	West Region, Ireland	National	100-150	1		RTCF
13	Emerald Aero	Cluster organisation	Aviation & Aerospace	2017	Non-Profit	Yes	Mid-West Region, Ireland	National	10-25	<1		REDF
14	Geoscience Ireland	Cluster organisation	Construction; Engineering; Marine Energy	2012	Public Entity	Yes	Dublin Region	All-Island (cross-border)	25-50	2.5	FP7; H2020 CIP/ COSME; INTERREG; EIT KICs	
15	it@Cork	Cluster organisation	Information Technology Computing;	1997	Limited Liability	Yes	Southern Ireland		200-250	1	FP7	REDF; Skillnet
16	LINC engineering Network	Cluster organisation	Engineering	2018	No legal Entity	Yes	West Region, Ireland	Regional	25-50	<1		REDF; LEO
17	Makers Alliance	Cluster organisation										ITI
18	The Fintech Corridor	Cluster organisation	Financial Services; Fintech	2020	No legal Entity		Mid-East Region, Ireland		50-100	1		ITI
19	Atlantic MedTech cluster	Cluster organisation		2017					<10			
20	EMD Ireland Technology Gateway Cluster	Technology Gateway Consortium	Medical Devices; Engineering; Construction; Advanced Manufacturing; Design	2016	Public Entity	Yes	Dublin Region	National	-	1		EI Technology Gateway
21	The Irish Food Tech Technology Gateway Cluster	Technology Gateway Consortium	Food / Drink	2018	Public Entity	Yes	Border Region	All-Island (cross-border)	50-100	1		ITI
22	Energy Cork	Network	Energy; Climate Action	2012	No legal Entity	Yes	South-West Region, Ireland	Regional	50-100	1		Local Authority
23	Cork Financial Services Forum	Network	Financial Services	2008	No legal Entity	Yes	South-West Region, Ireland	Regional	10-25	<1		
24	Applied IOT	Network	Internet of Things	2016	Public Entity	No	Dublin Region	All-Island (cross-border)	100-150	6		EI Technology Gateway
25	Atlantic Economic Corridor	Network	Energy; Medical Devices; Information Technology Computing	2021	No legal Entity	Yes	West Region, Ireland	Regional	<10	2		WDC
26	CRIOS Group (Business Services Group)	Network	Business Process Outsourcing (BPO)	2009	Limited Liability	No	South-West Region, Ireland	National	<10			REDF
27	Engenuity Engineering	Network	Engineering	2017	No legal Entity	Yes	Midlands Region, Ireland	Regional	50-100	<1		LEO Competitive fund
28	InsurTech Network Centre	Network	Financial Services	2018	Limited Liability	Yes	South-East Region, Ireland	All-Island (cross-border)	50-100	1		EI and IT Carlow funding
29	Ireland South East Financial Services Cluster	Network	Financial Services; Information Technology Computing; Sustainability/Circular Economy	2020	Non-Profit	Yes	South-East Region, Ireland	Regional	50-100	<1		REDF; Local Authority
30	SportsTech Ireland	Network	Sports Technology & Innovation	2017	Non-Profit	Yes	Mid-West Region, Ireland	All-Island (cross-border)	-	2		
31	Health Innovation Hub Ireland	Network										
32	Ireland South East Agri	Network										
33	Ireland South East Life Sciences	Network										
34	South-Eastern Creative Corridor	Network										
35	Donegal ICT/Fintech	Network										
36	Ireland South East Advanced Manufacturing and Engineering	Network	Dormant									
37	Ireland South East Information and Communication Technologies	Network	Dormant									
38	Ireland South East Creative	Network	Disbanded									
39	Irish Bioeconomy Foundation (IBF)	Industry association	Sustainability / Circular Economy	2017	Non-Profit	Yes	Mid-West Region, Ireland	National	10-25	3	Horizon 2020	REDF
40	Kerry SciTech	Industry association	Information Technology Computing; Engineering; Advanced Manufacturing; Pharmaceutical; Medical Devices; STEM	2016	Non-Profit	Yes	South-West Region, Ireland	Regional	50-100	1		REDF
41	Technology Ireland Innovation Forum (Formerly ISIN)	Industry association		2009	Other		Mid-East Region, Ireland		500+	1-5	FP7, CIP/COSME, Other	
42	MIDAS Ireland	Industry association										
43	Crystal Valley Tech	Industry association	Disbanded									REDF
44	Grand Canal Innovation District	Specialism	N/A			Yes	Dublin Region	National	n/a	1-5		
45	The International Financial Services Centre	Specialism	N/A									

Key	
	Functioning / funded clusters
	Dormant / not in operation
	Disbanded
	No response but considered active

						Cluster Activities					
No.	Organisation	Classification	Membership Fee	Higher Education Members	Research/Innovation Partners	Networking	Skills Development	Research and Innovation	Internationalisation	Business Development	Other
1	Advanced Technologies in Manufacturing Cluster (ATIM)	RTCF Cluster organisation	No	TU Shannon	APT, COMAND, IMR, ADAPT, CONFIRM, I-FORM	✓	✓	✓	✓	✓	✓ (Development of cluster ecosystem, marketing/communication)
2	AgriTech Ireland	RTCF Cluster organisation	No	Munster Technological University (MTU)	Technology gateway – ImaR; Technology gateway – APT;	✓	✓	✓	✓	✓	
3	Border Regions Manufacturing Cluster	RTCF Cluster organisation	No	IT Sligo, NW College, SW college, Letterkenny IT, Dundalk IT	PEM Technology Gateway, WISAR	✓	✓	✓	✓	✓	✓ (Attracting, hiring, retaining and upskilling talent)
4	Circular Bio Economy Cluster South West	RTCF Cluster organisation	No	Munster Technological University (MTU)	CircBio Research Group, ShannonABC, BiOrbic SFI research centre,	✓	✓	✓	✓	✓	✓ (Collaborative Project Development, Raising Finance)
5	Connected Health & Wellbeing Industry Cluster	RTCF Cluster organisation	No	Dundalk IT	DKIT - Regulated software & research centre; DKIT - Netwell Casala Centre; DKIT - Smooth Muscle Research Centre; CREDIT Technology Gateway - DKIT	✓	✓	✓	✓	✓	✓ (Liaise with other EU Digital health Clusters to showcase Best Practise, and new opportunities. Greater interacttion between FDI and Indigenous players in health & technology)
6	Construction Sector Cluster	RTCF Cluster organisation	No	TU Dublin	Hothouse TU Dublin, the Collaboratory at the LINC	✓	✓		✓	✓	
7	Cyber Ireland	RTCF Cluster organisation	Yes	IT Carlow; Munster Technological University (Cork); University College Cork; Letterkenny IT; Dublin Business School; TU Dublin; UCD; GMIT; Maynooth University; University of Limerick; IT Sligo; TU Shannon (Midlands Midwest)	All Research Groups hosted at HEI members	✓	✓	✓	✓	✓	✓ (Advocacy to government, FDI Attraction, Promotion of the cluster Nationally & Internationally)
8	Engineering South East	RTCF Cluster organisation	No	IT Carlow; WIT; Kilkenny Carlow ETB, Tipperary ETB, Waterford Wexford ETB (Further education)	Design +; SEAM; EngCORE	✓	✓	✓	✓	✓	
9	IDEAM (Irish Digital Engineering and Advanced Manufacturing) Cluster	RTCF Cluster organisation	No	TU Shannon (Midlands Midwest) (LIT/AIT), Trinity College Dublin, Cambridge University, GMIT, Munster Technological University (MTU), IT Sligo, University of Limerick; TU Dublin, Birmingham City University, Ipleiria, Innopharma, Faculty for Mechanical Engineering, Slovenia	IMR, IS4PROD DIH, Acron Research Centre, Nimbus, Confirm, DIZ Romania, Learnovate Centre in Trinity College Dublin, Adapt Centre, Metal Plasticity & Additive Manufacturing Group	✓	✓	✓	✓	✓	✓ (Access to Funding and Grants)
10	Killybegs Marine Cluster	RTCF Cluster organisation	No	Letterkenny IT	Wisar Lab, Letterkenny; Bryden Centre; MuARI Centre	✓	✓	✓	✓	✓	
11	MedTech and Life Sciences Cluster	RTCF Cluster organisation	No	Tyndall, UCC, NUIG, GMIT (New ATU Collaborations Sligo IoT, LIT)	MET Gateway, dConnect, Skillnet, HIHI, HealthXL,	✓	✓	✓	✓	✓	✓ (Regulatory & Clinical, related Cluster-to-Cluster Collaboration, Individual & team executive coaching, showcase best practice, cross-over healthcare /medtech / pharma-biotech sector support. Working with mainstream supports to customise offerings to digital health)
12	Wood and Furniture Manufacturing Cluster	RTCF Cluster organisation	No	GMIT, TU Dublin, NUIG, TU Shannon, Munster Technological University (MTU), Trinity College Dublin, UCD	MET Galway, SEAM Waterford, CREST Dublin, APT Athlone, PEM Sligo, BiOrbic (NxtGenWood), IRDG, SFI (AMBER), Coillte, DAFM	✓	✓	✓	✓	✓	✓ (Funding identification and support)
13	Emerald Aero	Cluster organisation	Yes	-	-	✓			✓	✓	
14	Geoscience Ireland	Cluster organisation	Yes		Irish Center for Research in Applied Geoscience , (iCRAG), an SFI funded project involving six third level institutions	✓	✓	✓	✓	✓	✓ (Promoting collaboration)
15	it@Cork	Cluster organisation									
16	LINC engineering Network	Cluster organisation	Yes	Regional Skills forum	Confirm Smart Manufacturing	✓	✓	✓	✓	✓	
17	Makers Alliance	Cluster organisation									
18	The Fintech Corridor	Cluster organisation	No	DCU, DkIT, Maynooth University, Queens University, Ulster University	DkIT; IVI Maynooth; IIDB DCU; QUB; UU	✓	✓	✓	✓	✓	
19	Atlantic MedTech cluster	Cluster organisation									
20	EMD Ireland Technology Gateway Cluster	Technology Gateway Consortium	No	TU Shannon (Midlands Midwest), TU Dublin, Dundalk IT, Carlow IT, WIT, GMIT, Sligo IT	APT, CREDIT, CREST, DESIGN+, SEAM, MET, PEM (Technology Gateways)			✓			
21	The Irish Food Tech Technology Gateway Cluster	Technology Gateway Consortium	No	TU Shannon (Midlands Midwest), Munster Technological University (MTU), IT Carlow, TU Dublin, GMIT, WIT	APT, DESIGN+, MICRA, CAPPA, SHANNON ABC, MET, PMBRC			✓			
22	Energy Cork	Network	Yes	University College Cork	IERC ; NIMBUS Centre (MTU); MaREI	✓			✓	✓	✓ (Climate action)
23	Cork Financial Services Forum	Network	No	University College Cork	Fintechnext, Centre for Investment Research, Financial Services Innovation Centre (FSIC)	✓			✓	✓	
24	Applied IOT	Network	No	MTU, TUS, LYIT, WIT	COMAND, NIMBUS, WISAR, TSSG & IMaR Technology Gateways	✓		✓		✓	
25	Atlantic Economic Corridor	Network	No	NUI Galway; GMIT	Hive, Lero	✓		✓			
26	CRIOS Group (Business Services Group)	Network	Yes	UCD	Ceadar Technologies based in UCD	✓		✓	✓	✓	
27	Engenuity Engineering	Network	Yes	AIT	IMR	✓		✓	✓	✓	
28	InsurTech Network Centre	Network	No	IT Carlow, LYIT	Design+, Walton Institute	✓	✓	✓	✓	✓	
29	Ireland South East Financial Services Cluster	Network	No	Regional Skills South East; WIT; IT Carlow; LIT Clonmel campus / Design Team; Skillnet Ireland - Technology Ireland ICT, IFS Skillnet and Sustainable Finance Skillnet; PAT FinTech; Wexford / Waterford ETB; Carlow / Kilkenny ETB	INC InsurTech; KTI; INC InsurTech; KTI; Walton Institute; RIKON; Arc Labs; HBAN SEBAN; South East BIC; Sustainable Finance Ireland; CIRDAS	✓	✓	✓	✓	✓	✓ (Developing and facilitating cross-promotional activities for e.g. we launched a series of workshops with the Construction Cluster Ireland where the FS cluster firms present products and fs solutions for the construction sector)
30	SportsTech Ireland	Network	Yes	UL; TU Shannon; Maynooth University; Letterkenny IT; Setanta College		✓	✓	✓	✓	✓	

Key	
(white)	Functioning / funded clusters
(orange)	Dormant / not in operation
(red)	Disbanded
(grey)	No response but considered active

						Cluster Activities						
No.	Organisation	Classification	Membership Fee	Higher Education Members	Research/Innovation Partners	Networking	Skills Development	Research and Innovation	Internationalisation	Business Development	Other	Key
31	Health Innovation Hub Ireland	Network										No response but considered active
32	Ireland South East Agri	Network										No response but considered active
33	Ireland South East Life Sciences	Network										No response but considered active
34	South-Eastern Creative Corridor	Network										No response but considered active
35	Donegal ICT/Fintech	Network										No response but considered active
36	Ireland South East Advanced Manufacturing and Engineering	Network										Dormant / not in operation
37	Ireland South East Information and Communication Technologies	Network										Dormant / not in operation
38	Ireland South East Creative	Network										Disbanded
39	Irish Bioeconomy Foundation (IBF)	Industry association	Yes	UCD, UCC, TCD, TU Shannon (formerly LIT and AIT were individual members), DCU, MTU (IT Tralee formerly was individual member)	MTL Moore Park / Teagasc Fermoy Cork, Udaras Na Gaeltachta (Nua Na Mara), BiOrbic (UCD), AMBER research, Shannon ABC	✓		✓	✓	✓		Functioning / funded clusters
40	Kerry SciTech	Industry association	Yes	MTU, Kerry ETB	IMAR, REEDI	✓	✓			✓	✓ (Driving the regional economic marketing activity in region. Bringing stakeholders together to promote Kerry collectively)	Functioning / funded clusters
41	Technology Ireland Innovation Forum (Formerly ISIN)	Industry association										No response but considered active
42	MIDAS Ireland	Industry association										No response but considered active
43	Crystal Valley Tech	Industry association										Disbanded
44	Grand Canal Innovation District	Specialism										Functioning / funded clusters
45	The International Financial Services Centre	Specialism										Functioning / funded clusters

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