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CLUSTER NAVIGATORS
nurturing competitiveness

CLUSTER DEVELOPMENT HANDBOOK

A practical guide to the development of clusters and smart specialisations, as centre-stage strategies for regional economies.

IFOR FFOWCS-WILLIAMS

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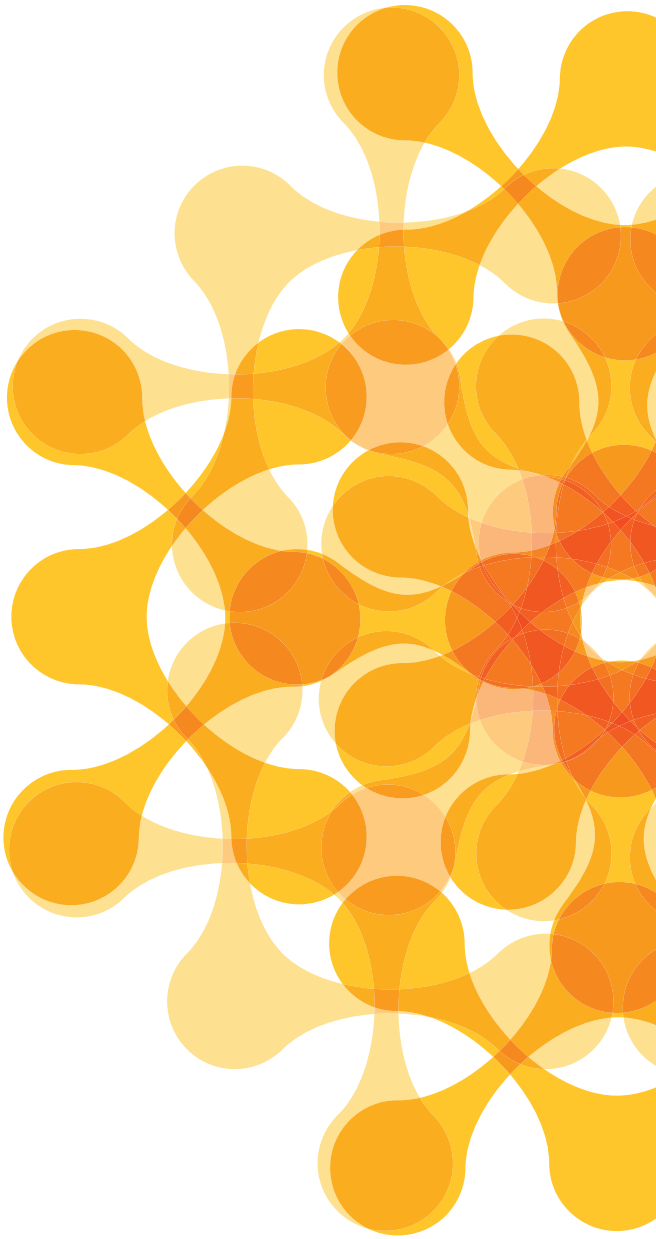

INTRODUCTION

"Ifor, how do we put Porter into practice?"

The question came to me from my boss at New Zealand's export development agency, following visits to New Zealand by Professor Michael Porter in the early 1990's.

Professor Porter's earlier research had explored: *"Why is it that firms based in particular locations succeed in global competition, where firms in other locations fail?"*

These questions started me on a journey. I wanted to move beyond the acceptance of clusters as a natural phenomenon to understand how to systematically raise the competitiveness of clusters, particularly in New Zealand, the most remote small country in the world.

During visits to many countries, I gained insights into what leads to dynamic clusters and strong clustering initiatives. I appreciated that a key was the breadth and quality of collaborative engagements. I had the opportunity to test frameworks and tools to address the practicalities of cluster development in a range of environments. Finally, the Twelve Step process for cluster development that is described in this handbook emerged.

This 2nd edition of the handbook continues to draw on my experience in engaging in cluster development … in well over fifty countries and contact with over a thousand clusters. It also draws on the work of many TCI Network members, the global practitioners network for competitiveness, clusters and innovation that I co-founded in 1997.

Cluster Development in Action

Today's economy is about speed, flexibility and connectivity in an environment where innovation and economic growth are geographically concentrated. Clusters and smart specialisations are cornerstones of this reality.

The focus for economic development is shifting from the national level, shifting from support to industries and to individual firms. Today the emphasis is on the development of regions and their clusters. This bottom-up approach reflects that while companies may come and go, strong and evolving clusters provide economic stability to a region.

Though clusters are a natural occurrence, the development of clusters does not need to be left to chance. Over the last two decades, cluster development has become a mainstream framework for regional development, especially across Europe, providing a centre stage strategy that addresses innovation, productivity and competitiveness. The European Commission is actively funding the development of world-class clusters, to support the internationalisation of small firms and differentiated regions, each with their smart specialisations.

Handbook's Structure

Much has been written on the phenomenon of clusters. This handbook covers the practicalities in moving from isolated *clumps* of firms and a *clutter* of uncoordinated support organisations. The approach centres on establishing early successes in non-threatening arenas. This engagement provides the foundation for subsequent and more fundamental collaborative activity in upgrading a cluster's competitiveness.

The first part of the handbook explores The What? and The Why? of cluster development. It opens with the natural phenomena of clusters and then takes an inside perspective on successful clusters. The logic for cluster engagement is presented and the key roles of cluster organisations and cluster managers are described. The framework for engagement centres on triple helix partnerships, with business firmly in the lead, public agencies in support and academic underpinning.

The second part of the handbook, **'Cluster Development in Twelve Steps',** identifies in detail The How? of cluster development, dividing the journey into a series of practical steps. The process provides guidelines rather than firm rules of engagement. I have used the Twelve Step process in kick-starting new clustering initiatives and in revitalising existing initiatives.

Acknowledgements

Many colleagues and clients around the world have participated in this journey. Sixty-four generous people from twenty-eight countries have contributed 'Invited Forewords' to chapters, with their perspectives. An extensive body of academic work supports the observations that I summarise. I draw on over 300 quotations in this 2nd edition, providing sources for those who wish to explore further.

I acknowledge my partner, Jennifer Phillipps, whose exceptional patience and encouragement has kept this journey on the rails for over two decades.

I wish you well with the development of your clusters. Your stories, comments and feedback will be welcomed.

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FOREWORD

The discussion about clusters has progressed significantly over the years, building on the new foundations laid in the early 1990s. At that time, Michael Porter's "The Competitive Advantage of Nations" and the work of others, like Giacomo Becattini, had exposed a broader public to the role of clusters in economic development. While clusters as a phenomenon had been well described earlier, this new work put them squarely into the context of the modern, globalized economy. The evidence was clear: regions that were home to dynamic clusters, and companies that were rooted in such clusters, did better.

Many practitioners could easily relate to these concepts and started quickly to think about how to translate them into action, whether in terms of companies' thinking about location or governments' approach to economic development efforts. Many economists were highly sceptical, expecting these initiatives to be not much more than a re-branding of the interventionist industrial policies that had failed in many countries. But policy practitioners developed interesting new approaches – and twenty years ago some of them then went on to create TCI, the global professional network in the field, to promote and develop the cluster idea. While practitioners were not discouraged by the concerns of the academics, they faced a difficult task in designing effective cluster-based activities: there was no concept of cluster mobilization that they could easily draw on.

Over the last two decades, the experience with cluster-based economic policies and the launch and management of cluster initiatives has grown significantly. Many countries, especially in Europe but also in Latin America, North America and parts of Asia have designed policy programs based on the cluster idea. Hundreds of cluster initiatives have been launched, and many of them by now have years of experience. What has emerged is clear evidence that cluster-based policies are a powerful new tool for economic development. Companies, regional governments, and others, especially academic institutions have learnt to use cluster initiatives as useful platforms for joint action.

The issues that concern cluster practitioners today are different from the challenges academic researchers identified twenty years. One of these concerns is the significant heterogeneity in the impact of cluster initiatives. The presence of these performance differences suggests that there is a need for the broad adoption of tried and tested practices of cluster engagement.

Ifor Ffowcs-Williams' book provides a personal and up-front perspective on what he has seen in the practice of cluster mobilization and management. Ifor, one of the founders of the TCI Network, has over two decades been following the evolution of cluster practice as an active participant. A truly global traveller, he has worked with cluster groups around the world, gaining insights on what works, and what doesn't. The book opens the door into his uniquely broad treasure chest of experiences. It will be hugely valuable to cluster initiative managers all over the globe in their fascinating journey of organizing joint action to raise the competitiveness of their clusters.

DR. CHRISTIAN KETELS, HARVARD BUSINESS SCHOOL
President, TCI Network

CHAPTER 1

CLUSTERS, A NATURAL OCCURRENCE

A range of clusters from around the world are introduced.

All are spontaneous occurrences.

Clusters are defined.

INVITED FOREWORDS

PROFESSOR MICHAEL ENRIGHT

University of Hong Kong; TCI Co-founder

The most important reason to focus on clusters is 'because they are there'.

Clustering can be seen in the high tech agglomerations of Silicon Valley and the M4 west of London, the financial sectors of Wall Street and The City, the service agglomerations of Hong Kong and Singapore, the crafts-based industries of Italy and Spain, the light manufacturing assembly industries of Southern and Eastern China, and the creative industries of Hollywood and Bollywood. Even such "placeless" industries as IT outsourcing and call centers, industries that in theory could be anywhere, have clustered in places like Bangalore and Dalian. While some clusters are relatively new, some trace their history back hundreds or even thousands of years.

It is the very ubiquity of clusters that tells us they are a fact of economic life that need to be understood and leveraged if we are to foster economic development.

PROFESSOR TORGER REVE

BI Business School, Oslo, Norway

Clusters are as old as the ancient market place, but only recently have we been able to understand and tap the enormous development power of industrial clusters. Clusters are regional agglomerations of firms that compete and cooperate at the same time, building knowledge bridges across traditional boundaries in order to compete internationally. Firms interact with customers, suppliers, service providers, banks, universities, government agencies and all types of facilitators, building a more competitive local region. It has to do with creating industrial attractiveness in a world of increasing global competition, especially from the emerging Asian economies.

In my own research on knowledge intensive clusters, I talk about building a stronger knowledge commons and creating stronger knowledge dynamics. In order to build a stronger knowledge commons we need to attract a critical mass of firms in related fields, develop an educational system that provide the specialised talents needed, and actively utilise research and development in order to foster entrepreneurship and innovation, and a higher level of productivity. The research findings are quite clear: Strong industrial clusters deliver what they promise, given that they embrace the forces of change and do not seek protection from external competition.

DR. STUART ROSENFELD,

Regional Technology Strategies, Inc., North Carolina, USA

The tendency of companies to want to be near like and complementary companies - including competitors - has been going on as long as humans have made things. It's a natural tendency of workers learning and honing their skills in a workplace to break away to compete, complement, or innovate but remain near the centers of knowledge and experience. There is, of course, a danger in overspecialization, but in most cases only if the companies grow complacent, misread economic signals, and fail to recognize their true competencies and/or innovate. Thus, while economic development emphasizes diversification to hedge their bets, companies still see the greater benefits of clusters and regional identities.

As clusters have come to dominate policy, there has been a tendency to make them ubiquitous and not special or organized. It's important to keep in mind that the most valuable clusters are those that represent a special regional strength. The very real examples in this book go a long way toward giving clusters meaning as an economic system and as a strategy for competitive advantage.

Clusters, a Natural Occurrence

Clusters form spontaneously, naturally emerging through a market driven process. Some serve very local markets, such as a High Street shopping centre. Residents of Calcutta looking for books head for College St; residents of Istanbul seeking chandeliers head to Sishane. Visitors to Dubai will be familiar with the Gold Souk, the Carpet and the Spice Souks, each with their speciality and servicing more than just Dubai residents. International shoppers know of Oxford Street, London; Orchard Road, Singapore and 5th Avenue, New York.

Some clusters, over time, grow from servicing local markets to being global players, recognized as the 'Go-To' places for their specialties. Silicon Valley and Hollywood are two Californian clusters that have become household names. Both clusters have naturally grown over decades from small beginnings. Our world is not flat. It is spikey with hot spots, many having a global reach:

- Aarhus, Denmark's 'Capital of Wind Energy' and home to 87% of Denmark's wind industry.
- Auckland, New Zealand's *'City of Sails,'* and a world leading super yacht centre.
- Bollywood, Mumbai, India, produces more movies than Hollywood.
- Bresle, France's *'Glass Valley,'* manufacturing 75% of the world's perfume bottles.
- Como, Italy, Europe's silk capital.
- Costa Brava, Spain, supplying 70% of the world's corks for sparking wines.
- Dalton, Georgia, USA; Kidderminster, UK; and Kortrijk, Belgium, the dominant carpet manufacturing centres in each country.
- Hangji, China (population 35,000) produces 30% of the world's toothbrushes.
- Linn County, Oregon, USA, grows 70% of all temperate grass seeds traded internationally.
- Karasu on Turkey's Black Sea coast produces 75% of the world's hazelnuts.
- Montebelluna, Italy, the *'Sports Footwear Capital of the World',* (population 25,000) accounting for 75% of world ski boots.
- Nashville, Tennessee, USA, *'Music City',* the world's country music capital.
- Qiaotou, producing 80% of China's buttons and 60% of global production.
- San Diego, Calif., USA, the highest concentration of Defence facilities in the world.
- Sassuolo, Italy manufactures 60% of internationally traded ceramic tiles.
- Sialkot, Pakistan, the world's largest producer of disposable stainless steel surgical instruments.
- Stoke-on-Trent, UK and Limoges, France, two leading fine china production centres.
- Wenzhou, China, producing 95% of the world's disposable cigarette lighters.

Clusters are not just urban/metropolitan phenomena. World-class clusters can also be found in small, even rural communities:

- Castel Goffredo, Italy (population 11,000) produces a third of Europe's socks.
- Hay-on-Wye, Wales (population 2,000) is the world's largest antique book centre.
- Húsavík, Iceland (population 2,500) and Kaikoura, New Zealand (population 2,000) are two of the world's leading whale tourism clusters.
- Grenada, the Caribbean Spice Island (population 110,000), is known as the world's leading supplier of high quality nutmegs.
- Scone, Australia (population 5,000) is the world's #2 thoroughbred horse cluster, accounting for 80% of Australia's thoroughbred exports.

Other clusters are more regional in their competitive scope:

- Cape Town, South Africa, producing 45% of the country's clothing.
- Christchurch, New Zealand, home for half of the country's electronic engineers.
- Guatemala, home to three quarters of Central America's call centres.
- Lake Naivasha, Kenya, growing two-thirds of Kenya's cut flower exports.

- Lyon, France, home to 70% of French video game developers.
- Morogoro, Tanzania, an agricultural machinery hub.
- Vallès Occidental County, Catalonia, producing 80% of Spain's woollen fabrics.
- Sleman, *'Indonesia's City of Education',* with 35 public and private universities.
- Jyväskylä, *'Finland's City of Education',* a city where every fourth resident is a student.
- Gore, New Zealand's country music capital.
- Tamworth, Australia's country music capital.

In Europe some 10,000 clusters have been identified covering primary industries, secondary and tertiary, some only familiar to industry insiders. Six thousand clusters have been identified in India, many in existence for centuries, including knitwear in Ludhiana, brass products in Moradabad; hand block printed textiles in Jaipur and cotton in Tirupur, accounting for over half of India's cotton knitwear exports. A much younger Indian cluster is Bangalore software, today accounting for one-third of India's IT exports.

Catalonia, Spain	*"Catalonia is a region with a long industrial tradition where business clusters have existed in certain areas for many years, some dating back as far as the Middle Ages."* *"Clusters are a spontaneous 'natural' phenomenon and no administrative decision is required to create them."* Professor Antoni Subirà, Past Minister of Industry; Catalonia, Clusters and Competitiveness: The Case of Catalonia (1993-2010) Gascón, Pezzi and Casals

A Historic Perspective

Clusters are not a new invention. The practice of businesses co-locating with related firms, including competitors, was observed in ancient Athens. In the city's heart, the agora, fruit, fish, spice and perfume retailers and jewellers gathered in adjacent corners. Two German regions with long traditions in specific skills are Nuremberg for pencil manufacturing and Solingen for speciality steels, known as the 'The City of Blades'.

Observers of this co-location phenomenon include:

Alfred Marshall, describing in 1890 *'The Concentration of Specialised Industries in Particular Localities',* drew on his observations in northern England: *"When an industry has chosen a locality for itself it is likely to stay there long: so great are the advantages which people following the same skilled trade get from near neighbourhood to one another … and presently subsidiary trade grows up in the neighbourhood"*[1]. Marshall described the advantages of being located in a cluster as the availability of skilled labour and intermediate goods and the easy transmission and discussion of new ideas and improvements.

Joseph Schumpeter in 1939 highlighted the *"swarm like appearance of entrepreneurs"* and *"the clustering of industry"* [2].

Giacomo Becattini in 1979 drew on his experience with Italy's industrial districts, highlighting place-centred economic development and social relationships. Becattini emphasised passive *"embededness"* and an active *"sense of belonging"* to a place with a common vision.

Michael Porter in 1990 popularised the relevance of clusters as a framework for economic development with his seminal contribution[3] drawing on the research that had been led by Michael Enright. This explored the reasons why some firms and some regions were particularly successful. Porter's comprehensive work centred on ten countries: Denmark, Germany, Italy, Japan, Korea, Singapore, Sweden, Switzerland, the UK and the US. The eleventh country Porter and his team investigated was New Zealand, with Michael Enright again leading the fieldwork[4].

Northern Italy was on the agenda of many researchers and I was one who visited Italy in the 80's and 90's and came away from these visits intrigued by the *'flexible specialisation'* that Piore & Sabel[5] had highlighted. Based on Piore & Sabel's insights, a business-networking programme was developed in Denmark by the Danish Technological Institute (DTI), closely followed by similar programmes in Canada, Norway, Australia, New Zealand and Oregon, USA.

[1] Alfred Marshall, *Principles of Economics,* Macmillan and Co. Ltd., London, 1890

[2] Joseph Schumpeter, *The Theory of Economic Development,* Transaction Publishers, 1982

[3] Michael E Porter, *The Competitive Advantage of Nations,* Free Press, NY, 1990

[4] Crocombe, Enright & Porter, Upgrading New Zealand's Competitive Advantage, Oxford University Press, New Zealand, 1991

[5] Piore & Sabel, The Second Industrial Divide, 1984

When I was with New Zealand's export development agency, I developed a programme to encourage collaboration amongst small groups of SMEs. I called the programme 'Hard Business Networks' to differentiate these formal commercial alliances (including consortiums and joint ventures) from softer networks such as industry associations and chambers of commerce. Our focus in New Zealand was encouraging SMEs to collaborate for export development. As Dr. Stuart Rosenfeld has observed, these business network programmes were in many cases the precursors to the cluster development programmes that subsequently evolved around the world.

Defining 'Clusters'

Clusters are an umbrella concept. With variations in usage across industries and across geography, and variations between academics, public agencies and private sector groups, 'clusters' are not a precisely defined term.

At its simplest level, a cluster is a group of firms that are operating in the same sector and are in close geographical proximity to each other. A cluster may also have a range of support organisations such as trade associations, chambers of commerce, technical and training institutes, government agencies, universities and schools. A cluster is therefore more than just a group of firms. There may (or there may not) be close relationships between these different players. There may (or there may not) be a deliberate process underway to upgrade the cluster's competitiveness. The definitions that follow have many commonalities, with some differences, and start to identify the internal mechanisms of strong clusters. The first is the most widely used.

Defining Clusters	
Professor Michael E. Porter	*"Clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (e.g., universities, standards agencies, trade associations) in a particular field that compete but also cooperate."* Location, Competition, and Economic Development: Local Clusters in a Global Economy, Economic Development Quarterly, 2000
EU Expert Group on Clusters	*"Clusters are a nebulous concept. It covers a variety of business structures and is used for different purposes. Therefore, there are numerous different definitions but almost all of them share the idea of proximity, networking and specialisation. The expert group used as a working tool Porter's definition, to which they added few finer points: Clusters are groups of independent companies and associated institutions that are:* • *Collaborating and competing;* • *Geographically concentrated in one or several regions, even though the cluster may have global extensions;* • *Specialised in a particular field, linked by common technologies and skills;* • *Either science-based or traditional;* • *Clusters can be either institutionalised (they have a proper cluster manager) or non-institutionalised."* Final Report of the Expert Group on Enterprise Clusters and Networks, European Commission
European Union	*"Groups of firms, related economic actors, and institutions that are located near each other and have reached a sufficient scale to develop specialised services, resources, suppliers and skills."* Smart Guide to Cluster Policy, EU Guidebook Series, 2016
German Federal Ministry of Education and Research	*"What is a cluster? The regional concentration of innovative players is a key characteristic of clusters. In the business world, it means the conglomeration of companies, research facilities and other organisations which are linked by a common area of activity. It is precisely this physical and content-related proximity which creates trust - a crucial requirement for the successful utilisation of existing potential. Ideas are born, refined and jointly implemented. This gives rise not only to new partnerships and the faster exchange of knowledge, but also to a competitive situation which creates a positive start-up climate."* www.bmbf.de

United Nations Industrial Development Organisation	*"Clusters are agglomerations of interconnected companies and associated institutions. Firms in a cluster produce similar or related goods or services and are supported by a range of dedicated institutions located in spatial proximity, such as business associations or training and technical assistance providers. Vibrant clusters are home of innovation oriented firms that reap the benefits of an integrated support system and dynamic business networks."*
World Economic Forum	*"Groups of related businesses in a common geographical framework, operating in an environment characterised by a high level of specialisation, intense competition and a critical mass of highly-trained employees."*
Indian Cluster Observatory	*"A concentration of enterprises producing same or similar products or strategic services and is situated within a contiguous geographical area spanning over a few villages, a town or a city and its surrounding areas in a district and face common opportunities and threats."*
Innovation Norway	*"A cluster is generally defined and delimited on the basis of the participants' affiliation to: The same value chain or the same knowledge/technology base; A geographical concentration of businesses and related functions; A grouping of enterprises and related knowledge communities that have a critical mass that can form the basis for triggering; cooperation and dynamic relations between the participants; A common understanding of the cluster's importance and vision for further development."*

Cluster Origins

Clusters develop over time; they are not an overnight phenomenon. Full development takes years, often decades. Public policies support, rather than create, a cluster. While clusters are, with very few exceptions, a natural occurrence, the origins of clusters differ markedly. There is no single trigger as the examples that follow demonstrate. I have visited many of these clusters, others I am aware of through the TCI Network and from academic writings. In presenting these examples, I am emphasising the ubiquity of clusters around the world. Many clusters could be categorised under more than one headings.

Proximity to a natural resource, a raw material:

- Clay, the raw material for many pottery clusters, including Stoke-on-Trent, UK; tiles in Sassuolo, Italy and porcelain in Limoges, France.
- Oil & gas extraction engineering: Houston, Texas; Calgary, Canada; Stavanger, Norway; Taranaki, New Zealand.
- Oceans technology in Newfoundland, Canada.
- Mining services: Sudbury, Canada (known as hard rock mining's 'Silicon Valley'); Kalgoorlie, Australia.
- Wine: Bordeaux and Burgundy, France; Barossa Valley, South Australia; Napa Valley, California; Marlborough, New Zealand.
- Dried figs and raisins: Izmir, Turkey.
- Fishing/seafood: Reykjavik, Iceland; Humber, UK; Nelson, New Zealand; Lake Victoria, Uganda.
- Gem stone mining: Tanga, Tanzania.
- Medicinal plant processing: Macia, Mozambique.
- Katwe salt cluster, Uganda.
- Virgin coconut oil production, Samoa.
- Chair cluster in Manzano (Udine) Italy was in a forestry region.
- Zanzibar's seaweed cluster.

Proximity to physical features:

- Transport/logistics clusters in Rotterdam, Hong Kong, Singapore, Dubai and New Orleans.
- Auckland, New Zealand's *'City of Sails'* and a super yacht manufacturing centre, centred on one of the world's most extensive, year-round harbours.
- Beach tourism: Hawaii; Costa del Sol, Spain; Sunshine Coast, Queensland, Australia and Sunshine Coast, Eastern Cape, South Africa.

- Spa tourism in Spa, Ardennes, Belgium; in Karlovy Vary, Czech Republic; in Rotorua, New Zealand.
- Cruise tourism: Miami (Caribbean hub); Sydney (South Pacific hub).
- Ski tourism: Whistler, Canada; Zermatt, Switzerland; Queenstown, New Zealand.
- Omarama, New Zealand's gliding centre, close to the Southern Alps thermal lifts.
- Dark sky parks in remote rural communities: Tekapo, New Zealand; Snowdonia, Wales; Galloway, Scotland; Horseshoe Bay, Texas.

Proximity to knowledge centres:

- Many biotech clusters are centered on strong bioscience universities, including San Diego; Boston; Munich (Germany); Uppsala (Sweden).
- Medical tourism clusters: Singapore; Bangkok (Thailand); Antalya (Turkey); Medellin (Colombia).
- Austria's Hagenberg IT cluster, developed over 30 years from a university IT centre, now with a Software Park housing 60 firms including 30 start-ups.

A specific local demand, venturesome consumers:

- Dry land horticulture: irrigation technology in Israel and Shepparton, Australia.
- London's antique auction cluster (Sotheby's, Christie's) with proximity to high net worth individuals.
- Manitoba, Canada has a niche in global aerospace as the world's leading cold weather testing location.
- Reykjavik, Iceland is an exporter to Antarctica of cold proof, soft terrain vehicles thanks to the local demand for glacier-climbing SUVs.
- Sliedrecht, Netherlands is the world's leading dredging cluster, thanks to the local demand for precision dredging services.
- Beer drinkers in Portland, Oregon are five times more likely to drink beer from a microbrewery than the typical US consumer; Portland commuters are seven times more likely to commute by bike; and more likely to demand active footwear (leading to Portland being the home of Nike, Columbia, Adidas North America and Icebreaker North America)[6].

An external shock, adversity:

- The closure of a Fiat factory in Moderna, Italy in the 1950's stimulated the establishment of a number of firms including Bugatti, Ferrari, Lamborghini and Maserati.
- The closure of a steel works in Newcastle, Australia drove the growth of an engineering cluster, Hunternet.

Ethnic concentrations:

- Geneva, Switzerland's watch cluster, with its origins in Protestant Huguenots escaping persecution in France and Italy.
- Ultra-Orthodox Jewish diamond merchants in Manhattan, Antwerp and Ramat Gan (Israel), three of the world's four largest diamond centres.
- Moncton, New Brunswick is a major Canadian centre for translation services and bilingual PR & marketing firms, thanks to the community's 50/50 French/English composition.
- Shiro Meda handloom cluster, Addis Ababa. The cluster has existed for decades; migrants from a southern Ethiopia ethnic group.

Cultural traditions, local history:

- Jazz in New Orleans.
- Reggae music in Jamaica (Bob Marley +).
- Basketry in Luwero, Uganda.
- Glass bead manufacturing in Krobo, eastern Ghana.
- Cultural tourism in Bagamoyo, Tanzania.
- The fiddle players of Prince Edward Island, Canada.

[6]Thanks to Joe Cortright, Portland, Oregon for these examples.

Public sector anchors

- Gothenburg's biotech cluster is centred on one of northern Europe's largest hospitals, Sahlgrenska University Hospital.
- Omaha, Nebraska's telemarketing cluster developed around the bandwidth installed for the local US Strategic Air Command facility.
- Ottawa, Canada's high tech cluster has its origins in a major government R & D telecommunications laboratory, Bell Northern Research.
- Turkey's defence and the construction services clusters are located close to Ankara's powerful public agencies.
- Eskişehir's aviation cluster, Turkey has grown around the location of the country's first Tactical Air Force HQ.

Emerging from an existing cluster:

- Clocks have been produced in Germany's Black Forest for hundreds of years, a process requiring fine mechanical skills. Today, Tuttlingen, at the edge of the Black Forest, is home to 400 companies specialising in medical technology and the production of surgical instruments, drawing on the same competencies.
- Beijing's Zhongguancun Science Park (China's Silicon Valley) emerged in the mid 1980's from a cluster of computer retailers and is today home to many of China's leading IT companies, some 6,000 high tech SMEs, 39 universities and 213 research institutes.
- Medical technology cluster, Saint-Etienne, France emerged from a historic textile cluster and then medical textiles.
- Medical instruments, Minneapolis, USA emerged from a declining computer industry.
- Mobile phone technology, North Jutland, Denmark emerged from maritime radio communications.
- Carlsbad, California's golf cluster, drawing on aviation engineering capabilities.
- Office furniture cluster in Zeeland, western Michigan, USA (with Hawarth, Herman Miller and Steelcase) emerged from a Dutch cabinet making/home furnishings cluster.
- Nigeria's Nnewi automotive components cluster is centred on a traditional trading and transport hub.
- Subsea Technology Cluster, North East England developed from a local heavy engineering tradition.
- Textile machinery, Istanbul, Turkey emerged from the textile industry.
- Carpet cluster in Dalton, Georgia, USA *'The Carpet Capital of the World',* grew out of a local tufted textiles craft producing bedspreads.
- Gujrat, Pakistan's fan manufacturing centre, draws on a local tradition of hookah components and water hand-pumps.
- The Majorca, Spain tourism ICT cluster has evolved from the specialist demands of island's tourism cluster.
- The Burano, Venice lace knitting cluster evolved from the local fishing (and fishing net knitting) cluster.
- Marine engineering and deep maritime legal competencies in Nelson, New Zealand emerged from the local seafood cluster.
- Yacht building in Bodrum, Turkey evolved from the manufacture of fishing boats.

Go-getting godfathers[7]:

- Hyderabad IT, India: Chandrababu Naidu
- Oita, Japan's 'Silicon City': Morihiko Hiramatsu
- Silicon Valley, California: Frederick Terman

By chance:

- ICT in Seattle, Bill Gates' birthplace.
- Christchurch, New Zealand's electronics cluster is centred on Tait Electronics Ltd., whose founder moved to the city in 1945.

[7]Drawing on: Prof. Fred Phillips, State University of New York

A deliberate intervention by a public agency:

- Hsinchu Science Park, Taiwan is frequently referred to as an example of a government 'creating' a cluster, following a visit by Taiwanese authorities to Silicon Valley in the 1970's. Growth was stimulated by an integrated package of extensive public support, including encouraging the return of Taiwanese engineers with technical and management skills, the provision of finance and on-going connections to Silicon Valley. A go-getting godfather, Morris Chang, played a key role in the cluster's development.
- Government taking the lead with cluster construction in a number of countries including Saudi Arabia and South Korea, with an emphasis on physical infrastructure during the early stages.
- Clusters in a number of African cities have developed with public officials relocating metalworking and other 'dirty' activities scattered across inner city regions to designated locations.
- Similarly, Venice's glass cluster developed as public authorities closed the many fire-hazard furnaces on the main island in 1291, forcing relocation to the outer island of Murano.
- Mauritius' textile cluster began as an Export Processing Zone with special incentives.
- North Carolina's Research Triangle, USA is a publicly instigated biotech cluster initiative. The cluster's performance is lagging behind more bottom-up initiatives, such as San Diego and Boston/Cambridge.

Feral clusters[8]

- Port Royal, Jamaica in the 17th century was the pirate capital of the Caribbean and *"the richest and wickedest city in the world".*
- Canton, China in the 19th century had an even larger pirate fleet, over 400 junks.
- Hobyo, Somalia is currently the world's pirate capital, a feral cluster with a global reputation.
- Zheleznogorsk, 3,000 km east of Moscow, was established in 1950 to produce nuclear weapons. It officially did not exist during the Soviet era. Today, three-quarters of Russia's satellites are produced in this still-closed city.

Similar Concepts, Different Terms

The terminology for 'clusters' varies around the world, at times with subtle differences:

Branches; Centre of Excellence; Centre of Expertise; Competence Networks; Global Knowledge Hubs; Growth Hubs; Growth Nodes; Growth Poles; Hot Spots; Industrial Districts; Innovation Hubs; Innovation Networks; Innovative Milieux; Industrial Poles; Innovation Hubs; Knowledge Mega Centres; Local Industrial Production Systems; Localised Industry; New Industrial Spaces; Pôle de Compétitivité; Pôles de Croissance; Pôle d'Excellence; Reduced Scale National Innovation System; Smart Specialisations; Strongholds; Systems Productifs Locaux (SPL); Technopoles.

Clusters, an External Perspective

Viewing dynamic clusters from the outside, it is evident that they have a profound impact on business growth and on regional economics[9]. From a firm perspective, the international evidence is clear: **firms that are based in strong clusters are more competitive** than similar firms that are scattered around a country.

From an economic development perspective, the evidence is also clear that **with strong clusters comes growth in employment, especially in high value jobs.** Research demonstrates that regional economies with strong clusters have higher levels of innovation, more patents, more entrepreneurship, more successful start-ups, higher export and economic growth, higher wages and better productivity. Regions with strong clusters are particularly successful in attracting new investment and in attracting talent.

New regional industries emerge from strong clusters. Prosperous regions tend to have portfolios of related clusters and thus create reinforcing strengths that are hard to copy by competing locations.

[8]Drawing on: 'Off the Map', Alistair Bonnett, Aurum Press, London, 2014

[9]For a comprehensive review, see: Mercedes Delgado, Michael E. Porter and Scott Stern, Research Policy, Volume 43, Issue10, Pages 1785–1799, 2014.

"Once the forces of agglomeration are set in motion at any location, increasing returns effects sustain an upward spiral of growth and development while making it increasingly difficult for other locations to compete.

Allen J.Scott *" Origins of Hollywood Motion-Picture Industry, Cluster Genesis, Braunerhjelm & Fedlman, Oxford Press, 2005*

A Cluster Typology	
Marshallian	Small and medium sized locally owned firms; craft based or hi-tech; densely networked.
Hub & Spoke	One or several large firms with numerous smaller suppliers and service firms; hub firms tend to dictate cooperation arrangements with smaller (supplier) firms.
Satellite Platform	Medium and large branch plants owned by MNCs; relatively independent plants; few spin-offs.
State-anchored	Large public or non-profit entity (e.g. a university, a military base) and related, supplying service firms.

Based on: Markusen, A., Sticky Places in Slippery Space: A Typology of Industrial Districts, Economic Geography, 1996

Wannabe Clusters

Most of the cluster development initiatives underway around the world are well grounded in the reality of their local communities, systematically building on regional assets. But some clustering initiatives are vulnerable 'want-to-be' clusters, often driven by politician's wish lists. ICT, biotech, nanotech and creative activities are particularly popular 'wannabe' clusters. Drawing on the example of Silicon Valley, an extensive (and without doubt excessive) number of Silicon Somewheres are under development.

Some Silicon Somewheres

Silicon Alley, Manhattan, New York; **Silicon Beach,** Santa Cruz, California; **Silicon Bog,** Limerick, Ireland; **Silicon City,** Chicago; **Silicon Coast,** Auckland, New Zealand; **Silicon Corridor,** England; **Silicon Desert,** Phoenix, Arizona; **Silicon Ditch,** England; **Silicon Dominion,** Virginia; **Silicon Fen,** Cambridge, UK; **Silicon Forest,** Portland, Oregon; **Silicon Forest,** Australia; **Silicon Freeway,** Southern California; **Silicon Glacier,** Montana, USA; **Silicon Gorge,** Bristol, England; **Silicon Glen,** Scotland; **Silicon Gulch,** San Jose, California; **Silicon Gulch,** Austin, Texas; **Silicon Gulf,** Davao, Philippines; **Silicon Hill,** Massachusetts; **Silicon Hills,** Austin, Texas; **Silicon Holler,** Washington DC; **Silicon Hollow,** Tennessee; **Silicon Island,** Virgin Islands; **Silicon Island,** New York; **Silicon Island,** California; **Silicon Island,** Taiwan; **Silicon Island,** Whidby Island, Washington; **Silicon Isle,** Ireland; **Silicon Kashba,** Istanbul; **Silicon Mesa,** New Mexico; **Silicon Mountain,** Colorado Springs; **Silicon Mountain,** Pennsylvania; **Silicon Mountain,** Massachusetts; **Silicon Necklace,** Boston, Massachusetts; **Silicon Oasis,** Dubai; **Silicon Orchard,** Wenatchee Valley, Washington; **Silicon Plantation,** Virginia; **Silicon Plateau,** Bangalore, India; **Silicon Polder,** Netherlands; **Silicon Prairie,** Champaign-Urbana, Illinois; **Silicon Rainforest,** Seattle, Washington; **Silicon River,** St. Louis, Missouri; **Silicon Sandbar,** Cape Cod, Massachusetts; **Silicon Saxony,** Germany; **Silicon SeaBoard,** Richmond, Virginia; **Silicon Seaside,** South Norway; **Silicon Sentier,** Paris; **Silicon Slopes,** Utah; **Silicon Snowbank,** Minneapolis-St Paul, Minnesota; **Silicon Spires,** Oxford, UK; **Silicon Swamp,** Florida; **Silicon Triangle,** Durham, Nth Carolina; **Silicon Tundra,** Ottawa, Canada; **Silicon Valais,** Switzerland; **Silicon Valley North,** Ottawa; **Silicon Valley East,** Malaysia; **Silicon Valley Forge,** Pennsylvania; **Silicon Valley,** Iowa; **Silicon Valley of China** (Zhongguancun); **Silicon Valley of Europe** (Dublin); **Silicon Valley of Russia** (Moscow); **Silicon Valley of South Korea** (Incheon); **Silicon Valley of Sweden** (Kista); **Silicon Valley of Taiwan** (Hsinchu); **Silicon Village,** Massachusetts; **Silicon Village,** California; **Silicon Vineyard,** Okanagan, British Columbia, Canada; **Silicon Vineyard,** Napa Valley; **Silicon Wadi,** Israel; **Silicon Welly,** Wellington, New Zealand; and **Cwm Silicon,** Wales

Drawing on: www.tbtf.com/siliconia.html

Many of these Silicon Valley imitators will be unsuccessful. The evidence from around the world is emphatic: it is very difficult to create a new cluster from a zero base. Cluster development is not about creating clusters or picking winners, but rather understanding and then building on a region's fundamental strengths.

Clusters mature & die

No cluster has a locked-in, permanent competitive position. Many clusters have grown to leading positions, withered and finally disappeared. Occasionally, all that is left is a museum as a reminder of past glories.

- In the thirteenth century Worcester, England had a Glovemakers Street. By 1820 glove manufacturing dominated the local economy, employing 30,000. Worcester remained until the 1950s the world's major glove manufacturing centre[10].
- Lancashire, England was a world leading textile centre.
- Romans-sur-Isère is still recognised as the shoemaking capital of France though what largely remains of the leather and shoe cluster are discount shoe retailers and a shoe museum.
- The Titanic was built in Belfast, Northern Ireland in 1912, in what was at the time one of the world's largest shipyards. Today, the Belfast Titanic Museum offers the *'World's Largest Titanic Visitor Attraction'.*
- Macclesfield, England was once the world's largest producer of finished silk; today it is home to four silk museums.
- Medicine Hat, Alberta accounted for 75% of Canada's pottery production in the 1920's. Today all that is left is the Historic Clay District Museum.
- Dundee, Scotland in the 19th century was known as 'Juteopolis', the world centre for jute processing and jute machinery. Today Dundee hosts Scotland's Jute Museum.

> *"Many of the industrial clusters of the past are pushing up the daisies, have gone to meet their maker, have become ex-clusters."*
>
> **Professor Paul Krugman** *The New Economic Geography, Now Middle-Aged, 2010*

An International Buyers Perspective	
Looking for **carpets?**	Go to Dalton, USA; 175 carpet mills to choose from, manufacturing almost half of world supply
Looking for **radish seeds?**	Go to mid-Canterbury, New Zealand, producing half of global supply
Looking for **oil rig accommodation systems?**	Go to Kristiansand, Norway, producing 95% + of world supply
Looking for **wedding dresses?**	Go to Huqiu, Suzhou City, China with 1200 suppliers to choose from. Or to Chernivtsi, Ukraine with 300 suppliers.
Looking for advice on **fishing quota regulations?**	Go to Nelson, New Zealand, the largest concentration of marine lawyers in the southern hemisphere.
Looking for **high specification laser components?**	Go to Vilnius, Lithuania, 80% of the world supply

[10]'Industrial Clusters and Regional Business Networks in England', 1750-1970, Eds Wilson & Popp (2003) Ashgate

Looking for an **Ebola vaccine?**	Lyon, France is one of three possibilities globally.
Looking for **dairy farming technology?**	Visit the largest agricultural fair in the southern hemisphere, at Mystery Creek, New Zealand.
Looking for a **Formula 1 racing car?**	Go to Motorsport Valley, near Heathrow Airport, London, home to 8 of the 11 global manufacturers.

For international buyers searching the world for new suppliers, their task is becoming simpler and travel less onerous. They hear about places that are the Go-To location for specific items and knowledge.

Two questions for all regions in today's global environment are:

1. *"In which areas can we be the Go-To location and attract international customers?"*
2. *"How do we continue to upgrade within those areas?"*

Before getting into the practicalities of cluster building … The How? … let's go inside dynamic clusters and explore commonalities, what makes these places so successful … this is the next chapter.

CHAPTER 1.2

CLUSTERS ON THE INSIDE

The previous chapter described many clusters from the outside.

This chapter explores such clusters from the inside, looking for commonalities.

These elements provide the foundation for the cluster development approach to come.

INVITED FOREWORDS

JOE CORTWRIGHT

Impresa Inc., Portland, Oregon, USA

Clusters come in many shapes and sizes, and like all living things, go through a life-cycle, from formation, to growth to maturity and decline, and for some renewal. But at their heart clusters are about ideas, relationships and place. Is there special, shared knowledge? Do workers, firms, entrepreneurs and managers connect with one another? Are these connections concentrated in a particular locale? These three elements define clusters and prescribe the avenues for making them stronger.

MUKESH GULATI

Executive Director, Foundation for MSME Clusters, New Delhi, India

Ifor provides rich insights into what makes the chemistry work inside the clusters, the networking and linkages. His description of the key cluster actors and differentiation between dynamic and stagnant clusters provides a very useful insight for the cluster practitioners and policy makers. I congratulate him for bringing out the current compendium.

ERIC ROLF HANSEN

Economic Transformations Group, Inc., New York City and Silicon Valley

In the hundreds of clusters we have worked with in over 40 countries, leadership and collaboration are the "secret sauce" of dynamic clusters, whether it comes from the private sector, government, or universities. In the take-off and growth of emerging clusters, charismatic and tenacious leadership by private sector entrepreneurs is often key – as in the case of Robert Mondavi's transformation of the Napa Valley wine cluster into a world player, Dr. Bob Breault's championing of the laser/optics cluster boom in Arizona, and Arturo May Mass's masterful orchestration and launch of the apparel and light manufacturing cluster in Campeche, Mexico. These leaders and brokers of innovation bring together diverse private and public leaders to collaborate on forging new industry and regional competitiveness, and now importantly, sustainable economic development.

BILL WICKSTEED

Founder SQW, Cambridge, UK
Author, The Cambridge Phenomenon Revisited

Clusters usually benefit from agglomeration effects such as specialist labour markets which make it easier to start and grow companies; but they have extra strengths as well. From the Cambridge (UK) perspective these can be summed up in a single word "culture".

A culture in which networking is pervasive and effective, in which helpfulness is the norm, entrepreneurial endeavour is admired in both business and research communities and in which there is a strong commitment to the overall success of the "place".

At the outset, clusters often have a distinctive resource on which others draw. As they mature their strength becomes multifaceted and more robust, with interactions between the various actors driving innovation and growth.

Clusters on the Inside

Much has been written on Silicon Valley's 'secret sauce' and that of other high performance clusters around the world. In this chapter I draw on the extensive academic literature and flavour this with my own experiences. I have connected with over 1,000 clusters globally, in a diversity of sectors, countries and environments. Each cluster has taken it's own development path. Some are stagnating; others are dynamic. Some clusters have been severely hit by globalisation; others have become thriving global players. So, why such performance differences? What is actually happening within the clusters? Are patterns discernable?

The tight geography of innovation

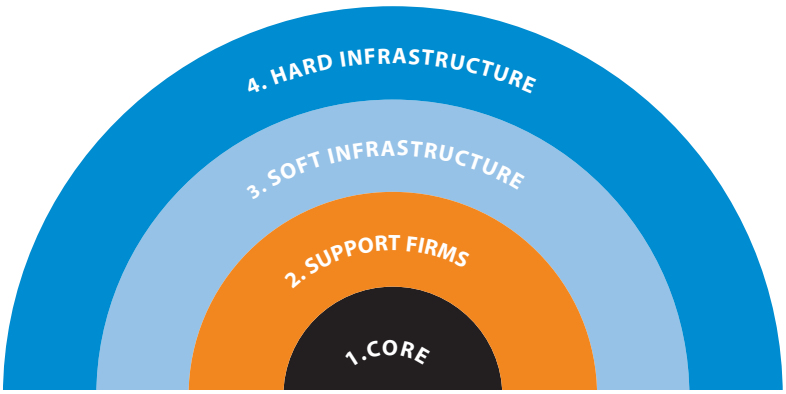
Dynamic clusters are in part driven by close physical proximity. Suppliers, customers and specialised facilities are at hand, reducing transaction costs. But there are other, usually more substantial, co-location benefits. Geographic proximity brings advantages that are not available to distant businesses:

- Multiplicity of links between a concentration of similar and related activities … large firms, SMEs, suppliers, knowledge institutions, professional advisors … leading to dense networks that share supply chains, inputs and infrastructure.
- Ease of face-to-face interactions and chance encounters leading to trust and social connections, social connections, enabling commonalities to be easily explored.
- Trust combined with mobility speeding up tacit information flows and the diffusion of new knowledge … new knowledge that is tacit and tends to be localised. Learning quickly what works … and doesn't work.
- Proximity and trust offering access to diverse knowledge that is recombined in novel ways. Knowledge spillovers between public research centres and firms.
- A deep pool of relevant skills.
- Businesses able to monitor each other's activity, increasing rivalry. But also offering opportunities for collaborating through informal and formal mechanisms. Untraded interdependencies developing amongst the businesses.
- Strong clusters have the local buzz … the formal and particularly the informal networking, leading to a collective efficiency.
- Become magnets, attracting public and private investments, migrants …

The geography of innovation can be very tight, as in Silicon Valley. There is stickiness to innovation that is very place specific, spill over benefits can decay within a few city blocks. New York's Garment District is concentrated into just eight Manhattan blocks. Located within 2 km of Sydney's University of Technology is 40% of Australia's creative/digital media capability. Tourism and primary product clusters cover a wider geography, though often with a service hub … innovation has a tighter geography than production activities. The functional region of many clusters is the commute distance.

M.P. Feldman	*"Knowledge crosses corridors and streets more easily than oceans and continents."* The Geography of Innovation, Kluwer Academic Press
Professor Michael E. Porter	*"Geographic, cultural and institutional proximity provides companies with special access, closer relationships, better information, powerful incentives and other advantages that are difficult to tap from a distance. The more complex, knowledge-based and dynamic the world economy becomes, the more this is true. Competitive advantage lies increasingly in local things--knowledge, relationships and motivation that distant rivals cannot replicate."* Clusters and the New Economics of Competition, HBR, 1998
Shanghai	*"Shanghai's creative clusters are primarily distributed in particular locations, namely in the inner-city, old industrial districts, places close to universities, Central Business Districts (CBDs), and entertainment and tourist zones. Moreover, a differentiation in space among various categories of creative clusters in Shanghai was also noticed."* Creative Clusters in Shanghai, Jin-Liao He and Hans Gebhardt, European Planning Studies, 2014

Germany	*"The physical and content-related proximity creates trust - a crucial requirement for the successful utilisation of existing potential. Ideas are born, refined and jointly implemented. This gives rise not only to new partnerships and the faster exchange of knowledge, but also to a competitive situation which creates a positive start-up climate."* Federal Ministry of Education and Research
Cambridge, UK	*"As the Cambridge model shows, a national system of innovation can only operate through local clusters where the travel time is under an hour; where people and ideas mix freely and where there are roll models; where there are local (recycled) capital, great events, universities, champions, local press, alumni, local wins, second time entrepreneurs and 'marquee' local companies."* The power of technology clusters, David Cleevely CBE, Policy Network, 2014
Inter American Development Bank	*"These linkages make possible the transfer of essential tacit components of knowledge that require interpersonal relationships, help to build trust, and foster knowledge spillovers."* Impact Evaluation of Cluster Development Programmes, 2016



Four Cluster Elements	
1. Core Firms	Firms with the competitiveness to service customers from beyond the cluster's functional region, and thus attracting wealth into their home region.
2. Support Firms	**Material suppliers:** e.g. raw materials; component suppliers; packaging; machinery … **Service providers:** e.g. finance/angel investors/seed funding/VC; logistics; legal/IP; technology, design & marketing specialists; waste management; accountancy; recruitment agencies …
3. Soft Infrastructure Organisations **Knowledge & Social Infrastructure**	Public agencies, this can include national, state/provincial agencies and at the regional/local/municipal levels. Relevant agencies may include: Economic development; Industry; Education; Trade & Foreign Affairs; Investment Attraction; Science & Technology; Transport; Regional/Rural Development. Regulatory & standard setting agencies. **Academia:** Universities, other tertiary institutions, technical & vocational training, high schools. Research institutions, laboratories, research hospitals, medical schools. **Institutions for collaboration** … neither government agencies nor private-for-profit firms … often connectors and collective action facilitators. Can include: Trade & professional associations; producer/grower associations; unions, labour groups; business, industry & cluster associations; chambers of commerce; entrepreneurs' networks; business development service (BDS) providers.

	Cluster-specific common user facilities; co-working spaces; incubators; science parks; technology transfer networks; think tanks. **Donors, NGOs:** Multilateral and national development agencies, NGOs and philanthropic organisations may also be relevant.
4. Hard (Physical) Infrastructure	Industry parks and incubators, when the focus is on real estate. Industrial land for development. Roads, ports, airports; communication links, bandwidth. Fresh water; waste treatment.

Canada	*"While the actors and elements that make up a cluster ecosystem are the same, their interactions are unique."* Clusters in Ontario, Institute for Competitiveness & Prosperity 2016

Contrasting *Stagnating* & Dynamic Clusters

While there is no 'typical' or 'average' cluster, the table below contrasts elements in many *stagnating*, weak (though possibly embryonic) clusters and more dynamic, innovative clusters.

Stagnating and Dynamic Clusters		
	Stagnating clusters	***Dynamic clusters***
1. Core Firms	*Relatively few in number, shallow competencies.* *Few interactions, clumps of stand alone firms, vertically integrated.* *Dependency on a few anchor firms & branch plants, gatekeepers to global networks.* *Footloose anchor firms with a propensity to migrate.* *Limited differentiation; competition centred on price.* *Many inputs sourced from afar.*	Many firms, highly specialised, well connected to international markets, to global value chains. Meeting the needs of sophisticated, demanding customers. Strong rivalry based on differentiation. Flexible specialisation, interlocking. Many start-ups … and a number of departures … high churn rate. Contracting out what can be done better, cheaper. Businesses reinvesting within the region.
2. Support Firms	*Lack of sophisticated suppliers, so many specialised inputs imported.* *Few in number, generic competencies.* *Ad hoc, remote, at times dysfunctional relationships with core firms.*	Many firms, highly specialised. Close and open interaction with core firms, co-producing & co-designing. Responding to sophisticated, leading-edge demands. Savvy accounting, legal and recruitment firms that also act as tacit information conduits. Specialised local suppliers with new competencies, even new clusters, emerging.
3. Soft (Knowledge) Infrastructure	*Basic needs covered.* *Weak presence of supporting organisations & institutions for collaboration, remote from the core and support firms.* *Universities, vocational training and high schools detached.* *Industry associations, when present, with an external lobby focus.* *A clutter of public agencies and support organisations, each with individual agendas, little coordination.*	Advanced training and R&D infrastructure, leading edge research. Well-connected institutional support, aligned economic infrastructure responding to private sector signals. Well-embedded centres of academic excellence (university, public R&D), developing and bringing in specific knowledge that relates to firm absorption capacity. Inflow of students, skilled migrants, new knowledge. Well-structured institutions for collaboration.

4. Hard (Physical) Infrastructure	*Multi purpose, multi-sectoral industry parks and incubators.* *Not aligned with specialised business needs.*	Specialised, dedicated physical infrastructure, e.g. freight logistics, bandwidth. Cluster-specific technology parks & incubators. Availability of tailored-to-suit, move-on premises. Shared common user facilities.

***Stagnating* Clusters: Multiple Imperfections**	
United Nations Industrial Development Organisation	*"Firms within stagnating clusters face severe bottlenecks. They operate out-dated, often environmentally hazardous technology. Shortages in infrastructure and basic services limit their ability to improve product quality and capture emerging market opportunities. The labour force is poorly skilled and entrepreneurs lack access to credit and other services to expand business operations.* *A business culture skewed against dialogue and cooperation prevents firms from specializing in complementary production processes, thus production remains limited to a narrow range of goods or services. Firms' efficiency and productivity are low, as they are unable to draw on new sources of technology and information.* *At the same time, the institutional environment is unresponsive to the needs of the cluster or unable to provide customized services and assistance. As a result, firms are locked into a path of cutthroat competition based on cutting costs and disregarding environmental and labour standards."* Development of Clusters and Networks of SMEs

Contrasting Cultures	
Stagnating clusters	**Dynamic clusters**
Firms and support organisations are geographically close, but not socially close. *Lack of personal networks.* *Low trust environment.* *Opportunistic behaviours, free riders, market spoilers.* *Gaps between the local actors.* *Not well connected with soft infrastructure.* *Isolation.* *Looking backwards.* *Rigid.* *Paralysis-by-analysis.* *Little investment in new product development, new technologies, training.* *Disregard of worker's welfare.* *Extractive institutions.* ***Based in the region.***	High trust, open innovation environment, outward orientated. Shared norms, common language. Dense inter-firm relations, multiplicity of personal connections, interactions, reciprocity … favouring social capital development and reducing experimentation risks. Many strong ties, and even more weak ties. Places for chance encounters, informal conversations. Information spillovers, circulation of tacit knowledge. A co-opetition culture … simultaneous competition & collaboration between firms. Core/anchor firms acting as a magnet, attracting allies, rivals and specialised support firms. Continual spawning of new firms. Vigorous entrepreneurship, breakaways from academia and anchor firms; talent, student & FDI inflows. Reinvestment within the cluster. Continual adjusting, experimentation. Reshuffling of resources (people, technologies, capital) with new combinations emerging. Inclusive institutions, institutions for collaboration in place, including a self-help cluster organisation. Dynamic systems, at times chaotic. Firm strategy continually evolving. Looking forwards. Learning-by-doing. **Part of the region.**

The links between firms are both vertical (e.g. through buying and selling chains), and horizontal (e.g. through complementary products and services, the use of similar specialised inputs, technologies or institutions, and other linkages). Most of these linkages involve social relationships.

Professor Michael E. Porter	*"The social glue that binds clusters together also facilitates access to important resources and information. Tapping into the competitively valuable assets within a cluster requires personal relationships, face-to-face contact, a sense of common interest, and "insider" status.* *The mere colocation of companies, suppliers, and institutions creates the potential for economic value; it does not necessarily ensure its realization."* Clusters and the New Economics of Competition, HBR, 1998
Dr. Stuart Rosenfeld	*"Social capital often proves to be the difference in competitiveness of clusters that are 'Overachievers' and those which are 'Underachievers', clusters which exist but lack synergy."* RTS Inc., The Social Imperatives of Clusters

Dynamic Clusters, Other Commonalities	
Interrelated, but not of equal importance to all clusters	
Entrepreneurship	Start-ups supported by serial entrepreneurs, with business and academic (star scientist) spin-offs. Start-ups benefiting from close interaction with suppliers and buyers; the cost of failure lowered as alternative opportunities exist. Dynamic clusters have many small firms (speed boats) rather than just a few large firms (ocean liners). A banking structure with the flexibility to respond to specific SME needs.
Skilled labour	Labour market pooling. A deep talent pool with specialised and mobile labour. Attracting skilled migrants, especially knowledge workers.
Sophisticated local demand	Lead buyers present who pull technology development and innovation in close interaction with suppliers. Nature of the demand - the sophistication - more critical than the volume of demand.
Well coordinated soft infrastructure	Tight alignment amongst public agencies and other support organisations, based on a common understanding of the cluster's development priorities. For many clusters, particularly close ties between research, education and innovation. Not a *clutter* of uncoordinated support.
Knowledge base	The knowledge that is being locally generated is of direct relevance to the core and support firms; this knowledge is often needs driven. A key is the absolute level of excellence in research, the strong scientific base and an intellectual property regime that favours research commercialisation. A large pipeline in place between publically funded research and start up formation.
Diversity yet integration	Entrepreneurial discovery processes and on going adaption are supported by institutional diversity and integration. A diversity of cultures, a diversity of graduates from different disciplines and a diversity of knowledge coming e.g. from other strong regional clusters. Not a monoculture. Not silos.
Related clusters	Related strong clusters are in close proximity. Opportunities for recombining capabilities and knowledge.
Strong ties & weak ties	Strong ties build the social capital. Weak ties bring in fresh knowledge, insights … with other regional competencies, other clusters and related technology areas. Weak ties offer chance encounters with new customers, new suppliers, and new knowledge.
Local buzz and global pipelines	Well connected locally, a dynamic eco-system that undergoes continual change. Well connected globally, drawing in customers, investors, talent, new knowledge.

Sustained development	Dynamic clusters strengthened by participation and encouragement from civic leaders. Financial support extending beyond election cycles.
Speed	Capacity and flexibility to adjust rapidly.
Peer pressure	Pressure to innovate coming from constant comparisons with peers in close proximity.
Start-ups **Spin-offs**	Concentrated customer base. New suppliers developing, filling niches.
Scale	Increased opportunities for interaction and for specialisation.
Magnets	Attracting customers, skilled labour, capital, specialised FDI, public investments, returning scientists …

Professor Örjan Sölvell	*"The 'Hollywoods' of the world have increased their attraction of mobile resources – including talented people (students, researchers, entrepreneurs, inventors and other skilled people), technologies/patents, venture capital, portfolio investments, and, not the least, foreign direct investment from MNCs."*
USA	*"The root cause of success in startup ecosystems is 'network connectivity': the ability to bring disparate groups of people together to create collaborative communities of interest and learn from each other."* Innovation That Matters, How City Networks Drive City Entrepreneurship, US Chamber of Commerce, 2015
Canada	*"Clusters energize the economy because they foster the creation of new companies that support the cluster, attract and build talent, and draw suppliers and related industries to locate in the same area."* Clusters in Ontario, Institute for Competitiveness & Prosperity, 2016
Professor Michael E. Porter	*"Once a cluster begins to form, a self-reinforcing cycle promotes its growth, especially when local institutions are supportive and local competition is vigorous. As the cluster expands, so does its involvement with government and with public and private institutions."* Clusters and the New Economics of Competition, HBR, 1998
Ireland	*"Cluster advantages may arise through access to an appropriately skilled labour pool, local supplier linkages or local knowledge spillovers."* Do Clusters Matter for Innovation, Intertrade Ireland, 2015
Eric Weiner	*"Silicon Valley's most iconic symbol is not the iPhone or the microchip but the moving van."* The Geography of Genius, 2016

Dispensing some Myths

Clusters are not necessarily science or technology driven.

Tax incentives & subsidies do not play a decisive role in cluster development.

While a local university is an asset … especially a university that engages around the local clusters … it's not essential.

Science Parks & Incubators by themselves are of limited value in building dynamic clusters.

Solitary geniuses remain solitary. Unconnected.

Clusters are in rural as well as urban areas.

Clusters are in developing as well as developed economies.

Cluster Life Cycle Stages	
Emerging Clusters **Loose, chaotic**	Cluster emerging at the periphery of an existing cluster, or through chance events. Heroic entrepreneurs, pioneer firms sprouting, often recombining existing regional knowledge and/or drawing on new knowledge development from centres such as a university; intuitive exploration; uneven progress with false starts, then significant forward leaps; high risk; market uncertainty; new product/service development; evolving distribution channels; strong patent activity; limited firm interaction & linkages, more an agglomeration of firms, a *clump*. Active seed finance, business angels; venture capital firms following the entrepreneurs. A *clutter* of support organisations with only partial awareness of the emerging cluster.
Growing clusters **Refining position**	Cluster's competitive position becoming clearer; attracting skilled workers, diaspora; attracting private investments, venture capital; development of specialised support firms; opening new markets; applying new technologies; product innovation; filling of competency gaps; merger and acquisition activity. Increasing trust & interdependencies, interlocking firms, informal collaboration; formation of non-market relationships facilitating tacit information flows; co-specialisation. An economic scale that now attracts public support; self-organisation with collaborative engagements underway; institutions for collaboration, industry, cluster associations.
Maturing Clusters **Critical mass achieved**	Strong international reputation; well-understood competitive position; few and predictable risks with relatively small rewards; incremental and mainly in-house innovation. Profit pressures; consolidation, fewer & larger firms; innovation no longer at the forefront, fine tuning within the current knowledge base; data driven. Established networks & institutions for collaboration; sub-groups developing within the cluster.
Declining OR Transforming clusters	Declining demand & investment; firms shut down or exit for more favourable locations. At the extreme: museum stage (see below). New cluster(s) sprouting at the mature cluster's periphery; new growth can be crisis or new technology driven; renaissance; new products & processes; a new knowledge stage; firm diversity, a spin-off renaissance offering renewal & new growth potential for the region.

As the intensity of global competition develops further, clusters will fall (and rise) more rapidly.

Rigidity **Limited Renewal** **Competitive position eroded**	Fossilising, lock-in to old specialisations, old solutions, old technologies, declining markets, exhaustion of raw materials. Innovation & productivity improvements weakened by inflexibilities. Unable to respond as new centres emerge in other regions with lower cost structures, as radical technologies develop. Unable to develop new business practices. Development of cartels and mergers that reduce local rivalry. Workforce/union inflexibility. No institutional variety. Myopia, with the cluster's stakeholders remote from changing market conditions, evolving technologies, new competitors emerging. Reputation decline, no longer the Go-To place. Public agencies view investment attraction as the priority. Or the physical infrastructure, e.g. yet another 'Technology Park'.

Isolation within the cluster	Limited dialogue, little trust across the cluster. Predatory behaviours. Erosion of social capital. Businesses isolated from each other, few chance encounters. Solo actors. Rivalry centred on price, not differentiation. Privileged tacit information available only to the 'old boy's club'. Dysfunctional public support, not aligned around priority needs. Little engagement. Public agencies inside their silos, individually and remotely drip-feeding support to the cluster. Inertia aggravated by conflicting private sector signals. Universities and public R&D remote from the cluster's needs. Little knowledge of commercial relevance escaping. Or local firms do not absorb the knowledge that is developed. Isolation of the cluster's Triple Helix stakeholders. Inflexible. No deliberate action by the cluster's stakeholders to collaboratively engage … no common user facilities, no institutions for collaboration, no cluster organisation.
Isolation beyond the cluster	Not connected to other regional clusters, isolated from international knowledge hubs. The cluster views itself as a self-contained entity, and all other clusters as competitors. Poor connections with international customers. Collective myopia, unable to see how the future is changing, institutional sclerosis.
Static group of firms	On going dominance of a few, vertically integrated anchor firms with little regional outsourcing/subcontracting. Decrease in firm diversity. Start-ups not pushing the existing firms to innovate. Mergers and rationalisations. Few new companies being formed, halting in the spin-off process. Exit of MNCs and anchor firms to more favourable environments, especially during a crisis. Inability to attract fresh talent.
Congestion effects	Higher cost of land, skills outweighing agglomeration benefits. Transport inefficiencies.
Change avoidance	Comfortable in maintaining the status quo rather than going through the pain of change. No urgency. Failure to adjust to external shocks. Successful lobbying protects the status quo.

Ruhr, Germany	*"The crucial lesson from history is that over time, inward-facing clusters tend to ossify. As the economic geographer Gernot Grabher observed in the context of the demise of the Ruhr's steel industry, the 'ties that bind' - the lifeblood of genuine clusters - can insidiously also become 'ties that blind' as the cluster fails to adapt, innovate and ultimately survive."* SQW, Cambridge, UK; Accelerating Local Economic Growth-Clusters and Deals, 2014
Atlanta, USA	*"Unless a local high-technology industry develops rich multiple, locally centred social networks, which embed companies in the region, cluster development will stagnate."* Reflections on Atlanta's technology cluster, Dan Breznitz and Mollie Taylor, Entrepreneurship & Regional Development, 2014

CHAPTER 1.3

CLUSTER DEVELOPMENT: THE LOGIC

Before moving into the practicalities of cluster development, this chapter steps back to explore alternative approaches to economic development.

One approach, cluster development, is presented as a centre-stage strategy.

President Obama

"This cluster concept is so important. We're all familiar with clusters like Silicon Valley. When you get a group of people together and industries together and institutions like universities together around particular industries, then the synergies that develop from all those different facets coming together can make the whole greater than the sum of its parts."
Winning the Future Forum on Small Business, Cleveland State University, 2011

INVITED FOREWORDS

ALISON DALZIEL

Alison Dalziel, Director, Localise, Perth, Australia

It is often in times of painful economic adjustment that communities start asking what can we do to improve our prospects? How can we accelerate economic growth? For example, in Western Australia at the time of writing, the economy is adjusting to the end of the resources investment boom. This has created significant spare capacity in the economy for the first time in over a decade. Economic development is high on the radar screen. There is impetus to act, but where should the effort go?

In all the years I have been working in economic development, I have seen many worthy plans and many agencies working diligently to improve local conditions. These efforts are not to be dismissed. Small businesses get easier access to advice, transport infrastructure is improved, entrepreneurs receive better support, more research gets commercialised, regulations are easier to navigate and so on – but these incremental gains often belie the true potential of the local economy. As we see in this chapter, business-led growth in areas of deep specialisation in the traded economy is an effective way to bring more wealth into the locality. When communities ask how they can accelerate economic growth, like Western Australian communities are right now, this is the place to start.

DR. DAVID WILSON

CEO, Economic Development, Northland Inc., New Zealand

Chair, Economic Development Agencies of New Zealand

The notion of clusters as a development tool or pathway is not new. However there is an increasing understanding in regional development literature on the importance of firm and cluster connectivity alongside a need to think beyond traditional notions of (resource-based) comparative advantages and (firm/industry based) competitive advantages. This broadly takes the form of collaborative advantages. Put another way, those regions that have the strategies, mechanisms and institutions in place to support innovation and collaboration have a greater chance of unlocking their endogenous potential.

New business models, economic integration and global value chains do not undermine this logic, in fact the reverse is true. Clusters are simply a strategy to realise endogenous potential in global markets.

DR. EMILY WISE

Researcher and Innovation & Public Policy Consultant, Lund University, Sweden

In an increasingly dynamic and competitive global context, policymakers are challenged to define strategies that will successfully guide their geography along the path of sustainable long-term development – encompassing economic, environmental and social aspects. Instead of focusing solely on approaches to deliver boosts in productivity and growth, policymakers are focused on leveraging unique local strengths and collaborative efforts across stakeholder groups to address challenges and act on opportunities. These approaches to development often build on cluster initiatives (and other structures for collective action). This chapter presents a number of shifts in business environment and public policy, and motivates a "centre-stage" position for the cluster development approach.

Economic development strategies

An extensive range of economic development strategies can be seen around the world. This is not unsurprising, with different environments, histories and public funding approaches. There are also differing understandings as to what a 'good' local economy looks like and therefore different building blocks in place. The economic development interventions that I have seen around the world come under many headings, from A – Z (well, almost):

A smorgasbord of economic development strategies	
Accelerators	Liveability
Agglomeration policies	Logistics, freight services
Anchor firms & institutions	Marketing the region, branding
Business advisory services	Networking events
Business-friendly environment	Migrant attraction
Buy local campaigns	Place-making initiatives
Competitiveness enhancement	Platform technologies
Cluster development	Procurement policies
Common user facilities	Public utilities, bandwidth
Co-working spaces	Research & innovation hubs
Diaspora engagement	Retention, expansion of existing businesses
Diversification	Revitalisation of town centres
Economic gardening	Seed funding, venture capital
Entrepreneurship development	Sister cities
Events management	Smart specialisations
Export development	SME support
Gender equity	Subsidies, R&D support, tax breaks, grants, loans, cheap land
General framework conditions	Supply chain development
Incubators	Sustainable / inclusive growth
Industry parks	Talent attraction
Infrastructure improvements	Technology centres
Investment attraction, site selection services	University – business links
Innovation ecosystems	Workforce development, skills
Innovation networks	Youth transitions …
Leakage minimisation	

This list can certainly be extended further. It contains some duplication and repetition … for example 'cluster development' is at times described as 'innovation ecosystems'.

As strategy is about focussing, where can a difference really be made? Where might limited public resources be concentrated? A starting point is in reviewing the major shifts that are underway in the business environment and then responses to those shifts.

Big Shifts in the Business Environment	
From	**To**
Stable environments	Turbulent environments
Transactions	Relationships, Partnerships
Vertical integration	Core competency, Specialisation
Cost of Labour; Physical infrastructure	Knowledge spill overs
Capital, bank borrowing	Seed funding, VC
Availability of R&D Labs	Reduced transaction costs
Technology focus	IPOs, Serial start-ups
Incremental innovation	Disruptive innovation
Supply chain development	Innovation networks
Codified knowledge	Tacit knowledge

Drawing on: P.Cooke and J.Hagel/J.Seeley Brown

"… the shift from large, vertically integrated corporations to networks and clusters of smaller interdependent, knowledge based production units - 'micromultinationals' – with increasingly specialised functions in global markets and value chains."

Dean Roy Green, University of Technology Sydney

Shifts in Public Policy

In many countries, in particular across Europe, these major shifts in the business environment are leading to significant changes in the delivery of economic development support.

Economic Development Approaches	
Shifts in Public Support	
From national & macro	**To regional & micro**
Centralised industrial policy approach, targeting high growth markets, new technologies. National compensation for economic disparities. Implementation by remote national agencies, centred on political regions.	Regions identifying, leveraging their assets. Decentralisation, with the capacity to coordinate around regional priorities and niches, to fine tune delivery. Regions becoming the essential unit for addressing competitiveness. Regions assuming roles that were the province of national/state governments. Functional regions, a place-based approach.
Implementation 'in regions'	**Implementation 'for regions'.**

From	To
From immediate job creation Driven by short-term & isolated project grants and subsidies, often one-offs.	**To longer-term business development** Profitability, innovation, competitiveness & productivity focus. Support extending beyond political cycles.
From a 'Low Road' route Businesses lowering production costs; price pressure on suppliers, wage pressure on staff; lobbying for less stringent environmental and social regulations. Pressure of special interest groups.	**To a 'High Road' route** Businesses enhancing value of products and services through investments in innovation, relationships, skills, new machinery & adoption of more stringent quality standards. Avoiding capture and rent seeking
From one or two ocean liners From subsidies, grants & loans for large firms and for FDI attraction … with the danger of intervening in competition. From chasing smokestacks & economic hunting. From *clumps* of isolated firms.	**To a thousand small speedboats** Engaging less directly through addressing broader conditions underpinning groups of firms, especially SMEs. Establishing shared assets, collaborative agendas. Regional networks of linked firms … linked horizontally with firms at the same level of the value chain, and vertically, with buyers and input providers, often through value chains.
From exogenous growth driven primarily by external factors, esp. investment attraction. Reactive, ad-hoc prospecting.	**To endogenous growth,** capability driven by local/ internal factors, from within. More sustainable growth, path dependent. Concentrating on a few priorities.
From picking winners … by public agencies & politicians.	**To backing leaders …** groups of business leaders with successful entrepreneurial achievements.
From financial inducements Resourcing investment attraction through tax breaks, subsidies and soft loans.	**To knowledge ecosystems** Resourcing workforce training, research institutions, institutions for collaboration … building the regional ecosystem.
From isolated interventions Ad hoc support drip-fed by a multiplicity of agencies. From agency *clutter*	**To multi-agency integration** Joined-up support within a region of relevant policy areas, tighter alignment of multi-level agencies. Place-based approach addressing the regional context. Breaking silos, spanning boundaries. Linking urban and rural communities. Joint approaches to common problems, e.g. Grand Challenges. Linking related competencies & specialisations within the region, also nationally and globally.
From an *'Old Boy's Club'* From decision making by a few.	**To the *'The Wisdom of the Crowd'*** Informed decision making on regional priorities (choices) centred on entrepreneurial discovery. Integrating fragmented knowledge. Transparent, community wide (triple helix), with grassroots involvement by implementers in the decision-making.
From supply driven Traditional supplier/agency led support. Replicating other regions, the 'next Silicon Valley'.	**To demand driven** To needs-driven priorities. To triple helix collaboration with public agencies as a partner.

From hard infrastructure	To soft infrastructure
Emphasis on the physical infrastructure … precincts, science parks, incubators, export zones, free trade zones, development corridors … all near examples of clustering.	The longer term, more complex soft (knowledge) infrastructure And … the most difficult … the social infrastructure, connecting the regional actors into an ecosystem.
From subsidising ambulance cases The mature/declining activities, often politically well connected. From subsidies to struggling firms.	**To accelerating the strong** Building on regional strengths. Addressing opportunities. Engagement with the mature and the embryonic clusters.
From industry/sector approach Narrow engagement.	**To cluster engagement,** broader (and less distortive), linking related industries.
From Top-down generic support e.g. exporting, investment attraction, sister city engagements … all relatively easy … and offering marginal returns.	**To Bottom-up tailored support** Concentrating public resources on distinctive regional strengths, knowledge bases … the traded clusters. Differentiating the region's economic development strategy from other regions. *When well executed, this approach is the foundation of a dynamic regional economy.*

Many influencers and economic development agencies – multilateral, national & regional – are responding to these shifts:

Public Policy Changes	
A global perspective	
USA	*"Leaders in new approaches to economic development focus on strengthening assets that enable their distinctive industries to flourish and grow from within, rather than rely primarily on marketing to recruit individual firms from elsewhere."* Remaking Economic Development, Amy Liu, Brookings Institution, 2016
UK	*"Central government is not best placed to determine skills needs across different parts of the country as local nuances are missed."* Manifesto for Local Economies, Centre for Local Economic Strategies, 2015
UK	*"Enterprise clusters and networks are recognised as important settings for the development and growth of SMEs because they help improve productivity, increase innovation capability, facilitate the commercialisation of innovation and generate high employment. At a higher level, clusters and networks enhance the economic as well as the social growth of the region or nation hosting them". "Research suggests that clusters of firms and skilled workers may be one of the key drivers of economic growth."* Department of Industry
Professor David A. Wolfe	*"It implies the devolution of power from remote bureaucratic ministries at the national level to local and regional levels of government, which are better positioned to build lasting, interactive relations with local and regional firms and business associations."* New Forms of Governance in Economic Development, University of Toronto
Hausmann and Rodrik	*"The idea that the government can disengage from specific policies and just focus on general framework conditions in a sector neutral way is an illusion based on the disregard for the specificity and complexity of the requisite publicly provided inputs and capabilities."* 2006
UNIDO	*"Support programmes targeting groups of enterprises are more cost-efficient and cost-effective than those targeting individual enterprises."*

Asian Development Bank	*"In cities such as Bangalore, Shenzhen, or Singapore, the focus of economic development has shifted from investing in physical infrastructure to promoting competitiveness of industry clusters, high level skills, and reducing business transaction costs."* Competitive Cities in the 21st Century, Cluster-Based Local Economic Development, Choe, K., and Roberts, B., 2011
The Nordic Analysis	*"Entrepreneurs thrive at city-level, often in neighbourhood clusters within cities, and it's these rather than countries that are the relevant entities when it comes to optimising for innovation and start-up activity"* City Initiatives for Technology, Innovation & Entrepreneurship, 2015 www.citie.org
Canada	*"Government intervention to facilitate economic growth has oscillated between subsidizing businesses and attempting to replicate other regions' clusters. Although both initiatives intend to attract larger firms and increase competitiveness; their ineffectiveness has garnered criticism. As such, provincial and federal governments are taking a new approach by establishing a cluster policy."* Clusters in Ontario, Institute for Competitiveness & Prosperity, 2016
Dr. Christian Ketels & Olga Memedovic	*"The attractiveness of the cluster concept stems to a significant degree from the frustration with traditional approaches: a focus on stable macroeconomic policies and open markets is seen as not sufficient by many policy makers, and interventionist industrial and innovation policies also have a poor track record. Cluster-based policies are different from these two approaches."* From clusters to cluster-based economic development, International Journal of Technological Learning, Innovation and Development, 2008
Inter-American Development Bank	*"With the objective of higher productivity, more and better jobs, and sustainable development, governments in most countries are increasingly developing and implementing programs to support clusters."* Impact Evaluation of Cluster Development Programmes, 2016
European Commission	*"Clusters are powerful engines of economic development and drivers of innovation in the European Union. They provide a fertile business environment for companies, especially SMEs, to collaborate with research institutions, suppliers, customers and competitors located in the same geographical area."* Enterprise and Industry
Australia	*"Clusters and other eco-systems which promote collaboration, knowledge sharing and capability building are vital to the competitiveness and profitability of firms in modern developed economies. Clusters are also an antidote to the problems of scale experienced by small economies such as South Australia."* Professor Göran Roos, South Australia Government Briefing, 2012
World Bank On China	*"The Special Economic Zones and industrial clusters have made crucial contributions to China's economic success."* Douglas Zeng
World Bank On Africa	*"Africa … is generating pockets of economic vitality in the form of enterprise clusters. These clusters have enabled enterprises to access and develop capital, skills, technology and markets and to grow and compete by defusing knowledge and technological know-how. They tap into global knowledge and technology stocks and have encouraged product specialisation. These clusters have helped lift African families out of poverty."* Knowledge, Technology and Cluster-Based Growth in Africa, 2008
Asian Development Bank	*"Cluster-based development has become an increasingly attractive topic during the last decade in the field of business competitiveness."* City cluster development: Toward an urban-led development strategy for Asia, 2008
UNIDO	*"There is substantial evidence that clusters generate employment and incomes for the poor in the developing world."* Industrial Clusters and Poverty Reduction
Asian Development Bank	*"Successful cities increasingly foster growth in high value added industry clusters using skilled workers, advanced infrastructure and innovation."* Competitive Cities

UK	*"Much has been said in recent years about the importance of 'clusters' – complex, economically significant ecosystems in which people can meet, exchange ideas, develop innovations, and create business together."* Lord Sainsbury, Industrial revolutions: capturing the growth potential, CentreforCities/McKinsey, UK, 2014

Regional Economic Development Approaches

But not all economic development strategies are responding to these shifts. Six approaches that are particularly common in the USA are identified below. Just one of these approaches adequately addresses the shifts in the business environment.

Regional Economic Development	
Prevailing US Approaches	
Open for Business *Improving the general business environment*	Developing long lists of generic improvement areas. Attempting to match competing regions. Fails to reinforce existing specialisations. Limited impact on specialised 'export' firms.
Big Game Hunting *Competing aggressively for branch plants, for foreign investment*	Lowest bidder often wins, the 'Winner's Curse'. Costly, ineffective; can be low-value jobs. Footloose firms unlikely to embed in the region. Neglects & frustrates the existing business base.
Economic Gardening *Supporting second stage local firms*	Focus on growing existing companies, the 'gazelles'. Intensive, individually tailored support, e.g. strategy development, market data, web sites. Does not address firm isolation.
The Next Big Thing Picking winners, Entering new high tech, high growth industries	Many regions are chasing the same 'opportunities' … biotech, nano, greentech, creative, etc. Few regions have the assets in place to succeed. Danger of capture by interest groups. PR activity can camouflage limited progress.
Build It and They Will Come Investing in industry parks, incubators	Rarely offers a strong advantage v. other regions. Generic physical infrastructure does not offset lack of skills, other weaknesses, absence of related firms. Attracted firms mainly servicing the local market.
Cluster-based Economic Development Centred on the region's traded clusters	Addressing competitiveness, not job creation. Focus on local assets & capabilities, not weaknesses. Narrowly tailored strategies around each cluster. Co-development of strategies, not action lists for others. An effective coordination approach requiring limited resources. *But how to get it right?*

Drawing on: Prof Michael E Porter and Dr. Christian Ketels

Specialise, then Diversify

Many economic development strategies, particularly in Europe, place emphasis on developing *'smart specialisations'.* Others have diversification as a central focus … the development of a broader base of economic activities. These two directions are not in conflict.

Certainly, the over dominance of a single economic activity is risky in today's global environment. Over specialisation has the danger of new competitors emerging and of myopia, a regional lock-in with isolation from changing markets and technologies. Further, specialisation in one or two areas limits the opportunities by firms for the absorption of related knowledge from other regional activities.

On the other hand, a regional economy that is diverse and presenting a 'little bit of everything' to today's world is

unlikely to be internationally competitive with much of its offerings.

In practice, the limited public resources that are available to support economic development need to be focussed. If the options are narrowed to specialisation v. diversification, which brings the most promising results?

Let's first explore a third route … fostering an entrepreneurial environment that supports new business start-ups and growth, such as through mentoring high growth firms, and an angel support network. The more aggressive entrepreneurs will be seeking high growth opportunities and these are likely to come from servicing a wider market than the region itself. Such opportunities will tend to be found within the region's clusters where an array of supporting firms and a specialised soft infrastructure provides a particularly fertile environment for export growth.

Successful entrepreneurs, as they develop new products and services and explore new markets, will naturally be pushing out the boundaries of their firms and therefore the clusters. Through entrepreneurial discovery at the cluster's periphery, there will be a step-by-step emergence of new activities, leading to the diversification of the region's economic base.

Sustainable diversification particularly comes from building and extending a region's strengths, the clusters. It is less likely to come from a random scattering of activities. And this related diversification may well lead to the emergence of a new cluster, such as the historic textiles cluster in Saint-Etienne, France developing firstly medical textiles competencies and more recently a broadening out to become a medical technology cluster. Strong, innovative clusters have continual experimentation and adaptation on their periphery.

Specialisation therefore comes first. From that strength, sustainable diversification naturally develops … diversification within the specialisation.

United Nations Industrial Development Organisation	*"Sectoral specialization is also to be looked at in a dynamic and visionary way, as it can change over time when entrepreneurs are able to reinterpret traditional skills and crafts to move into new production activities such as a furniture-producing cluster evolving into an ecological housing hub or a local community shifting from artisanal fishing to a hub for sailing."* Cluster development for pro-poor growth: the UNIDO approach
Maryann Feldman & Sam Tavassoli	*"The creation of new industries is a process that has inherently geographic features. Something new is created out of prior knowledge."* Something New: Where do new industries come from? CITR Electronic Working Paper Series, 2014/2
French Clusters Guide	*"Clusters are powerful instruments to nurture 'emerging industries' in a region."* Dr. Reinhard Büscher, DG Enterprise and Industry, European Commission, 2012

Sectors, Value Chains and Smart Specialisations

These are three complementary frameworks for economic development. A cluster is broader than **'a sector'** or **'an industry'**. A furniture cluster may include saw millers and wood processors; plastic, glass and metal componentry firms; packaging suppliers; furniture designers; transport/logistic firms; export agencies and banks along with training institutions.

Value chains address the value creating flow from raw materials, production, commercialisation and ultimately delivery to end-users or consumers. Value chains are a component within a cluster; indeed clusters can comprise many, or parts of many, value chains. There may be strong competition amongst value chains within a cluster. Value chains increasingly span multiple regions; clusters are geographically centred. (Global value chains often draw on multiple clusters, each with their specialisation). Value chain analysis is a tool used in understanding a cluster's competitiveness. Value chain development is more transaction orientated with a closed membership. It can be a key strategy in upgrading a cluster's competitiveness. A value chain approach is typically linear; a cluster approach more systemic.

The European Union is placing strong emphasis on the development of **smart specialisations**. In order to receive EU Structural Funds for innovation related support, regions need to have a smart specialisation strategy in place. The rationale is on regions understanding their distinctive industry structures and knowledge bases, which may underpin a number of clusters. This approach encourages differentiation between regions that is based on regional assets, not the development of 'me-too' strategies. Smart specialisations position a region in specific global markets/niches and international value chains. There is a strong focus on cooperation beyond the region. Regional research and innovation strategies for smart specialisation **(RIS3)** are integrated, place-based transformative agendas that focus policy support and investments.

The European Union's Competitiveness Agenda	
Smart Specialisation Platform	*"All regions have a role to play in the knowledge economy, providing they can identify comparative advantages and potential and ambition for excellence in specific sectors or market niches."* European Union RIS3 Guide
Vienna Cluster Manifesto	*"Clusters are particularly important for implementing research and innovation strategies for smart specialisation, taking into account the different needs and priorities of the regions."* 2012
Smart Guide to Cluster Policy	*"Cluster policies and smart specialisation strategies have become central to the implementation of Europe's growth strategy."* EU Guidebook, 2016
Regional Policy for Smart Growth	*"Smart specialisation … encouraging all regions to invest in areas best suited to developing their comparative advantage. Clusters ... an important element in smart specialisation strategies."* Regional Policy for Smart Growth in Europe 2020, Directorate-General for Regional Policy, European Commission
Clusters & Smart Specialisations	*"Both cluster policies and Smart Specialisation Strategies are policy approaches with a place-based dimension, aiming at exploiting advantages of proximity to promote economic growth and competitiveness."* The role of clusters in smart specialisation strategies, European Commission, DG Research, 2013.

The Death of Distance?

Thanks to globalisation and the opening up of world markets, thanks to easier travel, to lower transport costs and Skype-type communications technology, the world has indeed become flatter. It is now relatively easy to trade on a global scale. In this environment, the notion of *'The Death of Distance'* has gained considerable traction, with many arguing that place is increasingly irrelevant in today's global economy.

But contrary to popular impression, **place is of increasing importance**, especially for knowledge intensive activities that are dependent on tacit information flows. Knowledge is sticky to a place. Related companies choose to co-locate.

Silicon Valley is not self-destructing with the communication technologies that it is developing, though certainly some lower value activities are moving out. The Valley's on-going competitive edge comes in part from the ease and frequency of face-to-face meetings, by design and by chance.

Thanks to globalisation and the death of distance, many regions have established reputations as the Go-To place on a global scale for a specific activity. For innovation, even more than for production, there is a tight geography. Globalisation and localisation are two sides of the same coin.

Professor Paul Krugman	*"You need a thousand rubber gaskets? That's the factory next door.* *You need a million screws? That factory is a block away.* *The point is that successful companies don't exist in isolation. Prosperity depends on the synergy between companies, on the cluster, not the individual entrepreneur."* New York Times, 26 January 2012
Professor AnnaLee Saxenian	*"Competitors consulted one another with a frequency unheard of in other areas of the country."* Regional Advantage: Culture and Competition in Silicon Valley and Route 128, Harvard University Press, 1994
Professor Richard Florida	*"In today's creative economy, the real source of economic growth comes from the clustering and concentration of talented and productive people."* Who's Your City, Random House, 2008

A Case Against Cluster Development

Some academics, and to a lesser extent economic development practitioners, have argued strongly against cluster development interventions[11]. 'Cluster development' is at times interpreted as attempts to create clusters, with valid concerns over such a naïve approach. There need to be seeds in place to which 'clustering fertiliser' is then applied. What is being created is the clustering initiative, not the cluster.

The dangers of over specialisation within a region are highlighted, along with the danger of public subsidies being used to artificially extend the life of a decaying cluster. The risks of politicians determining in isolation the clusters that merit public support, and then the cluster's development agenda, have been well highlighted.

These concerns can be addressed through careful management of the cluster development process. Indeed, the case against clusters has at times centred on the inadequacy of cluster development interventions, rather than a denial of the natural occurrence of clusters and their importance as an economic development focus.

A number of academic geographers are uncomfortable with the lack of precision as to what exactly constitutes a 'cluster'. There is a similar imprecision over what constitutes a 'city'. Cities come in all shapes and sizes, as do clusters. Cities can have blurred geographic boundaries, as do clusters. Unfortunately for academics, there is no single definition of a 'cluster' that covers all analytic needs.

USA	*"The thinking behind clusters is cursed with being vague, comprehensible, and basically true."* Making Sense of Clusters: Regional Competitiveness & Economic Development, Joseph Cortright, Brookings Institution, 2006

[11] One of the most cited papers is Martin & Sunley, Deconstructing clusters: chaotic concept or policy panacea?, Journal of Economic Geography, 2003 with the recommendation that economic development agencies should focus on improving the general business environment and not 'purchase the Porter brand'.

Why Cluster Development Matters

The logic for cluster development as a centre-stage approach centres on:

- Clear evidence that the foundations of a strong regional economy are its clusters.
- The positive links between clusters, productivity and competitiveness.
- Regional economies develop through their clusters.
- Clusters enable places to connect to the global economy.
- Clusters develop and attract public and private resources.
- Clusters foster interaction and collaboration amongst firms and provide a positive environment for start-ups.
- Clusters provide impetus and direction for innovative activities.
- The increasing efficiencies that come with co-location, in particular a specialised labour force.
- The opportunities for related (and sustainable) diversification, with new clusters emerging from existing ones.

Cluster Development: The Logic	
European Union	*"Economic activities that are located in clusters account for about 39% of European jobs and 55% of European wages."* Smart Guide to Cluster Policy, EU Guidebook, 2016[12]
USA	*"Clusters are the key organisational unit for understanding and improving the performance of regional economies. The foundations of a regional economy are its clusters, not a collection of unrelated firms. Cluster thinking matters because it orients economic development policy and practice towards groups of firms and away from individual firms. The cluster approach leads to little if any reliance on economic development subsidies and recruitment efforts aimed at individual firms."* Making Sense of Clusters: Regional Competitiveness and Economic Development, Joseph Cortright, Brookings Institution, 2006
Canada	*"Clusters are the manifestation of a thriving economy."* Clusters in Ontario, Institute for Competitiveness & Prosperity, 2016
UK	*"In terms of the future competitiveness of the UK economy, clusters matter greatly. They matter because they help to de-risk economic activity and they embed it, de facto, within a particular place."* Accelerating Local Economic Growth - Clusters and Deals, SQW, 2014
Professor Örjan Sölvell	*"Today, there is substantial evidence that suggests that innovation and economic growth is heavily geographically concentrated. Clusters provide an environment that is conducive to innovation and knowledge creation. Regions with strong cluster portfolios are innovative leaders, while regions with no clusters or isolated research facilities fall behind. Globalization has increased the benefits of strong clusters and raised the costs for regions which fail to develop some level of clustering."* Clusters - Balancing Evolutionary and Constructive Forces, The Cluster Red Book, 2008
Dr. Christian Ketels	*"Globalisation and the technological and economic changes it encompasses were expected to reduce the importance of local economic factors and therefore also the role of clusters. In fact, the dynamic seems to suggest the opposite and economic geography is now recognized as a critical factor to understand differences in economic growth and prosperity across countries and regions."* Expert Report to Sweden's Globalisation Council, 2009
European Secretariat for Cluster Analysis	*"Strong clusters can promote economic growth through leveraging the innovation and business potential of a region. New employment opportunities, new products and services, new companies, new R&D activities and new patents can be the result of activities within a cluster."* www.cluster-analysis.org
Sweden	*"Geographical proximity between actors brings competitive advantages in co-operation, learning, access to competence and expertise, business development and collaboration. Regions that realise this and have capacity for renewal can greatly enhance their competitive edge. However, this requires collaboration between companies, researchers, and the political/public sector."* VINNOVA, Sweden's National Innovation Agency
UNIDO	*"The cluster concept has gained prominence as an economic policy tool aimed to foster innovation and the growth of a competitive private sector in developing countries."* Cluster development for pro-poor growth: The UNIDO approach
Asian Development Bank	*"The benefits of these cluster activities include: Facilitating joint market assessments, marketing and brand building; Encouraging relationship building within the cluster, within the region, and in other locations; Promoting collaboration in research activities, product and process development; Aiding the spread of innovation and the adoption of innovative products, processes and practices; Supporting cluster expansion by attracting companies and supporting new business development; and Sponsoring education and training."* Competitive cities in the 21st century: Cluster-based local economic development, 2011

[12]The EU's 'Smart Guide to Cluster Policy' refers to: Ketels, C., S. Protsiv (2013), Clusters and the New Growth Path for Europe, WWWforEurope Working Paper, WIFO, Vienna and to Delgado M.,M. Porter, S. Stern (2014), Clusters, convergence, and economic performance, Research Policy.

Ethiopia	*"Cluster development programs have become increasingly widespread tools in fostering innovation and growth of a competitive private sector in developing countries, including Ethiopia. As part of the MSE Development Strategy of the Government of Ethiopia, industrial clusters are considered as the main tool for spurring income and employment growth among micro- and small-scale enterprises."* Government's Role in Cluster Development for MSEs, Lessons from Ethiopia, CM Institute, Norway, 2012
Africa	*"While the manufacturing base is considered weak in Africa, industrial clusters appear to provide pockets of vitality. Cluster-based micro and small enterprises are performing better than enterprises of the same size, in the same industries, and in the same cities, but outside the clusters. Joint actions by firms in the clusters, such as joint sales practices, help enterprises to penetrate distant markets."* Industrial Clusters and Micro and Small Enterprises in Africa, World Bank, 2011
Xavier Tinguely	*"It is now well established that innovation is the main engine of competitiveness and economic growth. Despite the widening of the geographical options offered by globalization, production and innovation still appear particularly concentrated in specific locations and clusters are the ultimate representation of this regionalization stream."* The New Geography of Innovation: Clusters, Competitiveness and Theory, Palgrave Macmillan, 2013

As a centre-stage approach, cluster development integrates many of the regional economic development activities identified at the beginning of this chapter. Cluster development provides a low-cost, holistic route to building regional economies. Developing a region's traded clusters has a direct flow on to the domestic side of the economy, increasing demand for local goods and services. This then flows through into job creation.

Dr. Christian Ketels	*"The lesson for economic development practitioners is that clusters can unleash a bigger potential if they are seen as an approach, not just a nifty tool. As an approach, they deliver best results if they cut across the traditional fields and tools of economic development, and helps to enhance their effectiveness. This way cluster-based economic development can affect many parts of the economy, and leverage many tools currently used by economic development agencies."* www.tci-network.org/news/902
European Union	*"To improve Europe's innovative capacity in particular, more resources for science and R&D will not be enough. The focus needs to shift to the microeconomic capacity of European regions: quality and specialisation of factor conditions, sophistication of demand, quality of firm strategies and entrepreneurship and presence and depth of clusters. These are the qualities of the business environment that enable the transformation of scientific knowledge into new products, services and competitive firms."* EU Clusters in the EU-10 New Member Countries, Europe Innova Cluster Mapping Report, Christian Ketels and Örjan Sölvell, 2005
French Clusters Guide	*"Clusters are a well-proven concept for economic development and strengthening the industrial base in a region. Clusters mobilise different competencies, foster cooperation and facilitate SME internationalisation. But most importantly clusters provide fertile grounds for innovation and continuous industrial change. Well functioning clusters are like resilient eco-systems."* Dr. Reinhard Büscher, DG Enterprise & Industry, 2012
USA	*"Clusters are the key organisational unit for understanding and improving the performance of regional economies. The foundations of a regional economy are its clusters, not a collection of unrelated firms. Cluster thinking matters because it orients economic development policy and practice towards groups of firms and away from individual firms. The cluster approach leads to little if any reliance on economic development subsidies and recruitment efforts aimed at individual firms."* Making Sense of Clusters: Regional Competitiveness and Economic Development, Joseph Cortright, Brookings Institution, 2006

World Bank	*"When designed carefully and implemented efficiently, cluster initiatives may well be one of the most effective tools in a broader context of policy reform and other private sector development initiatives. Industrial clusters can increase productivity and operational efficiency through linkages, spill overs and synergies across firms and associated institutions and through efficient access to public goods, better coordination and the diffusion of best practices."* Clusters for Competitiveness, A Practical Guide & Policy Implications for Developing Cluster Initiatives, 2009
UNIDO	*"Why Clusters? Clusters have gained increasing prominence in debates on economic development in recent years. Governments worldwide regard clusters as potential drivers of enterprise development and innovation. Cluster initiatives are also considered to be efficient policy instruments in that they allow for a concentration of resources and funding in targeted areas with a high growth and development potential that can spread beyond the target locations (spill over and multiplier effects)."* The UNIDO Approach to Cluster Development, 2013

Whilst clusters are a natural occurrence, the development of clusters does not need to be left to chance.

Professor AnnaLee Saxenian	*"Spatial clustering alone does not create mutually beneficial interdependencies. An industrial system may be geographically agglomerated and yet have limited capacity for adaptation."* Regional Advantage: Culture and Competition in Silicon Valley and Route 128, Harvard University Press, 1994
EU Cluster Manager of the Year, 2014	*"I have had the pleasure of interacting and visiting many locations around the world. Places that claim to have an active cluster in operation. However on inspection, I often found a collection of manufacturing plants, companies or researchers who rarely work together on any topic at all … locations where industry for historic reasons or due to financial incentives happened to have assembled. These are not clusters, they are industrial parks or industrial regions."* Dr Stan Higgins, CEO, North East of England Process Industry Cluster, UK

The impact of clusters can be enhanced through deliberate interventions … cluster development initiatives. This Handbook now moves on to address the practicalities of cluster development, the How?

> *"The mere colocation of companies, suppliers and institutions creates the potential for economic value, it does not necessarily ensure its realisation."* Clusters and the New Economics of Competition, HBR, 1998
>
> **Professor Michael E. Porter**

CHAPTER 2

CLUSTER DEVELOPMENT BY DESIGN

While clusters start naturally, the development of clusters does not need to be left to chance.

This chapter introduces cluster development as a deliberate intervention to upgrade competitiveness.

Aspects in the design of cluster development initiatives are identified.

INVITED FOREWORDS

LARS CHRISTENSEN

Director Regional Development & Growth, Region Värmland, Sweden

Having been involved in cluster development activities for over a decade, it is a pleasure reading a condensed material that identifies and explains the basics of a successful cluster organization. At the same time as objectives are reached, concrete results are achieved and the spirit of the cluster's stakeholders and financers are kept up.

As in any other successful organization, running a cluster is all about process, facilitation and the art of balancing vested interests among all stakeholders. It doesn't come easy and there are no short cuts, but based on our experience in Sweden, we have learned that there is one aggregated factor that every successful cluster organization needs to handle – the ability to build trust among all stakeholders. Reading this chapter you will definitely get a better understanding of what it takes to build that much needed trust.

DR. GERD MEIER ZU KÖCKER

Director General, Agency Competence Cluster Germany,

VDI/VDE Innovation + Technik GmbH, Berlin

Nowadays, cluster organisations, as well as cluster management excellence, are high on the agenda of cluster policy makers, practitioners and researchers. When looking at the cluster support schemes worldwide, resourcing and supporting cluster organisations have become more and more relevant.

Cluster organisations play a crucial role at any time of a cluster's life, from the point at which a cluster emerges through to maturity. Of course, the tasks and objectives change considerably over time, but cluster organisation excellence remains one of the key success factors for a good cluster development.

When having a closer look at successful cluster initiatives, cluster organisations have turned into highly professional entities, comparable to innovation service providers. In addition, successful cluster initiatives have been able to set up dedicated business models that allow them to operate in a sustainable way. Thus, it is no surprise that organisational excellence is now receiving significant emphasis in cluster policy issues, the same as cluster business models and cluster dynamics. The following chapter deals with this important issue and introduces the role, tasks and success indicators of cluster organisations.

PROFESSOR ÖRJAN SÖLVELL

Stockholm School of Economics

The essence of cluster initiatives is to build bridges across actors on the cluster stage, to enhance coordination and cooperation, which in the end will support innovation and long-run competitiveness.

Cluster Development: Upgrading Competitiveness

A cluster development process is not being introduced to maintain *'business as usual'.* It is not about preserving the status quo. It is a deliberate intervention to catalyse change:

- Upgrading the competitiveness of the cluster's firms and significantly improving export earnings.
- Addressing the *clumps*, removing the isolation of the cluster's co-located firms.
- Addressing the support *clutter*, securing the active participation of publically funded agencies and building alignment around common agendas.
- Facilitating collective action to address opportunities and roadblocks.

As such, cluster development is deliberately disturbing the status quo.

Stagnating v. Dynamic Clustering Initiatives

In **Chapter 1.2, Clusters on the Inside**, differences between stagnating and dynamic clusters were identified.

To introduce the cluster development process to come, differences between stagnating and dynamic clustering initiatives are identified in this chapter.

Stagnating **Clustering Initiatives**
• *Ill-conceived engagement on 'wannabe' clusters. Engagement with too broad a scope, e.g. 'advanced manufacturing'. Political boundaries artificially limiting the cluster's functional region.*
• *A prolonged cluster identification process exhausting public agency funding (and business interest). Followed by all-embracing cluster analysis.*
• *Uninterested politicians.*
• *Resourcing short-term for the cluster's long-term agenda. Limited time for trust to develop and to establish on going working relationships, guaranteeing frustration and disappointment.*
• *Little trust. Inability of the cluster's diverse stakeholders to agree on direction. Priorities driven by funder's requirements and outsiders rather than the needs of the cluster.*
• *Strategy is frozen in time.*
• *A series of short term, ad-hoc projects supported by a range of public agencies, each with their own agendas and perspectives on the cluster.*
• *Forward agendas limited to just one or two projects. Internationalisation not included.*
• *A cluster Board that is not driven by business, not moving at the speed of business. A small clique locked in to history. Or a Board confined to an advisory role.*
• *Desk-bound, reactive cluster managers. Analysts rather than born networkers.*
• *Management team driving all the development activities, not empowering others.*
• *Clustering initiative is unable to substantially influence the agenda's of support organisations.*
• *Fail to move beyond talkfests, strategy workshops, yet further analysis, and lobbying.*
• *Fail to survive political changes.*
• *Tolerate no project failures.*
• *The clustering initiative's PR trumpet is muzzled.*
• *Evaluation restricted to hard data, e.g. job creation.*
• *The cluster's stakeholders share negatives.*
• *Change makers viewed as problem creators.*

Dynamic Clustering Initiatives	
Common Characteristics	
Driving change	Deliberately disturbing the status quo. A change catalyst, removing isolation, building bridges. Moving support organisations from supply to demand driven, no longer second guessing business needs. Building a co-opetition culture amongst the cluster's firms. Identifying opportunities for collaboration, some cluster-wide, others more focussed.
Emphasis on business results	End point: successful firms. Clustering initiative with a noticeable impact on businesses, a portfolio of projects. Avoiding 'lowest common denominator' projects that have minimal impact.
Cluster governance	Visible triple helix commitment: business + academia + public agencies, with business in the lead. Active engagement on the Board, and beyond the Board.
Cluster management **Garnering influence through performance**	Cluster management that is relationship building. Building bridges and then increasing traffic over the bridges. An emphasis on coordination failures. Extensive personal connections with, and strong knowledge of, the key firms and support organisations. Building trust, increasing chance interactions, accelerating the tacit information flows. There is urgency. Able through performance to earn the respect & confidence of the cluster's stakeholders. Agile to changing circumstances. Establishing a sense of belonging and common identity. Avoiding marginal activities, meetings with limited benefits. Emphasis on the cluster's hot spots. Not competing with industry associations; not replacing commercial services. Clarity over which services are provided by the clustering organisation for free, and which carry a charge.
Fighting inertia **Breaking rules**	Fighting the fear of change … standing still is the riskiest strategy of all. A commitment to action. Avoiding the inertia of an old boy's club. As a change agent, accepting that the cluster organisation will bruise some of the cluster's stakeholders. And will itself be bruised. Cluster development is not a sport with well-defined rules and referees. It is more an art. So when fighting … break the rules.
Pipeline of projects underway	Projects are the clustering initiative's engine room. Project portfolio with a range of pay-offs, differing resource requirements and delivery dates; some higher risk than others. Learning by doing. Some projects cluster-wide, others focusing on the cluster's 'hot spots', others commercial collaborations. Addressing common bottlenecks and common opportunities. Internationalisation is firmly on the agenda. Acceptance that some projects will fail. Projects generating a steady stream of PR activity.

Experimenting **Exploring at the edges** **Diving with the deviants**	Strategic renewal demands a variety of ideas and options. Applauding and exploiting diversity, accepting that diversity speeds up learning and is a pre-requisite for long-term cluster viability. Scanning wide, continually exploring new solutions, opening new frontiers. Responding to the pioneers at the cluster's edge … the positive deviants within the cluster, the next generation, the juniors who are on the front line in engaging with customers and supplier and have little to lose by challenging and questioning … those pushing out new boundaries, exploring new technologies, testing new markets, new products and new services; new combinations. Dissenting views are explored, multiple options generated and then tested through low-cost experimentation. New agendas backed by passion are tested, not extensively debated. Comfortable with a chaordic development process … chaos opening up new perspectives & agendas followed by order for delivery. New projects bringing different groups of stakeholders together.
Open, participative process **Transparent** **Flexible**	Only a participatory process can build wholehearted commitment to proactively change. A voluntary network cannot be managed from above, and as the pace of change accelerates it is increasingly difficult for any small group of seniors within the cluster to chart its path. Clustering process strengthened by addressing inherent tensions: **Diversity** **Conformance** **Divergence** **Consensus** **Disagreement** **Cohesion** The clustering initiative moves on from 'one best strategy' developed through top-down analyses to opening up the clustering initiative to multiple decision points. Strategy development then becoming an emerging process, with power flowing to those adding value. Common understanding of the cluster's development priorities. Priorities transparently identified. Setting direction is shared. Funders participating in the developing the forward agenda, but not determining it.
Neutral catalyst **Newcomers welcomed**	Neutrality carefully maintained. Not favouring a few within the cluster. Narrow interest groups unable to capture the initiative. Senior stakeholders within the cluster unable to automatically garner public funding for their favourite projects. Entry of new actors to the initiative is not blocked.
High profile **Loud trumpet**	The initiative gives voice, identity and credibility to firms, both large and small. High profile within the region (with businesses, banks, school leavers…) and beyond (with customers, investors, national agencies, related clusters…) As a change agent, not whispering but loudly blowing the cluster's trumpet. Garnering attention. Ensuring that activity substance underpins the promotional sizzle.
Sustainable **Long-term resourcing**	At the start of a clustering initiative, resourcing in place for three years as a minimum, ideally for five + years. Opening the dialogue, building trust takes time. Public seed money playing a lead role in the first phase so the management team can focus on generating benefits rather than raising funds. A diversity of funding sources, so not beholden to any one funder. In later stages membership fees and industry contributions to cluster projects becoming increasingly important.

	Adequately (not generously) resourced, pushing the cluster organisation to lever resources through engaging with partners. Some services provided for an annual membership fee, e.g. networking functions, access to information, participation in project teams. Others on a user-pays basis, e.g. access to training, visiting buyers; trade fair and trade mission participation; company visibility on cluster web site. Not an over reliance on a few key firms or key people; no risk of volunteer burnout. Teamwork and resilience in place to lever a crisis into behaviour change breakers, e.g. a downturn in demand, exposure through a technology, the exit of an anchor firm, political changes. Organisational stability within the Board and with the cluster management team.
Small & flexible **Multiple responses**	As opportunities come and go at speed, the initiative intercepts quickly and reconfigures capabilities, infrastructure and resources. To be flexible, cluster development is organised into small units with fluid, project-based structures that self-destruct on task completion … a disaggregated structure. Demonstrating success through small pilots.
Cluster Ignition Team in place **Broad participation**	Addressing one of the most complex aspects of cluster development, a Cluster Ignition Team is established at the start of the clustering initiative, bringing together representatives from relevant public agencies and support institutions (and NGOs). This Team initiates the cluster's analysis and development process, establishes the cluster's initial governance board and supports a portfolio of development projects. Subsequently becoming the cluster's long-term Technical Support Team.
Acting as a venture capitalist **Learning-by-doing**	As with a venture capitalist, a successful clustering initiative: 1. Establishes a broad portfolio of projects, accepting that there will be failures. 2. Never satisfied with the status quo, alert to new markets, emerging technologies, to new members. 3. Culture is one of learning-by-doing, with a tight feedback loop. 4. Focus is on addressing opportunities, not addressing problems.
Empowering the cluster's talent **A Coalition of the Willing** **Broad engagement**	Seeking and empowering the talent within the cluster, the cluster's scarcest resource. Like-minded individuals encouraged to converge around worthy projects, their passions, engaging on their cluster's development. These are the people who don't need formal authority to mobilise others or to lead task forces … the Cluster Action Teams. The next generation of leaders is being identified. Overloaded cluster organisation's staff, so they have no option but to empower others. Not by default the Project Manager for every initiative.
Involve politicians	Successfully engaging politicians on issues of relevance to them – speaking at cluster events, award evenings, welcoming a new international investor, introducing a new training programme, addressing Grand Challenges.
Building the regional innovation system **Identifying systemic issues** **Action in the white spaces**	Central elements in a regional innovation system are the traded clusters. A number of clustering initiatives under parallel development. (Competition plays a role in stimulating each cluster team in moving forward.) Working simultaneously on multiple cluster fronts enables bottom-up identification of the region's systemic, cross-cluster issues. Engagement across the 'white spaces' between regional clusters facilitates firms drawing on the region's diverse competencies. Competencies where two or three local clusters meet could herald an emerging cluster. Linking within the region, nationally and internationally
Measurement & Evaluation built in	On going evaluation of the initiative: project management; feedback loops; stakeholder satisfaction reviews, joint peer assessment and benchmarking with other cluster managers (e.g. through European Secretariat for Cluster Analysis, Berlin)

Cluster Development Challenges	
Jane Jacobs	*"Economic development, whenever and wherever it occurs, is profoundly subversive of the status quo."* The Economy of Cities
Inter-American Development Bank	*"Local development projects involve a large number of institutional actors and firms, which usually do not have pre-existing mechanisms of coordination, and inevitably are locked in historic patterns of interaction."* Competitiveness of Small Enterprises: Clusters, Business Environment and Local Development, 2008
Sweden	*"Triple Steelix was expected to contribute something new and, at the same time, also establish itself as a recognised actor. 'The new' involved implicit challenges to the prevailing system."* This is about Change - Ten years as an on-going evaluator of the Triple Steelix initiative, Jan Messing, VINNOVA Report 2016:05
Canada	*"The development of networks and alliances between organizations is at the very core of cluster success."* National Research Council
Iceland	*"Icelanders tend to feel as if they know everybody else on the small island and even though they don't know them, they can still give them a call. The problem with this attitude is that people are not making the call and if they don't, new ideas are not exchanged.* *We arranged a meeting with over 20 CEO's of the high tech marine firms. The first thing we noted is that they began to introduce themselves to each other. Many had never met."* Thor Sigfusson, Ocean Smart Workshop, Reykjavik, 2011
Samoa	*"Businesses in Samoa are generally reluctant to work together and do not like to share information."* Regional Cluster Initiative in the Pacific, PIPSO, Suva, 2015
Sweden	*"In real clusters, communication between different types of actors is massively flawed. Small firms and large firms don't meet. Policy makers often have only vague ideas about what business really needs. Researchers are more interested in academic publishing than commercialising their new findings. Schools formulate their curricula with little knowledge of what skills industry really needs. It is not difficult to realise that these connections will not just happen spontaneously."* Building the Cluster Commons, An Evaluation of 12 Cluster Organizations in Sweden, 2005-2012, Prof. Örjan Sölvell & Mats Williams, 2013
Caribbean	*"Low levels of trust (i.e., social capital) between the public and private sector is the single biggest obstacle to the cluster approach in the Caribbean because it undermines the joint action that is central to the cluster approach."* Cluster Best Practices for the Caribbean Inter-American Development Bank, 2010
Professor Charles Sabel	*"Cooperation in the solution of pressing, practical problems leads to networking with beneficial local spillover effects; but networking, in particular of the kind that many cluster development programs initially support, does not necessarily lead to useful problem solving."* The Impact Evaluation of Cluster Development Programs, Inter-American Development Bank, 2016
USA	*"We confirmed that the "secret sauce" of ecosystem development lies in the creation of effective networks that bring together broad arrays of stakeholders within an industry; facilitate open exchange of ideas; and bridge cultural gaps between different groups to promote effective collaboration."* Innovations that Matters, US Chamber of Commerce, 2015

Cluster Organisations as Bridges	
Spain	*"A set of coordinated public and/or private actions designed to support the development of relationships between agents within existing and/or emerging clusters."* Dr. James Wilson, Basque Institute of Competitiveness, Orkestra
Professor Örjan Sölvell	*"Cluster organizations … connect business with academia, education with industry, and large firms with small firms. They do this by providing activities and meeting places where common issues can be discussed and acted on jointly. They help the different actors overcome obstacles & start talking to each other. In doing so, they get the traffic moving along the paths."* On Strategy & Competitiveness, 2016
United Nations Industrial Development Organisation	*"Cluster development policies aim at stimulating/ boosting networking & cooperative efforts among different actors (firms, research centres, universities, public bodies and intermediate institutions) within a defined economic and geographical space to enhance competitiveness."* Gerardo Patocconi, Chief, Cluster and Business Linkages Unit, UNIDO
Canada	*"Cluster secretariats bring together companies, business associations, sector-based workforce committees from Emploi-Québec, the provincial and federal governments and research and educational institutions to encourage new types of partnerships among these partners."* www.grappesmontreal.ca/cluster-development
Innovation Norway	*"A cluster organisation is a formal institution that is established to facilitate increased interaction and cooperation between participants in the cluster. A cluster organisation is based on an organised partnership between the participants in the cluster, often with public development agencies as important contributors."*
Inter-American Development Bank	*"Solving coordination failures is one of the key objectives of CDPs. These interventions create formal and informal institutional frameworks to facilitate private–private, public–private, and public–public collaboration."* Impact Evaluation of Cluster Development Programmes, 2016
European Secretariat for Cluster Analysis	*"Cluster organisations, whose main rationale is to network different stakeholders in a cluster, are ideal intermediaries for creating an "open space" or brokerage platform, where businesses, knowledge institutions and business support organisations can meet to search for and explore radically new, cross-sectoral business solutions."* Cluster Organisations in Europe, Insights from Bronze and Gold Label Assessments, 2014
Denmark	*"It is the cluster organisations' task to facilitate partnerships between enterprises, knowledge institutions, public organisations and other actors that foster innovation and provide enterprises access to new knowledge, competencies, resources and markets."* Cluster Strategy 2.0, 2016-18
European Commission	*"Cluster organisations may be considered as the legal entity engineering, steering and managing the clusters, including usually the participation and access to the cluster's premises, facilities and activities. They are considered as new and highly efficient forms of innovation support."* DG Enterprise and Industry

Industry and Cluster Associations

Industry/trade associations are complementary structures to clustering initiatives. All facilitate dialogue; all are institutions for collaboration. Many industry associations provide forums for businesses to connect and exchange ideas and to identify common obstacles and opportunities. Many have well developed roles in organising trade fairs and missions and in distributing market information. Some industry associations provide product-testing facilities, at times in partnership with a university or public R&D facility.

Industry associations may consider that they are the cluster. However, an industry association is an element within a cluster's soft infrastructure, but is not the cluster itself.

Differentiating: Industry Associations & Cluster Organisations		
	Industry/Sector Association	**Cluster Organisation**
Membership	A membership association, often with a narrow group of firms, frequently just core firms within a sector. At times dominated by a few large firms.	An eco system rather than a membership body, traversing across sectors. Broad, open constituency … core firms, support firms and soft infrastructure.
Geography	Broad geography, often national or state/provincial wide.	Tight geography reflecting the cluster's functional region.
Resourcing	Largely private sector financing through annual membership fees.	Triple helix resourcing: public, private and academia. Multi-year financing.
Organisation focus	Lobbying & influencing, especially at the national level. Highlighting priorities for action by others. Narrow base of activity, short-term. Inward looking, maintaining status quo, protecting interests. Short-term tactical initiatives.	Self-help, change orientated local group. Wide-ranging focus on upgrading competitiveness. Addressing long-term strategic priorities. Outward looking. Concentration on strategic doing.
Organisational structure, mechanism	Committee structure, many established in perpetuity. Often the association's executive taking the lead with a limited range of initiatives as the 'project managers'.	Broad, multi-project agenda driven by many volunteers coming from the cluster's stakeholders. Self-propelled Cluster Action Teams.
Governance, Leadership	Rotating chairs. Elected annually, usually senior business CEOs. At times a small, rotating 'old boy's' clique.	Longer term leadership; initially selected then elected. A combination of business, public agency & academia. Diverse, integrating differing views and perspectives.
Executive	Holds strong power and influence within the association. Often in position for a much longer period than the association's governance.	A servant-leader as a change agent. A connecting catalyst empowering others to engage.

Some industry associations do emerge as the appropriate long-term home for a clustering initiative. To be able to effectively function on behalf of a cluster, an industry association needs to move beyond being a lobby group to viewing itself as a self-help organisation. An industry association may also need to broaden its membership to include firms from other sectors/industries and all the components of the local cluster, not just the core firms but also support firms and the soft infrastructure. National industry associations will need to effectively engage at the local level, within a cluster's functional region. Many industry associations are unable to make these major changes. One area of difficulty is when a cluster stretches across a number of industry associations.

However, when a cluster organisation is established, it needs to ensure that it in no way competes with any industry association in the provision of services. It is beholden to the cluster association, as the latecomer, to find its own space.

We are not an association … we go faster!

CATALAN SPORTS CLUSTER
INDESCAT

Cluster Organisations as Network Integrators	
USAID	*"USAID and its contractors must act as facilitators – not leaders – of the cluster process. As such, the contractor's role is nonetheless critical and serves key functions such as: an honest and trusted broker among often-fractious parties; a neutral, objective outsider, with needed global knowledge and perspective; and a provider of both strategic planning capabilities and in-depth industry expertise."* Promoting Competitiveness in Practice, An Assessment of Cluster-Based Approaches, The Mitchell Group Inc., Washington, DC
Austria	*"Ecoplus Clusters allow us to be very near to companies, which in turn enables quick and flexible reaction to the changing demands of the economy. Our services for cluster members are designed to yield both short-term and long-term results. We connect companies and markets, science and business, research and application, ideas and opportunities.* *We support cooperation amongst companies. We promote innovation. We ease access to research and development."*
Clusters & Cities Network	*"It is not a matter of enormous resources; rather it is about 'coffee money' – getting the right people, with the right mindset and competencies, at the right time together; it is about 'seed funding' for collaborative innovation projects."* CLUSNET
Nordic Innovation	*"One of the most significant impacts in cluster development is active cluster management providing tailor-made services to their cluster."* NGP Cluster Excellence conference, Copenhagen, 2011
Professor Antoni Subirà Former Minister of Industry, Catalonia Chair, TCI Board of Advisors	*"Clusters should not be turned into a new administrative structure aimed at channelling public support. If that happened, they wouldn't be used for the purpose they could best serve, namely:* • *Gaining insight into a country's situation in production terms.* • *Enabling intelligent dialogue between this (microeconomic) reality and the government of the day.* • *Helping this dialogue to achieve a strategic level.* *If such aims become tarnished, clusters will merely thicken the sludge of administration and bureaucracy that weighs down production activity. If clusters are used for the purposes I have mentioned, they will help to strengthen the capacity to compete."* Clusters and Competitiveness: The Case of Catalonia (1993-2010) Gascón, Pezzi and Casals

"Culture eats strategy for breakfast."

Peter Drucker

"For organisations with structures that sand down all rough edges and desiccate anything juicy, something terrible will happen: nothing. Get going – then get better." Velocity, 2012

Ahmed & Olander

CHAPTER 2.1

CLUSTER MANAGER AS THE GLUE

This chapter highlights the role and characteristics of the cluster manager.

This person, supported by the cluster organisation team, is primarily a catalyst and connector.

INVITED FOREWORDS

DR STAN HIGGINS

2014 European Cluster Manager of the Year, CEO, North East of England Process Industry Cluster, UK

To get real effective clustering off the ground, it is key to engage in dialogue with potential cluster members. Use these discussions to identify potential enthusiasts from big and small companies from across the supply chain. Use the collective minds to develop effective cluster strategy and early stage engagement activity within the region. The public sector should never be the driving force behind a region's cluster policy, it has a role to play convening cluster members but must step aside and allow the industry to develop its collective ideas on how to improve the economy for the region.

MICAEL GUSTAFSSON

2012 European Cluster Manager of the Year, Former CEO, Cluster 55° ICT, Öresund, Sweden

As a cluster manager your personal network is your key asset and trust is the keyword, when it comes to take care of it. So use your time building trust and remember that it takes time to prove that you are trustworthy.

JOHAN P BÅNG

2010 European Cluster Manager of the Year, Former CEO, Future Position X Cluster, Gävle, Sweden

As a new Cluster Manager you need an inspiring business plan and to fill your pockets with good stories. Stories that show how your cluster organisation makes a difference for the stakeholders and how it contributes to innovation, internationalisation and branding.

So put on your work wear and go out and start by fixing the easy things, to get good stories to tell. With the right storytelling you can get a deeper commitment and engagement from the different stakeholders around you and get them to contribute to new cluster stories.

CHRISTOPH BEER

2008 European Cluster Manager of the Year, ICT Cluster Bern, Switzerland

Passion and teamwork - the twins for successful cluster management.

PAVLA BRUSKOVA

National Cluster Association, Czech Republic

When establishing a cluster organisation and looking for a cluster manager based on all the must-have criteria, you may hear people mutter: "Such a super person does not exist". Fortunately, they do exist. Her or Him. Actually, does this make a difference? Yes, it does.

There is no doubt that men are strong, smart, efficient and ambitious – this is what a cluster initiative needs – a good general to line up the troops for a victorious battle in the field of global competitiveness. But, are we prepared then to see also a woman sitting on a leader´s saddle? Would there be a battle at all? Further, the soldiers have to be full-aged to take part. Getting to this stage, the cluster initiative requires a sort of "mother´s care", too (not excluding men):

A person with an infectious belief in the cluster concept and patience, and able to manage the cluster initiative through vulnerable phases of a cluster´s various childhood ailments;

A person endowed with good listening and communication skills, with a broad heart full of praise and recognition to help smooth over the squabbles among the cluster members on one hand and fostering their buoyancy to compete and achieve revolutionary successes on the other;

A person using her or his intuition for an action, grasping the best opportunities and uncovering the hidden potentials in a complex way;

A person keeping the "big family" together in a trustful relationship, giving her or his best without the need to be seen, enjoying a rightful pride later, when looking back and seeing the mighty works that have come true.

Let´s wisely look for them and cherish them – the proper people that will be good cluster managers and let´s be more conscious of the recognised edge of women for the respected profession of cluster manager.

To be a cluster manager is an honour.

VINCENT DUGRÉ

Vice-president Operations, Quebec Ground Transportation Cluster, Canada Director, TCI Network

A cluster's strategic deployment should always be based on the overall impacts for the companies within its ecosystem and with the active participation of the entrepreneur's community. As we say, clusters are for and by the companies!

A main impact of a strong cluster initiative is to facilitate the growth of companies at the regional level by providing a basis for reflection to develop business strategies and segments of its industry where companies are competitive, where markets are present and will be present for their products and services.

Creativity is a key to succeed in the future. So, to get a strong return on investment from their cluster involvement, companies need to take the lead, think outside the box and share business intelligence to facilitate the emergence and development of new products through collaborative innovation, cross sectorial projects and smart specialization.

KLAUS HAASIS

ask klaus! Coach, Innovation Trainer; Former CEO, MFG Innovation Agency, Baden-Württemberg, Germany, Director, TCI Network

After 17 years of experience in innovation and cluster management in a public innovation agency, I have completely changed my perspective based on exposure to person-centred counselling and systemic coaching.

As cluster managers we are forced to deliver hard facts, so we focus on rationality and on a rational process where reason calculates the best way to achieve goals. But investigations from different areas of cognitive science have shown that human actions are much more influenced by intuition and emotional responses than it was previously thought. So any new idea, any innovation, any successful cooperation is based on emotions. People taking part in any innovation process have to change, adapt and to adopt. They have to change perspectives to get new ideas, they have to leave their comfort zone to believe in something new, and they have to change their former habits to use a new product, service or process. As a cluster manager I am part of this process causing anxiety, resistance and conflicts.

As a cluster manger I am a rule breaker.

But how can a cluster manger be a rule breaker and create fruitful conditions for the integration of anxious cluster member at the same time? I summarize my experience in innovation and collaboration management with three major rules:

1. *Process over Project - Consider the process of project development as important as the project itself: How can people open up and share, how should decisions be made?*
2. *Context over Text - Acknowledge that the context of behaviour and feelings and the mental and physical environment is more important than what is being said, planned and scheduled.*
3. *Dialogue over Discussion - Use a self-revealing communication and dialogue style to open up and reveal feelings and thoughts to build up trust and a common group reality*

In the clusters of the future it is important to create great technological innovations. But it is even more important that the clusters of the future are creators of social innovations for strong relationships and trustful cooperation.

DR. FLOWER E. MSUYA

Facilitator, Zanzibar Seaweed Cluster, Tanzania

A well organised, well working cluster needs a well-motivated, hard working, honest manager to spearhead the start, running and innovation of a cluster. Experience has shown that successful cluster managers are self-confident and comfortable in engaging with others. They have patience, self-motivation and learn quickly. Successful cluster managers do not view themselves as the bosses of the cluster but rather the leaders who unite the members and take a lead in making sure that their clusters are successful.

While many can possess these qualities, women are more likely to have them than men. Women are more patient and self-confident, more likely to learn about a tradition, adapt to it and generally become "one of them" in a short time. They are less likely to be antagonistic towards others.

The success of a clustering initiative is largely dependent on good cluster managers … and it is their happiness as well.

MERETE DANIEL NIELSEN

Director, Cluster Excellence Denmark

The acknowledgement of cluster management has grown considerably in Denmark over the last seven years, emphasizing the role of the cluster manager, the steering group/board, the cluster organisation and the interaction with the stakeholders integrated and collaborating with the cluster. This importance is underlined in the Danish Cluster Strategy being a cross collaboration agreement between six ministries, five regions and some of the larger municipalities. The Danish Cluster Strategy has a specific focus on the on going professionalization and competence development of the cluster secretariats, this being the main task for Cluster Excellence Denmark.

The Danish cluster landscape consists of around 45 major clusters, all matching a set of quality criteria like having a triple helix structure established within a specific branch or technology area with the aim of creating development and growth. Further there are minimum criteria for the cluster organisation: at least 1 FTE person should be in charge of running the cluster and at least 20 private companies should be dedicated members of the cluster.

Around half of the 45 major clusters are part of the national Innovation Network Program supported by the Ministry of Higher Education and Research, with specific requirements for the composition of the steering group reflecting key stakeholders in the network and the triple helix structure behind the network. The other half are a mix of regional funded clusters steered by a collaboration agreement, or non-profit private foundations running a cluster sometimes as the sole activity, sometimes as a range of other activities. This leads to a range of different organisation models and governance structures.

One model is a major cluster (with its own a legal entity) hosting a couple of smaller clustering initiatives each with their own cluster manager, steering group/board and own employees. Quite often the employees have different tasks and roles working for several of the clusters. But sometimes there is very little interaction between the "mother cluster" and the "hosted clusters" due to very clear distinction in terms of technology area/branch focus. Another model is the clusters and networks hosted at a university as part the university's third mission activities. Normally these cluster organisations are smaller organisational entities benefiting from the support of the larger organisation in terms of ICT and administration; however they still have their own board and secretariat. A third model is when clusters and networks are hosted as a think tank or branch organisation, with little interaction in terms of common governance, but where the cluster organisation can benefit from the host organisation especially in terms of the stakeholders involved in the host organisation.

While the different models offer flexibility in adjusting to local circumstances, in general it has shown to be extremely important to clarify the role of the cluster managers (also when more managers are working within the same "mother cluster"), to clarify who actually works in the cluster secretariat and working with stakeholders, and to clarify the composition of the board/steering group so it can match the on-going need of the cluster.

TRACY SCOTT-RIMINGTON

Regional Development Australia, Brisbane, Chair, TCI Network Oceania

Cluster Managers have evolved to become the New Economy's CEO, building collaborations of interdependent SMEs, micromultinationals and regional stakeholders and leading a process to compete successfully in global markets. Australian Cluster Managers are not only the cluster initiative driver, they design the engine and are the mechanic too. They are the glue that keeps a high performance cluster machine pointing towards the winner's podium and there's no pit crew to keep the car purring. Clusters will win or loose the competitiveness race stakes based on the passion, commitment and abilities of the Cluster Manager. Their role should never be understated.

LUCIA SEEL

International Cluster Consultant, Linz, Austria

During the TCI conference in Jyväskylä I chaired a table at the Cluster World Café on what skills/ knowledge/type of personality should an excellent cluster manager have.

The list starts with A - for Ambition and ends with Z - for Zeal, passing through an incredible variety of features like socialness and ability to build powerful relationships, self-reliance and sovereignty, perseverance and ability to get things done - in the right time!, mediation skills, integrity and discretion, genuine interest for other cultures, linguistic competence (not only mastering the political and business ones), experience in management, sector specific know-how, market knowledge, the ability to be a team leader for the cluster staff and a team player for the stakeholders …

The list is very long - and fortunately very well approached and analysed in the chapter that follows. The participants at the World Café concluded that if we put all the ingredients together, a cluster manager must be "Superman" (or Superwoman!). Leaving fiction behind, the reality shows that cluster managers deserve the recognition of both society and community for their outstanding and complex work.

The Cluster Manager's Role

A cluster manager, as the leader of the cluster development team, drives the clustering initiative. This person is the motor for the clustering initiative, catalysing and facilitating action within the cluster and between clustering initiatives. The manager needs close contacts with the cluster's stakeholders, listening carefully to needs and exploring opportunities for collaboration. The manager and the team work with the core firms, the support firms and the soft infrastructure, removing *clumps* and *clutter*. Facilitation is the key activity within a cluster organisation.

The cluster manager is a change agent, not in place to maintain the status quo, but to keep moving the cluster's development agenda forwards. This person needs to be able to earn through performance a position as a peer to the cluster's leaders, not that of a servant.

At times the cluster manager will need to radically change the way in which the cluster's stakeholders interact. There may be senior players within the cluster who have become comfortable with the status quo, with possible rigidities and vulnerability within the cluster's eco-system. Larger companies could be nervous of a strategy that supports the development of SMEs. Such established companies can make their views clear to their political connections. Academics could be comfortable in undertaking blue-sky research and writing papers for international journals, but not that interested in responding to research agendas developed by local SMEs. Some players will resent the intrusion of a change agent, others will openly welcome change to the status quo. The cluster manager will need to create the dialogue across the cluster, to open the conversations.

Cluster Manager as the Clustering Initiator: Most cluster managers, particularly across Europe, are appointed to an on-going clustering initiative. The following comments are for start-up cluster managers, appointed to kick-start a new clustering initiative. Ideally, the appointment is made early in the cluster development process so s/he is part of the initiative from the beginning. The cluster manager strongly benefits by being involved in understanding the cluster's development issues, preparing the analysis and meeting the stakeholders.

An early priority is establishing credibility for the clustering process amongst the senior stakeholders. From these seniors, an informal leadership group is developed which over time is formalised as the cluster's Board. A pro-active cluster manager will be seeking opportunities to link firms where there are commercial commonalities (such as joint purchasing, joint investment, collaborative export development) and in the longer term to build 'whole-of-government' alignment around the cluster.

On commencement, the cluster manager will most likely be reporting to the prime-funding agency. When the cluster's Board is formed, the Board should at that time appoint the cluster manager. The person should not be imposed from outside.

The Cluster Manager in a Nutshell

Gaining the trust of cluster stakeholders and building trust within the cluster.

Facilitating decision making by the cluster's stakeholders.

Leading the on-going cluster analysis process.

Building the face-to-face connections across the cluster; building the cluster's eco system.

Increasing the intensity of interactions within the cluster.

Moving from a *clump* of isolated firms, confident in exploring new areas for collaboration; building joint action; business networks; consortia.

Moving from a *clutter* of support organisations, establishing alignment.

Establishing a cultural change.

A natural networker, a broker, a consensus builder, a bridge builder across the cluster's stakeholders.

Well connected within their cluster (though not necessarily from Day One) and beyond … able to draw in resources, knowledge, connections to support the cluster.

Aggressive in identifying new business opportunities.

Guiding but not deciding; not doing, but getting done.

Comfortable in leading from behind, able to empower others, not seeking glory.

Transparent in terms of strategy, yet able to hold confidences.

Active at the cluster's periphery … where disruptions start.

Has no vested interest in the cluster.

Based in the cluster's functional area.

Daily involvement within the cluster.

Similar Roles, Different Titles

Whilst there is much in common around the world in terms of activities, the 'Cluster Manager' can have different titles:

- In Scandinavian countries a common term is **'Process Leader'.** This is a term that I particularly favour, signifying that the person is leading a process rather than managing an activity.
- The term '**Cluster Facilitator**' is often used, reflecting that this is primarily a facilitating and connecting role.
- UNIDO use the term '**Cluster Development Agent**' around the world.
- In most European countries '**Cluster Manager**' has become the dominant title. This identifies the person as a senior actor, though the role is not strictly that of 'managing' an activity. With some reluctance, I am using the title in this book.

The Cluster Manager – International Perspectives	
Nordic Innovation	*"One of the most significant impacts in cluster development is active cluster management providing tailor-made services to their cluster."* NGP Cluster Excellence conference, Copenhagen, 2011
Inter-American Development Bank	*"Cluster facilitator should be a 'professional stranger'. Fears of favoritism in business communities where everyone knows everyone suggests that a technically competent outsider is best placed to play the critical role of honest broker."* *"Effective facilitators possess an ability to build trust among participants, and to direct the project without leading it." Cluster Best Practices for the Caribbean, 2010*
United Nations Industrial Development Organisation	*"UNIDO cluster development initiatives rely on the engagement of facilitating agents who operate as impartial brokers among cluster actors and help them share information and coordinate their endeavours.* *These brokers, known as cluster development agents (CDAs), are professionals working on a daily basis in the cluster, who support all stages of a technical assistance initiative, from the formulation of a diagnostic study to planning and implementing private sector development activities."* Cluster development for pro-poor growth: The UNIDO approach
Sweden	*"The Cluster Initiatives still depend on key individuals – cluster managers. Therefore changes in cluster management can mean that most of the knowledge based process capital disappears."* Klusterprogrammet 2006-2010, Tillväxtverket, Swedish Agency for Economic & Regional Growth

The Cluster Manager, Complex Ingredients

The following descriptors come from the cluster training workshops that I have conducted in over fifty countries. I ask the participants at the end of the training to identify what makes a standout cluster manager. These comments come from a wide range of cultures and countries and are included here in some detail. As a result of this workshop discussion it is not uncommon for some of the participants to appreciate that being a cluster manager is not for them.

Common Characteristics, Cluster Managers	
Skills	Boundary crosser; Facilitates team decision making, but does not steer or lead in the traditional sense; Synergy seeker, linking stakeholders for common projects; Well connected within & beyond the cluster; Motivator; Empowerer; Diplomat; Action orientated; Excellent interpersonal, written, verbal and listening skills; Can handle complex projects in terms of technology, personalities and past relationships; Establishes the media as a partner; Identifies the structural gaps in the cluster's system.
Qualities	Opens up the cluster's culture, moving it from *clumps* of firms and a *clutter* of support organisations to an integrated system; A consensus and relationship builder; Encourages individuals to share information, integrating the cluster's 'secret squirrels' through trust building, removing silos; Opens access; Listens; A story teller; Empathises; Enthuses; Builds credibility across the cluster's stakeholders: the CEOs of multinationals and large firms, SMEs, university professors, schoolteachers, politicians, bankers….; Works as a member of a team, as well as unsupervised; Self motivated and can motivate the team when the going gets tough; Entrepreneurial, taking advantage of incremental opportunities; Comfortable in operating where a multiplicity of stakeholders and interest groups need to be handled and influenced; Ensures inclusion across the cluster, not a few seniors deciding for many; Friction free, inclusive, comfortable in 'looking people up'; Garners the active contribution of cluster members, e.g. in task forces; Conscious of the importance of celebrations...awards and certificates for cluster stakeholders, politicians; Does not favour individual players within the cluster; Earns a position as an equal to the senior cluster stakeholders.
Knowledge	Extensive knowledge of (1) the cluster's key players, (2) the cluster development process and (3) resources (especially from the public sector and donors) to support the development of the cluster; Within a few months of starting with a cluster, has accumulated a working knowledge of the cluster's markets, technologies and processes; Externally focused, aware of wider trends: market, customer trends, technology, community.
Attributes	Self-belief and confidence, an irrational optimist; Motivator, teacher, mentor, convener; High degree of frustration tolerance; Credibility; Integrity; Stick ability; Holds confidences; Humility, does not need personal credit for successes, comfortable in empowering and leading from behind; Passion for the cause, promoting the dream, building the buzz, continually raising the bar; An adventurer, curious, with a sense of fun; Able to restart if it flops, to try something else, to re-energise and establish another approach; Hero finder, uncovering talent across the cluster; Wins over volunteers; Project protector, galvaniser; Able to walk through barriers; A natural agitator; Building for the long haul; Idea rich, time poor … encourages others to pick up the pieces; Motivates and empowers cluster stakeholders to take the lead with projects; Able to work with the 'old boy network', dismantling privilege and removing turf kings; Constantly looking outside the cluster initiative for new opportunities, new risks, new connections, exploring at the cluster's periphery; Comfortable with little formal power, yet able, with imagination and persistence, to make a substantial difference; Able to operate in an environment of unstructured uncertainty; A locally anchored person, well connected within the community and beyond.

The Cluster Manager: A Rare Jewel

This extensive list is implying that the cluster manager is a Tarzan, an Einstein and a bit of Wittgenstein all rolled into one! Spain's Basque Country refers to the cluster managers as 'Rare Jewels'. As the requisite package of skills and attributes are unlikely to fully reside within a single person, a small team that collectively covers these characteristics is, where possible, established.

As the leader of a clustering initiative, the cluster manager is likely to have a minimum of 10-15 years work experience, with demonstrable skills in relationship development. Such skills may have been developed within

a marketing/business development background. A business background is more typical than an academic or government background. Competence in industry-specific issues is not as critical as social and networking skills, though well over half of Europe's cluster managers have industry experience that is relevant to their cluster. My strong preference is for the cluster manager to have a 'beginner's mind', able to challenge existing ways with no preconceived solutions. Non-experts can be better at questioning than experts, and arrive in the cluster with no baggage … no friends, but also no enemies. Most cluster managers have a tertiary qualification.

A dynamic cluster is not static. New activities will be developing at the cluster's edges, the periphery, and it is here that the cluster manager needs to be particularly alert.

Cluster Managers	
Exploring at the Cluster's Periphery	
Albert Einstein Physicist	*"A person who never makes a mistake never tried anything new."*
Mario Andretti Racing car legend	*"If everything is under control, you are not going fast enough."*
Frank A. Clark US Politician	*"If you can find a path with no obstacles, it probably doesn't lead anywhere."*
Woody Allen Movie director	*"If you don't fail now and again, it's a sign you're playing it safe."*
Wayne Gretzky Ice hockey's greatest player	*"You miss 100% of the shots you never take."*
Tom Peters US management guru	*"If no one is pissed-off with you, then you are dead … but just haven't figured it out yet.'*

As a generalisation, women tend to have strong relationship building and networking skills. Women often have a more finely tuned listening ability, are well able to multi-task and juggle a portfolio of projects and are less power hungry. A significant proportion of the top-flight cluster managers I have worked with around the world are women. However, so far all of the 'European Cluster Managers of the Year' have been men![13]

In carrying out the responsibilities of a cluster manager, s/he will need the flexibility to participate in the many meetings that will be outside of normal working hours. The cluster manager should be located within the cluster's functional region.

Advice to Cluster Managers[14]	
Listen!	*"Listen to the companies and plan cluster strategies and activities accordingly. Meeting companies is the most important thing we do!"* [15]
Converse	Listen carefully to the needs of your cluster's stakeholders. Fully understand their situation, their opportunities, their constraints. Converse with your cluster's stakeholders, don't dominate or interrogate. Richer information comes with a true exchange. Listen in particular to those at the edge of your cluster, those who are on the periphery exploring new markets and new technologies. Respond with demand orientated services.

[13]At the 2012 European Cluster Mangers Conference in Vienna, the Cluster Women European Network (ClusterWene) was established by 30 women from 12 countries. Further information: lucia@luciaseel.eu

[14]This draws on workshops I held during the 2010 TCI Global Conference in Delhi, India and in 2015 in Daegu, Korea with the participation of cluster managers from around the world. At both conferences participants were asked to identify their essential advice to a new cluster manager. This also draws on Six Habits of True Strategic Thinkers, Paul J H Schoemaker, Inc., 2012

[15]Mats Williams, past CEO, Paper Province, Varmland, Sweden

Build relationships	Cluster development is a relationship building process. Extensive personal contacts are needed with the cluster's stakeholders, active relationships, not passive. So visit with them frequently.
Use your soft power	You are a leader with no formal power. Carefully use your soft power … you win through persuasion, not coercion.
Extend your weak ties	Build wide external networks to help you scan the cluster's horizon and support new connections. Keep extending the breadth and reach of your connections … build your weak ties … reach out to the people that you don't know well, who may expose new information, new insights.
Have passion	Only then can you instil passion in others. Encourage others to have the passion to explore new territory and new opportunities.
Start with what requires low trust	Start with the 'low hanging fruit', the tactical, short-term projects. There may be grudging reference within the cluster to the number of plans that have been developed with little engagement or action. There may be wish lists left sitting on the table. A clustering initiative can break the deadlock. As trust develops, the cluster's stakeholders become more willing to open up and share. As early projects bring positive results, move on to the more strategic, longer-term projects.
Energise others	Be the lubricant, not the cluster's engine. Don't let others think that you will do it all for them. Avoid being the 'Project Manager' for everything. If you talk and act like a subordinate, you will be treated that way. Always.
Share the workload	Find and empower the cluster's talent. Search for the salmons, those swimming upstream. Look for the fired up people who can work with others.
Find the cluster champions that others trust	Have the cluster's shakers and movers working alongside you, providing honest feedback. Understand their agendas, including what remains hidden. Ensure that the clustering initiative is not dominated by an elite few. Open the dialogue; welcome a diversity of views. Keep attracting new people into the process; deepen the pool from which new leaders, with energy, vision, local contacts and the ability to pull in additional resources can emerge. Spread the workload to ensure no volunteer burnout.
Analyse and initiate	Systematically gather the facts, understand the cluster, its competitive position, its culture and its development options.
Identify goals	Synthesise multiple sources of information before developing a viewpoint, seek patterns. Use analysis just as a platform for action. Question the conventional wisdom, challenge current beliefs including your own. Reframe problems. Avoid myopia. Uncover hypocrisy, manipulation, bias. Walk-the-talk on the cluster's preferred future. Initiate. Facilitate. Then Liberate.
Create benefits & buy-in	Make real things happen that benefit firms. SMEs in particular need to see early benefits from engaging. Move at the speed of business. Avoid paralysis-by-analysis.
Get things done	Balance speed, rigor, quality and agility. Learn-by-doing. Leave perfection to others. Take a stand even with incomplete information and amid diverse views.

Over communicate	Change agents find multiple ways to communicate to different audiences within and beyond the cluster. Especially the clustering initiative's funders. Don't whisper. Blow your cluster's trumpet loudly. Take time to celebrate successes. Engage with the media as an active partner.
Be patient **Be transparent** **Stay smiling**	Changing behaviour patterns does not come easy. There will be people within any cluster who are resistant to change. There will be fence sitters perpetually looking for evidence. Don't wait for everyone to come on board; go with the early movers. But don't shut anyone out; always leave your door open.
Find the cluster's hot spots	Within any cluster there will be product, market and/or technology niches with higher growth firms. Engage with tightly targeted activities to further build the hot spots.
Ensure a spread of income sources	Don't be over dependent on any one source of finance. Minimise the risk of a sponsor suddenly withdrawing. Don't allow sponsors to unduly influence the cluster's strategic agenda. The cluster is not 'theirs'. Garner financial commitment from individual stakeholders, including SMEs, as soon as possible, starting with token amounts. Charge a fee for e.g. participation in a trade fair or a training course.
Don't compete with the private sector	You are in place to support the private sector. Avoid participation in fee-earning activity (such as providing services to organisations outside the cluster) simply to earn income for the clustering initiative. Receiving fees and royalties from patents or licenses are not an option, as a clustering initiative should not own such assets.
Don't compete with industry associations; **Or chambers of commerce**	They have their role and they are complementary to your clustering activity. As the newcomer, you need to be finding fresh space to add value. You are not seeking to provide all-inclusive solutions for business growth.
Long-term orientation to goals & strategies	Keep your eye on the horizon. Cluster development is not a quick fix. Break large projects down to short-term activities. Have an annual spring clean of all activities, projects. Pace yourself. You are a long-distance runner.
Cluster development, one approach in upgrading competitiveness	Value chains, supply chains, soft networks, hard networks are all approaches you should be using. A high performance cluster is perforated with networks, alliances and consortia and all can benefit from a neutral broker…that's you. A pro-active cluster manager will be seeking opportunities to link firms where there are commonalities (such as in purchasing, export development), removing the *clumps*. And building whole-of-government support for the cluster, removing the *clutter*. The starting point is your knowledge of the individuals within your cluster.

Use your neutral corner **Open many conversations**	With your neutral voice you can cross boundaries, open the dialogue and set new events in motion. Build the connections and trust. Manage conflicts. Bring your cluster's stakeholders together in different ways. Maintain with care your neutral position. Ensure that the larger, more articulate and politically well-connected companies don't dominate the development agenda. Accelerate tacit information flows. When the content of knowledge is changing rapidly, it is those who take part in its creation that gain fullest access.
Don't be parochial over cluster boundaries	The functional area of your cluster may extend to neighbouring regions, even neighbouring countries. Over time the boundaries will change. Opportunities may be just over the border.
Anticipate **Plan to adapt**	The direction for your cluster is unlikely to be straight ahead. Look for game-changing information at the periphery. Keep abreast of market, technology, personnel and policy changes. Search beyond the current boundaries of your cluster. Ask dumb questions. Keep exploring. Initiate, don't imitate. Make reversible, small steps. You are in a permanent beta.
Ride with the highs **But be prepared for the lows**	Celebrate the successes and the good times. But accept that there will be setbacks, they are integral to working on the edge and are a valuable source of learning. Be prepared for stakeholders that are infuriated with your activities. You are a change agent and not all will want to change. So keep your flak jacket handy!
Act as a venture capitalist **Build a project portfolio** **Quickly learn from failures**	Shift the focus from addressing problems to addressing opportunities. Explore new opportunities at the fringes, look for patterns in the outlier data, focus on what is different. Generate multiple options. New agendas that are backed by passion are not debated … just tested. Validation will come over time. Engage when there is momentum. Learn by doing. Be comfortable with knowing without reasoning, you're intuitive understanding. Spread both the benefits and the risks through developing a portfolio of projects. Not every project will benefit every firm. Accept that there will be failures; if there are no failures then you are taking it too easy.
Ignore the title on your business card	It's irrelevant to your cluster's insiders. The right to engage with your cluster comes from how you personally bring opportunities and value to each stakeholder and earn his or her confidence. Manage your reputation.
Negotiate your salary package & terms	Even an opportunity to make a dent in the universe should be paid at market rates. But you must accept that if things don't go well, you should voluntarily exit or be fired. This is not a job for anyone or everyone.
Is this the job for you?	It is a job that has little formal authority; offers much uncertainty. A job where you will need to earn respect from sceptics, be proactive when the limelight fades, work with the energy drainers. A job where you will be leading from behind. A job where you use a carrot, not a stick. A job with no regular hours. This is a job where you can break patterns, cross boundaries, find heroes and uncover talent. It is a job with a purpose. A job where you can make a major contribution to your community. It is a job where you can leave a legacy.

Three Henry Sign-Offs for Cluster Managers

"It is not enough to be busy; so are the ants. The question is: what are we busy about?"

Henry David Thoreau

"You learn from your experience and mistakes you may have made along the way. It takes at least two years to know what it's about, to get your feet under the table, to feel comfortable in the job." Coach, 2015 Rugby World Cup winners, the New Zealand All Blacks

Sir Graham Henry

"Whether you think you can, or you think you can't . . . you're right."

Henry Ford

Danger Signs: The Cluster Manager

The cluster manager:

- Is primarily an analyst, a report writer.
- Is on a short-term assignment, in place for just a few months.
- Is the initiative's administrative 'Secretary'.
- Is hardly ever out of the office.
- Is the last to know.
- Is the owner of every initiative, unable to empower and to engage others.
- Fails to bring new contacts, new perspectives, and new business opportunities to the cluster's stakeholders.
- Fails to establish close personal relationships.
- Fails to earn the trust and confidences of the cluster's stakeholders.
- Fails to bond the cluster's stakeholders into proactive teams.
- Fails to move at the speed of business.
- Fails to build a clustering initiative where s/he is no longer the sole central figure.
- Fails to celebrate … and there is little to celebrate.

CHAPTER 3

TRIPLE HELIX IN ACTION

Close partnerships between three elements are central to effective cluster development.

Business + **Government & Public Agencies** + **Academia**

"The most important type of actor is the firm".

Professor Örjan Sölvell

INVITED FOREWORDS

PROFESSOR FERNANDO G. ALBERTI

Director, Institute for Entrepreneurship and Competitiveness - LIUC, Italy

#Lombardia2030 - the new competitive strategy agenda for Lombardy, Italy, the 2nd region by GDP in the whole Europe - is grounded in the principles of Triple Helix model, where the industrial sector properly engage with government and public agencies as well as with academia. Although Lombardy has a seemingly high competitive profile, it shows signs of contingent suffering and, more importantly, it shows strategic weakness and a slow, but gradual, loss of competitive position. To regain competitive positions, four vertical lines of strategy were identified that will have the task of guiding the strengthening and enhancement of regional competitiveness: the promotion of a pro-industry culture, the development and reinforcement of Lombardy clusters, human capital and professional training, and internationalization and European networks. All four strategic lines rely on the triple helix effect, but that effect seems to be particularly evident with regard to clusters.

Lombardy has mapped nine clusters, whose competitiveness depends on the collaboration and the development of synergies between small, medium and large businesses with research centers and universities, business associations, public administration and banking entities. Clusters make the industries of the territory more internationalized, digitalized, and connected. Lombardy has already developed a similar experience in its past, with the industrial district model popularized by Professor Becattini. Continuing this tradition, the future of Lombardy's industry depends on the development of clusters, where - as it happened for industrial districts - a "bottom-up" approach prevails and this implies a strong involvement of the businesses in community life and in the governance of clusters, making the industrial component the key activator of the triple helix.

http://www.lombardia2030.it/doc/Lombardia2030_ENG_digitale.pdf

ANDREW MARTIN

Head, Business Development, Food Division, Welsh Government

Ambitious growth targets - a 30% increase in the Welsh Food and Drink sector by 2020 - have required a new approach and a new type of working. From 30 food and drink businesses engaged in some form of support, we now have over 280 businesses engaged in cluster activity. Our programmes are now business focused to support growth businesses, not the businesses that drain support without adding value.

BETHAN SIAN JONES

Menter a Busnes; & MARTIN JARDINE, Food Innovation Wales

Wales has a wealth of entrepreneurs producing world-class food and drink. Many are rural and small scale. The needs for business outcomes from clustering have never been greater.

Clustering has been invaluable in identifying and addressing growth barriers. Distinct projects have been identified, new partnerships between businesses and food innovation centers formed and support from the public sector has become more focused. Clustering energises a business community, enabling business to be at the centre of guiding the resources.

The term 'Triple Helix' identifies three groups of cluster actors:[16]

1. **Business** … core and support firms, from start-ups to multinationals, and business organisations.
2. **Government & public agencies** … politicians & government departments. Also donors, NGOs and philanthropic stakeholders.
3. **Academia** … public R&D bodies, universities, vocational training and high schools.

A practical difficulty in cluster development is the differing rationales for engagement between these actors.

Cluster Engagement	
Acknowledging Different Motivations	
For business	Main incentive: Profit. Time frame: 12 months Seeking new opportunities, global perspective; Increased turnover; Opening doors to new customers; Entrance to new projects; More face-to-face contacts, establishing active networks from local to international; Influencing and lobbying public agencies; Providing an entry point to new technologies; Faster information flows; Public relations and marketing opportunities; Image gain; Access to new employees and to better qualified employees. Unimportance of political boundaries.
For government & public agencies	Main incentive: Re-election. Time frame: Election cycle. Promotion of the region/location; Increasing regional attractiveness; Attraction of new companies, FDI; More start-ups; Increased GDP; Growing numbers of employees, firms; Higher tax revenues; Establishing a high-level forum for engagement with priority businesses; Better understanding of business needs within key sectors. Importance of political (i.e. election) boundaries.
For academia	Main incentive: Scientific curiosity. Time frame: 5-10 years Improved accessibility to companies; Platform for research projects and papers; Development contracts with local firms; Input on company needs for business and/or research; Opportunity to attract highly qualified students from beyond the region & internationally; Research and career openings for students; Support with political processes. Global perspective.

[16]The term 'quadruple helix' adds civil society … users, consumers associations etc.

CHAPTER 3.1

BUSINESS IN THE LEAD

The advantages from a business perspective of being located within a cluster are identified.

The lead role of the private sector with clustering initiatives is highlighted.

INVITED FOREWORDS

DR. ROBERT BREAULT

Chairman, Arizona Optics Industry Association; TCI Advisory Board

All through history businesses have struggled for growth, often against their overbearing governments that taxed them heavily. Sometimes the governments had the well-meaning intention of building a better and more competitive region with their tax money. But traditionally, even the best legislators or rulers have guessed wrong at what was the best thing they could do for the regional economy.

When the business leaders, economic developers and educators sit down together and discuss what are needed, then real positive results will follow. Businesses lead the process, as they know what they need to grow, what is needed to earn money.

This cluster concept will still be here a millennium from now.

JAIME ECHEVERRI

V.P., Medellin Chamber of Commerce, Colombia; Director, TCI Network

When the private sector knows what it wants, public agencies can respond faster to their needs. Leadership is required from the private sector as every company is responsible for both for their future and their business environment.

Whilst economies are shaped mostly by SMEs, the private sector has understood the importance of large firms joining forces with smaller companies. All firms should use the mechanisms of collaboration with universities and research centers to improve their ability to innovate and compete.

The private sector is aware of its responsibility and commitment to the development of the region and the country. The public-private partnership is getting stronger. For the business sector, it becomes very important to build business, social and institutional communities so as to do more and better business, to improve the social balance and to increase the ability to compete.

It has been proved that in regions where there is better collaboration, better clusters emerge and there is increased investment, innovation, employment and, most importantly, stronger businesses.

For us at the Chamber of Commerce, cluster development has therefore become an essential part of our work.

TED LYMAN

Managing Director, IHS Global Insight, San Francisco, USA; Former Director, TCI Network

CEOs know a lot about their business, often somewhat less about their industry and seldom know much about their "place" –the political and social workings of their region.

Cluster initiatives organize the private sector into the context of a region's economy. In that way, they bring together the actors from the public, private and academic sectors for dialogue, for identifying critical shared issues and often for jointly implemented actions.

As implementation "champions" business leaders can bring especially sharp focus on issues and opportunities and "the speed of business" to the implementation process.

ALONSO RAFAEL RAMOS-VACA

Clusterprenuer, Chihuahua, Mexico; Former Director, TCI Network

Nowadays, no matter how strong and brave you are, you can't do it alone. It is not only about partnering with other local businesses. You need as well a true alliance with government and educational/scientific institutions.

However, clustering success depends a lot on the continuity of commitment and leadership of the main actors. Many times, while governments are truly interested in the well-being and development of the private enterprise, they are limited by their finite time in office and continuity is always an issue. In my experience, private-sector led initiatives have a much better chance because governments come and go but businesses are in for the long run and have an intimate knowledge of problems and needs.

Strong Clusters, Strong Businesses

The evidence is clear: businesses situated in strong clusters have a distinct advantage. Proximity offers advantages that are unavailable to distant businesses. They are more profitable and grow more rapidly than similar businesses scattered around a country. The stronger the cluster is, the more substantial is the positive impact on an individual firm.

All businesses within a dynamic cluster benefit through lower transaction costs, quicker negotiations, fewer delays, improved tacit information flows and the ability to influence their supporting infrastructure. In addition,

- SMEs particularly benefit through having the critical mass to engage on new opportunities. SMEs can also tap into the global supply chains developed by the larger businesses.
- Large businesses benefit as the cluster's SMEs explore new technologies, new processes and new markets that they can scale up.
- MNCs benefit as they unbundle their activities, choose the most appropriate international knowledge centres in which to undertake specific activities and find partners within the preferred clusters.

An evaluation of **Sweden's** Paper Province cluster has shown the significant impact of a ten-year clustering initiative. Improved sales were reported by 40% of firms, better access to human resources by 60% of firms and 81% of firms attributed the development of new products/new services in part to the clustering initiative. The firms reported increased networking, an increase in the number of innovation projects and a new spirit that came from belonging to a successful cluster[17].

European Union	*"Being part of a cluster is an important competitive strength for business. Clusters help to close the gap between business, research and resources, thereby bringing knowledge faster to the market. Successful clusters promote intense competition, along with co-operation. They enhance productivity, attract investment, promote research, strengthen the industrial base and develop specific products or services and become a focus for developing skills. World-class clusters attract brilliant minds that sustain innovation."* Aho Report, Creating an Innovative Europe
USA	*"The more companies you have, the more willing people are to relocate there, as they know there are opportunities with other companies."* Robert Davis, co-director, Colorado Institute for Research in Biotechnology
UK	*"Most innovation takes place in clusters. Firms in specific industries locate close to one another to benefit from a deeper pool of skilled talent, proximity to firms offering support services, and a flow of ideas between firms and other institutions such as universities."* Mending the Fractured Economy, Adondis Review, 2014
USA	*"An industry cluster permits a group of biotechnology companies to become strategically successful together."* Ed Fritzky, Chairman, Immunex, Seattle
Professor Örjan Sölvell	*"Firms with their home base in dynamic microeconomic environments tend to outcompete firms from less dynamic environments."* *"For MNCs it is critical to have major operations in world-leading clusters in their fields of technology."* On Strategy & Competitiveness

Business Engagement with a Clustering Initiative

A business automatically benefits from being part of a cluster … even though the business may not realise that they are indeed part. A business can also choose to actively engage in a clustering initiative as an element in developing it's own competitiveness.

While businesses within a cluster face common problems and opportunities, during the early stages of a clustering initiative there can be scepticism. There will be uncertainty as to what, in practice *'a clustering initiative'* implies, especially as regards the exchange of confidential information. This caution can be particularly prevalent when the clustering process is driven by public agencies or academics. Businesses can be sitting on the fence.

Companies are more interested in the immediate, what is ready-to-sell, than in being part of a longer-term

[17]Prof. Örjan Sölvell, 2012 European Cluster Manger's Conference, Vienna

development process. It takes time before the pay-offs from participating in a clustering initiative become apparent.

Competitors will be competing for customers and for staff. It is not uncommon to have limited communication and trust amongst such businesses, with limited knowledge of each other. I have noticed CEO's exchanging business cards at a first cluster meeting. Companies may be concerned with proprietary information transferring through local gossip and staff movements. There will be concern over the sharing of information with competitors and in opening up to collaboratively engage with others in joint activities. A key aspect for each business to consider is what exactly are their core competencies … why do customers come to them rather than their competitors? **That 'inner heart' of the business should never be opened up.**

Businesses may have little trust in the cluster development process. The Twelve Step cluster development process introduced in this Handbook is designed with these obstacles in mind. The focus is on early engagement, in non-threatening areas and the generation of early benefits through collaborative activity. Then and only then comes engagement on the more substantive, long-term strategies.

Inter-American Development Bank	*"Firms with linkages may participate in social networks leading to positive outcomes: reduced transaction costs, increased efficiency, stronger originating and sharing of tacit knowledge, reduced uncertainty as a result of stronger bargaining and lobbying power, and stronger and more effective cooperative action."* Impact Evaluation of Cluster Development Programmes, 2016
Sweden	*"Companies taking an active part in a cluster show generally stronger motivation to grow than others."* Tillväxtverket, Agency for Economic & Regional Growth
Norway	*"Participation in Innovation Norway supported clusters leads to higher sales and employment in firms during the immediate period after enrolment."* Effect on firm performance of support from Innovation Norway, Statistics Norway Report 2015/35
Denmark	*"Enterprises that participate in clusters are four times more likely to be innovative than enterprises that do not."* Cluster Strategy 2.0, Strategy for Denmark's Cluster and Network Policy, 2016-18
Professor Örjan Sölvell	*"Joint actions allow cluster stakeholders to overcome limitations and reap opportunities that are beyond their individual reach."* On Strategy & Competitiveness, 2016

From a business perspective, there are six aspects to the benefits of active clustering.

1. Enhanced access to Advanced Services, Specialised Knowledge

Dynamic clusters automatically provide businesses with access to many services that are not directly available to more distant companies. These services, some private and some public, can include:

- Specialist support firms, including freight logistics;
- Universities, R&D providers, training organisations;
- Financial services, seed funding, angels, venture capital;
- Common user facilities, e.g. test laboratories, specialised incubators and technology parks;
- Formal knowledge transfers through consultants, technology transfer offices, suppliers, customers;
- Informal knowledge transfers through recruiting specialists, social gatherings, monitoring competitors.

Within an active clustering environment, the providers of advanced services are determining their priorities through dialogue with the core and support firms. Capability gaps in the cluster are identified that can be filled by local suppliers or by targeted investment attraction.

2. Enhanced Visibility

Clusters such as Silicon Valley, Hollywood and Cambridge, UK have strong recognition through their global 'brands'. Other clusters are well known within their sector and region. Germany's hidden champions are the Mittlestand companies, the micro multinationals that are not household names. But being part of an internationally recognised cluster considerably enhances their visibility and reputation.

Strong clusters make it easier for firms, not just SMEs, to establish an international profile. Academic institutions also benefit from, and contribute to, the enhanced visibility. Dynamic clusters enhance:

- Credibility;
- Reputation;
- Market recognition;
- Talent attraction, especially from distant localities;
- Attracting suppliers, customers;
- Investment attraction, enhanced advanced services;
- The entrepreneurial buzz.

Enhanced visibility also raises local awareness of the cluster's competencies and regional significance, attracting attention from national agencies, politicians, graduates, school leavers and potential entrepreneurs. Enhanced local visibility assists with firm access to local banks, to high net worth individuals in the community, to angel networks and to venture capital.

3. Enhanced Business Networking

Interconnected firms, much more than co-existing … out-sourcing non-core activities and sharing resources. A dynamic cluster brings to firms knowledge, connections and opportunities:

- Informal knowledge flows, information spillovers on markets and technologies, updates on customers and competitors … all improving a firm's ability to spot strategic shifts;
- As knowledge of who-is-who within the cluster is developed, the easier identification of potential partners, enabling firms to focus on their core competencies. New connections are made and over time joint opportunities developed.
- **Improved access to firms with complementary knowledge**, opening up new partnership possibilities.
- Opportunities to develop informal networks with other firms, including knowledge sharing and cost reduction e.g. joint purchasing.
- As trust grows amongst firms, the development of more formal links and collaborative relationships: manufacturing joint ventures, export consortia, the sharing of innovation risks, and the co-development of new products.
- Dynamic clusters and specialised firms go hand in hand … firms outsourcing, subcontracting, the development of co-specialisation. Mutual dependencies lead to tighter collaboration.

Professor Örjan Sölvell	*"Firms in rich clusters can operate more effectively, drawing on specialised assets, suppliers and buyers with short lead times. Critical resources and capabilities are often not within the firm but are accessible through networks inside the cluster."* On Strategy & Competitiveness, 2016
Germany	*"Co-location enhances firm's performance because it facilitates collaborative networking relationships with a range of local suppliers, customers, competitors, universities, research institutions etc."* Gerd Meier zu Köcker, Institute for Innovation & Technology, Berlin
Austria	*"Thanks to the large cluster network we are able to locate partner companies quickly and conveniently for all types of projects."* Harald Zodl, Rehau Polymer Gmbh, Ecoplus cluster, Lower Austria
Austria	*"The cluster provides us with an ideal platform to meet new partners, to stay in touch with innovation, and to bring out new products into the market. The keys to success for a company which is part of a cluster are openness, honesty, and you must be prepared to be actively involved in the cluster."* Erwin Stubenschrott, KWB, Eco World cluster, Styria[18]
Professor Michael Enright	*"How is the 'coalition of the willing' identified if firms don't know each other?"* TCI Auckland, 2011
New Zealand	*"Many of our cluster's companies did not know each other as we started."* Stuart Trundle, CEO, Enterprise Taranaki, TCI Auckland, 2011

[18]Business Planet video http://www.euronews.com/2013/02/08/green-light-for-green-clusters

4. Enhanced Influence

As firms become more specialised, the constraints to growth increasingly lie beyond the firm's boundaries. A clustering initiative enables firms to collectively influence activities that have a direct influence on their growth, to the advantage of each firm, e.g.:

- A strong cluster removes the isolation of firms from public agencies. Groups of firms are able to more clearly articulate to policy makers and public agencies their specific needs and to work through what is often a *clutter* of public support agencies. As the priority needs of firms are identified, more targeted needs-driven responses can be developed by public agencies.
- Negotiating and establishing market access, policy influence,
- Pre-competitive R&D,
- Attracting lead customers,
- Attracting key employees to the region, reaching out to local school leavers,
- Media attention, international journalists, hunting as a pack,
- Develop the local customer base in order to test their products and services before going global, enabling firms to more quickly engage in new markets.
- Collectively, SMEs can help each other in developing business opportunities beyond the local anchor firms and to gain access to new information, technology and market trends. The enhanced information flows through the cluster help a firm as an earlier adaptor of new technologies and to be more responsive to market changes.
- Joint market research and joint promotion in local and international markets.
- Directly influencing the specialist services that support them, improving the capacity of specialised input and service providers. Identifying gaps in the local system that could be filled through attracting new talent and investment.

A clustering initiative enables firms, even SME's, to exert influence above their weight. Firms have the critical mass to link to a larger context, are able to participate in regional, national and international arenas such as trade shows and to gain access and to influence local knowledge centres: the university, training programmes and publicly funded research.

This intensive interaction with other companies, academic institutions and public agencies helps firms generate new ideas and to more rapidly translate them into new products, services and new ways to provide value. A strong cluster creates an environment where problems and challenges through collaboration with others become more manageable.

A strong cluster enables semi-private institutions, such as cluster and industry associations, to be established along with research and advisory centres, knowledge transfer centres, testing laboratories, etc. Such institutions for collaboration further improve the influence of the cluster and the tacit information flows.

The enhanced influence of a strong cluster also facilitates the building of an attractive and vibrant community for employees and their families. The development agenda for many clusters, as with the Silicon Valley Joint Venture, includes addressing public transport and housing needs and encouraging the development of kindergartens and upgrading local schools.

Inter-American Development Bank Caribbean	*"The cluster approach is proven to be an effective instrument of achieving competitive advantage because it enables firms to achieve the "economies of scale"* around cooperation, advocacy, and innovation that are needed to successfully compete in global markets." Cluster Best Practices for the Caribbean, 2010
Inter-American Development Bank	*"To attract private sector participation in the roundtable, there must be something to be gained from participating … it could be the urgency of a problem to be solved and the importance of being present in order to affect the outcome."* Two to Tango: public-private collaboration for productive development policies, 2016

5. Being an Insider

A strong cluster enables a firm to be on the inside track for the all-important tacit formation flows that circulate within a cluster. This is the high value know-how that has yet to be codified and written down, and maybe never will be. It is the still-developing information on who is doing what, and on market and technology trends.

As an insider, the firm can be a co-participant in the development of that knowledge and in recombining existing knowledge. For SMEs, this knowledge will often come through open dialogue with other firms rather than from (the possibly more intimidating) university researchers. Many firms learn more informally from their close customers and suppliers than from formal exchanges such as through technology transfer agencies.

Being an insider within a strong cluster gives **better access to knowledge**, to specialised suppliers and to challenging customers. With fewer social barriers, business related knowledge is rapidly transferred. Local buyer-supplier relationships are established based on long-term trust that facilitates co-development, not tightly written arms length dealings.

Further, as Professor Michael Enright has highlighted, an insider has access to *"The negative information flows within a cluster … quickly learning about failures and dead ends."* Access to high-value tacit information becomes available as the individuals within the cluster accept each other as trusted members of the community, as insiders.

6. Evolving Business Strategy

Within dynamic clusters, a firm's strategy is influenced by its surrounding capabilities. The firm no longer needs to be a vertically integrated, self-contained island. Strong clusters offer firms a more secure local supply chain, lower inventory costs and lower transaction costs, shorter innovation cycles, quicker time to markets and earlier engagement with emerging technologies. Importantly, this inter-organisational interaction opens opportunities for joint discoveries and co-development, providing individual firms the opportunity to draw on 'the wisdom of the crowd', stimulating new thinking and new perspectives.

A cluster provides a firm with opportunities to evaluate which activities are located where, how to enhance firm benefits from the location, and how to improve the value of the location in underpinning the firm's strategy. Drawing on a close knowledge of the other cluster stakeholders, coupled with confidence in outsourcing and sub-contracting to local partners as trust develops, each firm can focus on what it does best … it's core competencies. In strong clusters, there are shifts over time **to more focussed, networked firms with extended local links**. With these shifts come productivity improvements and enhanced competitiveness.

Firms tend to compete in areas where their products/service are substitutes and cooperate in areas where they are complementary. As the specialisation of the cluster develops over time, additional opportunities for collaboration develop and the focus of each firm within the cluster evolves.

Finland	*"Organisations don't die because they do the wrong thing. They die because they keep on doing the things that were once right for too long."* Mikko Kosonen, Finnish Innovation Agency
Jack Welch	*"If you think you can go it alone in today's global economy, you are highly mistaken."* Former CEO, General Electric Inc., USA
Harvard Business Review	*"The biggest process improvements are often those that transcend an organisation's boundaries."* Collaboration That Works, OnPoint, 2014
Professor Örjan Sölvell	*"The quality of a firms' strategies, resources and capabilities are to a high degree a 'product' of its proximate environment."*
New Zealand	*"If you want to drive innovation, you have to go outside and then go inside."* CEO, Air New Zealand

Private Sector's Lead Role in Cluster Development

As businesses are best suited to identify opportunities (the process of entrepreneurial discovery) and to prioritise constraints, the initiative needs to be business driven.

Although a clustering initiative is usually kick-started by a public agency, the likelihood of sustainable change is low unless business leaders come through to take the lead. Companies, in particular large companies, give early legitimacy to a clustering initiative. In the US there is a dominance of private sector leadership even in the early stages of cluster development, with scepticism on public sector ability to play a long-term productive role. The private sector has multiple roles:

1. Governance of the clustering initiative. The on-going leadership of the initiative should be driven by the private sector, in partnership with public agencies and academia. The cluster's Board needs to be led by private sector representatives, with the Chairperson and the majority of members being from business.
2. Ensuring that the culture of the Board and the clustering initiative is action orientated, learning-by-doing, rather than paralysis-by-analysis.
3. Actively engaging as part of the project teams that emerge to drive the cluster's strategy. Business representatives who have a passion for the issue ideally lead these teams.

Senior leadership is needed. Rather than put senior time into a clustering initiative, a firm may choose to delegate participation to junior subordinates or to slip stream as a free rider. What ultimately makes the difference is leadership of high quality, private sector companies. The reality is that the decisions that are made in the absence of senior participation will affect the firm's interests anyway.

Many of the challenges faced by a business can be, in part, addressed through participating as a team member within a cluster, even with competitors: upgrading skills, understanding and complying with government regulations; finding skilled workers; applying new technology; reducing costs; quality improvements; developing new markets; providing health care and child care to staff.

USAID	*"Successful cluster-based initiatives are private sector driven – with links to the public sector."* Promoting Competitiveness in Practice, An Assessment of Cluster-Based Approaches for USAID, The Mitchell Group Inc.
Economist Intelligence Unit	*"While some clusters might work without government backing, none will work without market forces."* Fostering Innovation-led Clusters

Danger Signs

- The private sector fails to earn a senior position of influence, leaving public agencies to separately assess a cluster's priorities.
- A clustering initiative that is started with public funding but continues to be owned/driven by public agency/political leaders.
- The focus of the clustering initiative fails to move beyond analysis, report writing and yet more workshops.
- When no business CEOs take the lead, the likelihood of sustainable change is low.
- No evidence over time of changes in firm behaviour, no evidence of firm collaboration, no evidence of increased business influence over support organisations.

CHAPTER 3.2

PUBLIC AGENCIES IN SUPPORT

Clusters are a natural occurrence; the intervention is 'Cluster Development'.

Even in the absence of specific engagement, public agencies are supporting cluster development.

Agency coordination around business needs is one of the most difficult aspects.

INVITED FOREWORDS

JOEP BROUWERS

Vice Director, Brainport Development N.V., Eindhoven, Netherlands

For the last decade the Dutch policy for strengthening the economy has focussed strongly on what the Dutch call 'top sectors'. Top sectors are areas where the Dutch see their economy excel in industry and research centres worldwide. Businesses, universities, research centres and government work together on knowledge and innovation, internationalization, human capital and to reduce regulatory pressure to further strengthen this position. In the first half of this decade this approach was combined with a strong attention to those regions in the Netherlands where these areas are concentrated. Well-known examples are the high tech systems and materials clusters in the South-East of the Netherlands, the so-called 'Brainport'.

In the second half of the decade the regional approach has been reduced in emphasis in the national economic policy. At the same time regional governments and cities have developed a stronger involvement in regional clusters and we have seen an up rise of strong and ambitious triple helix governance models with economics agendas that give direction to this cooperation.

PROFESSOR PIERO FORMICA

International Entrepreneurship Academy, Bologna, Italy; National University of Ireland; TCI Advisory Board

Public intervention for clusters demands a light touch. Governments should encourage private leadership rather than relying on public agencies with a mandate for cluster creation and development.

MURAT K. GÜRSOY

Former Coordinator, UNDP, Turkey

What we observe, more often than not, is geographical agglomerations of companies that have the potential but fail to exploit the benefits of being a 'cluster'. The companies are there but they are 'interconnected' neither with each other nor with the institutions, e.g. universities etc. surrounding them. Call it a coordination failure, market failure or systemic failure, but something is failing.

We have many tools at our disposal to help regional economies grow. Clustering has proven to be one of the most rewarding.

CECILIA JOHANSSON & EMILY WISE

VINNOVA, Sweden's National Innovation Agency

Based on experience from the EU project TACTICS[19] and a decade of running the VINNVÄXT programme in Sweden, we see that cluster initiatives are an important part of economic growth strategies in most regions in Europe – and elsewhere globally. Yet the concept of clusters as a policy tool has evolved – broadening from a local, industry-specific collaborative effort, to a more globally-oriented node that leverages its specialized strengths in order to gain a competitive edge.

This evolution has implications on cluster development. In addition to the continued importance of development of the cluster initiative as such - development of outward linkages has become of higher importance. For this the capacity to effective evaluate and communicate cluster performance, identify relevant opportunities and appropriate partners with complementary knowledge as well as the capacity to orchestrate more complex strategic alliances are all important skills.

This places new challenges on both cluster managers and policy makers. Cluster managers must balance the development of local dynamics and specialized strengths embedded in regional strategies for innovation and growth, with the development of outward linkages. Policy makers can facilitate these efforts through funding and leveraging cluster initiatives as a channel for more effective implementation of innovation and competitiveness policies. But something that is just as much important is to make the cluster development process easier through interactive dialogues with the cluster managers as well as well-suited coaching and education.

[19]See www.eca-tactics.eu for more information

KEVIN X. MURPHY

President, J.E. Austin Associates, Washington DC, USA; Former TCI Director

PHaving had the opportunity to launch many cluster competitiveness initiatives in emerging economies, I can attest to the importance of bringing government leaders, private sector leaders and other civic leaders (such as university leaders) around the table and aligning interests around the common goal of generating more economic activity and more and better jobs.

In Thailand, Vietnam, Sri Lanka and the Dominican Republic, the environments were favourable for creating this consensus and fostering appropriate action by the relevant parties.

In pre-revolutionary Egypt, the Government was not so open but now there is hope.

In countries that face significant domestic political turmoil or violence, such as in Pakistan, it has been much more difficult to bring the Government together with the private sector around a competitiveness theme when short-term difficulties overcome the strategic long-term thinking and the ability to cooperate. It has been difficult to change mind-sets from the traditional approach which favours protection and incentives to a mode that fosters a focus on global competitiveness through cluster development.

ALBERTO PEZZI

Head of Competitive Strategy, Government of Catalonia, Spain; TCI Director

Catalonia has been active on cluster development for two decades. Clusters have proved to be for us a very flexible tool for designing and implementing competitiveness reinforcement initiatives. Their main value is in the framework they provide to understand our businesses and in the possibility they offer to structure a constructive dialogue among the different stakeholders in regional development.

THE LATE FREDERIC RICHARD

Former UNIDO Director, Vienna; TCI co-founder

Fondly remembered colleague and a cluster development pioneer

Industrial clusters are the backbone of the industrial and regional development of developing countries and play a key role in the organization of global production and distribution systems. Their dynamics of growth and innovation is however often constrained by out dated technologies, inadequate linkages with new market opportunities, low levels of skills, inadequate infrastructure and support services and by a local competition based on costs and not on innovation, specialization and diversification.

UNIDO started its Cluster and Network Development Programme in the 90's when we realized that the main problem of small firms in developing countries is not their size but their isolation. UNIDO technical assistance focuses not on individual firms but on the collective development and up grading of the cluster as a local system of firms and support institutions. A key aspect is moving the cluster from a culture of low trust to a culture of cooperation in addressing common opportunities and challenges and in building the collective efficiency for the cluster.

A key UNIDO actor in the organization of the project is the Cluster Development Agent who acts as an intermediary and broker. The Agent works with the cluster enterprises and in co-operation with a local development agency in the formulation and implementation of a strategic framework for the long-term development of the cluster as a whole. Joint actions are developed amongst enterprises and between them and the local support institutions to address common bottlenecks and problems in the dynamics of up grading and the growth of the cluster.

NIKHIL TREEBHOOHUN

CEO, Global Finance Mauritius

Moving from a dysfunctional clutter to tight alignment is no easy task.

This summary from the chapter describes the arduous task of trying to develop clusters in a socio-political and economic environment where firms have been used to competing with each other for additional market share, where public sector institutions have been used to deal with enterprise problems rather than industry issues, where well connected entrepreneurs have access to the corridors of power to move their own individual interests, and where co-opetition is a totally alien word!

I have been very much involved with promoting the concept of clustering in Mauritius, first at the Exports Processing Zones Development Authority and then at the National Productivity and Competitiveness Council. Building strong clusters cannot happen without the committed support of public agencies and policymakers who are willing to wade through the clutter by elaborating a clear three to five year plan.

STUART TRUNDLE

CEO, Venture Taranaki, New Zealand

Historically, economic development was driven by top-down or bottom-up models - ideas and action to drive economic growth were vested with either businesses or agencies. As the region's economic development agency, in Taranaki we've been able to achieve a far greater level of engagement through a more collaborative approach to growth. That shift is at the heart of the rise and rise of cluster thinking, just as it is a critical driver of strong and sustainable economic development. Our best example is the oil and gas industry that has been resident in Taranaki for over 150 years. Venture Taranaki has worked closely with companies and the industry as a whole – though clusters, research and building a national hub and spoke model out of Taranaki that is already fuelling growth.

DOUGLAS ZENG

Senior Economist, The World Bank, Washington DC, USA

From the developed world to the developing economies, numerous clusters, ranging from cut flowers to designing iPads, have been contributing to the economic growth, employment generation, and technology innovation. These clusters have enabled enterprises to access and develop capital, skills, technology and markets and to grow and compete by leveraging local competitive advantage, fostering production value chains and achieving gains in efficiency.

While clusters are very dynamic and vital for economic growth, most of them were grown through an organic way. However, this doesn't prevent government from playing a facilitating role, such as providing infrastructure, and a sound business environment.

Don't Even Try to Create a Cluster

There is real danger in a public agency focussing on 'wishful thinking' or 'wannabe clusters'. Cluster development is a brownfield approach, not a greenfield approach, starting from scratch. First comes the entrepreneurial discovery of new opportunities and then comes cluster development.

A number of countries and regions have tried to create clusters from a zero base, often in 'high-tech' sectors. There are very, very few successful examples of clusters being created by public interventions. Many of the interactions within a cluster are too complex to be designed and implemented from scratch by a public agency. Even with considerable public investments over a ten plus year timeframe, it is a high-risk strategy. Many of the 'Silicon Somewhere' initiatives identified in Chapter 2 will fail to provide value to their public sponsors. If you are still dreaming of creating a cluster, take this advice into consideration:

Professor Antoni Subirà	*"It's extremely difficult to create a cluster out of nothing and there are as many examples of failure as you'd like. It's much better to try to transform an existing cluster or get a new one out of an existing cluster, like a 'cutting'."* Past Minister of Industry, Catalonia; Clusters and Competitiveness: The Case of Catalonia (1993-2010) Gascón, Pezzi and Casals
World Bank	*"Because the formation of clusters takes time and needs an ecosystem based on market forces, the purely top-down approach to cluster creation should be exercised with caution, especially in low-capacity countries, where many such efforts have failed."* Douglas Zeng
Dr. Christian Ketels	*"There is very little evidence that governments can create clusters and ample examples of where they failed in such efforts."* Clusters and Competitiveness: The Case of Catalonia (1993-2010) Gascón, Pezzi and Casals
USA	*"It is difficult for public policy to create new clusters deliberately."* Making Sense of Clusters: Regional Competitiveness and Economic Development, Brookings Institution, 2006
Dr. Stuart Rosenfeld	*"Clusters are fostered, not created. They cannot be wished into existence."* RTS Inc., North Carolina
Mesopartners	*"Trying to create a cluster from scratch, e.g. trying to develop an industrial park with the explicit objective of creating an industrial cluster there, is a futile exercise since it does not match with the realities of a dynamic market economy."* J. Meyer-Stamer and U. Harmes-Liedtke, 'How to Promote Clusters'
Canada	*"Montreal Metropolitan Community's role is not to create new clusters, but to find clusters that are already active."* Innovitech

Logic for Public Support

As Professor Michael Enright highlights in his foreword to Chapter 2, *"The most important reason to focus on clusters is **because they are there.**"* The clusters now under development in many European regions account for some 25-35% of economic activity, amounting to most of the traded side of the local economy. The logic for this level of engagement is:

Logic for Public Engagement	
Engaging with the traded economy **Generating a business driven strategy**	Providing 'insider' access for public agencies and politicians to key wealth-creating industries … lead firms, key influencers … improving the number of interactions and their quality, going beyond infrequent, superficial relationships. Improved information flows, ensuring that public agencies understand what matters for business success, with an in-depth understanding of the traded economy. Improving services coordination, centred on business needs. Minimising the danger of public investments lagging behind evolving business needs.
Beyond generic support **More targeted interventions**	Going beyond generic, i.e. lowest-common-denominator support, e.g. seminars, brochures. More targeted support to the traded economy, reaching the high potential firms with stronger growth opportunities.

	Public agencies are interacting with clusters even in the absence of a cluster approach. So leveraging public investments through tighter coordination, more integrated delivery around business needs. Improving response mechanisms to external shocks and opportunities. Addressing weaknesses in struggling regions, e.g. retaining high school levers.
Building an innovation economy **Removing silos** **Building the dialogue**	Bringing factions & functions into one neutral platform, mixing core & support firms, entrepreneurs & traditional business (banks, utilities) and the soft infrastructure. Bridge building. Boundary spanning between sectors. Engaging CEOs in the process of developing an industry-driven strategy. Dialogue, opening up new perspectives for development, investment attraction. Innovation … exploiting the advantages of a connected economy, social links, removing isolation, improving triple helix information flows. Creating a broad constituency for change.
Changing behaviours	Creating an environment where firms learn from each other. Changing behaviour patters amongst firms, breaking down the social barriers, facilitating co-opetition, co-specialisation. Joint engagement on large projects/bids, joint purchasing, exchange of insights, ideas. Development of specialised support firms … legal, financial, logistics etc. Through the cluster organisations, establishing self-help teams to move the economy forwards.

Professor Michael E. Porter	*"Mounting a sophisticated, aggressive cluster policy … will not require a lot of government investment, but it will require government to play a convening role, a participating role, and a listening role. If industry is to move to the next level, government must participate in the processes to learn what the constraints are and what the needs are."* Wellington Town Hall, New Zealand, 1998
Professor Örjan Sölvell	*"Policy makers often have only the vaguest notion about what business really needs."* On Strategy & Competitiveness, 2016
Canada	*"Clusters should be market led and supported by government policy."* *"Knowing how to design optimal policies requires frequent contact with firms."* Clusters in Ontario, Institute for Competitiveness & Prosperity, 2016
Professor Dani Rodrik	*"In order to be effective, public polices aimed to promote productivity growth need to elicit information from the private sector."*
UK	*"Clusters cannot be created by design. Their origins are largely accidental, and they often evolve to fill market niches that are difficult for governments to anticipate."* Lord Sainsbury, Former Minister of Science & Technology, CentreforCities / McKinsey, 2014
Denmark	*"The public sector cannot and should not try to guide the development of a cluster. The public sector can, however, un¬derpin and support cluster formation, networking and de¬velopment of the cluster themes at a strategic level."* Towards an International Food Cluster in Denmark, REG X, The Danish Cluster Academy, 2013
Inter-American Development Bank	*"Cluster development programs represent an important opportunity to remedy the coordination failures that constantly hinder the process of economic development."* Cluster Development Programs in Latin America and the Caribbean, 2011

Coordination Failures

A major objective in cluster development is building alignment amongst a range of policy strands and public agencies. For many clusters, the participation of relevant agencies extends to:

- Industry policy; science & technology policy; public R&D;
- Industry/science parks; incubators; testing facilities;
- Sector development; value chains;

- Regional development;
- SME development; entrepreneurship; micro-credit; venture capital; seed funding;
- Export development; investment attraction; migrant attraction;
- Foreign Trade policy; market access; non-tariff barriers;
- Primary Produce; Manufacturing; Forestry; Tourism;
- Competition policy; regulations; product standards
- Labour; workforce development; management training;
- Education; vocational training; universities; schools;
- Health and safety; Environmental stewardship.

Coordination failures amongst agencies occur naturally, due more to remoteness than neglect. Many agencies have limited interaction with firms, especially SMEs, yet have programmes to deliver to support those businesses. At the extreme, public agencies are separately second-guessing a cluster's needs. Each have their individual strands of information, with silos (and at times overlapping functions) limiting the opportunity for these strands to be integrated.

Public coordination complexities are increased when in many countries the regional / state / provincial governments; the municipal / local governments, and in developing economies, a multiplicity of well-intentioned donors / NGOs need to be included along with national agencies. A disconnect may exist between national economic policy and regional/urban development policy. Similarly, there may be a disconnect between sectoral policies at the national and regional level. Regions are often closer to the action and better positioned to take the lead.

Public agency choices on physical infrastructure developments, the location and focus of educational and research institutions and regulatory issues all impact a cluster's competitiveness.

Cluster development provides an opportunity to remedy this fragmentation and through dialogue to **establish joined-up government services around the needs of specific clusters**. Through a clustering initiative, priorities can be discussed, gaps identified and duplications addressed. Quick and flexible responses are particularly important for clusters engaging internationally, facing unpredictable markets and technologies. Accessing a multiplicity of support organisations is time consuming for firms and risks negative interactions.

Rodin Genoff, an Australian cluster consultant, refers to *"the difficulty in getting lined-up government."* This is one of the most complex, yet super critical, aspects of cluster development. Removing agency *clutter* is far from easy and is one of the central activities of a cluster organisation and cluster manager. Successful clustering initiatives are able to influence the agendas of a multiplicity of agencies in real time. Moving from a dysfunctional *clutter* of support agencies, each with individual development agendas for the cluster, to consistent and aligned support from government agencies, especially national agencies, is no easy feat. Strong clustering initiatives are able to identify priorities for public support, with agencies responding. Public agencies responses are then not short term and ever changing.

Clusters provide an effective platform to cost-effectively service groups of firms. An effective dialogue process should result in more narrowly targeted public investments that are centred on the needs of business. In totality a successful clustering initiative may well not need an increase in public funding.

Public Agency Coordination Failures	
Addressing Support Agency *Clutter*	
Inter-American Development Bank	*"Public–public coordination … the most difficult of all targeted forms of coordination. The expectations were that, after generating a detailed diagnostic of the cluster's strategic needs and identifying the missing public and semi public inputs, multilevel coordination within public agencies would find it easy to coordinate interventions. However, the differences among public actors in mandates, bureaucratic processes, strategic views, and short-term political considerations trumped the collaboration opportunities the Cluster Development Programs generated. The higher the level at which collaboration was sought (e.g., between national ministries), the lower the degree of success."* Impact Evaluation of Cluster Development Programmes, 2016
Australia	*"A challenge: the multitude of duplication. Some organisations were not prepared to cooperate or share information that was not commercially sensitive, even though they were funded by taxpayer money."* Food Innovation Australia Ltd, Annual Report, 2013-14

World Bank	*"Business support mechanisms tend to be scattered across multiple agencies and departments of national government."* Making Cities Work for Central America, 2016
European Commission	*"Position clusters as integrators across policies, sectors, regions and borders."* M. Baldinato, Commissioner for Industry & Entrepreneurship, European Cluster Conference, 2014
JP Morgan Chase & ICIC	*"A city's small business support is often comprised of an uncoordinated set of programmes developed by a disparate group of private and public sector organisations. Focussing small business initiatives around cluster strategies should increase the initiatives' effectiveness because it would provide a strategic direction that connects small business growth to a city's comprehensive advantages."* The Missing Link: Clusters, Small Business Growth and Vibrant Urban Economies, 2014
Inter-American Development Bank	*"Cluster development programs are tools to coordinate microeconomic policies. They are often flexible enough to adapt to local circumstances and needs. Through their participatory approach they have often helped to identify the missing public inputs, the public policies needed, to prioritize policies, and create consensus. ('Discovery' of the right policies). Many programs have created local conditions for better coordination and collaboration among firms and with public entities, 'Platforms' to facilitate coordination and joint actions."* Carlo Pietrobelli, TCI global conference, Monterrey, 2014
OECD	*"Cluster policies are also promoted by different policy streams, which impacts the targets and instruments used. Policy streams commonly promoting cluster-type policies include: regional economic development policy, science/ technology/innovation policy, industrial/ enterprise policy, and even higher education policy. A cluster policy may be at the intersection of more than one policy stream given their increasingly shared goals."* OECD Innovation Policy Platform, 2010
UK	*"Boroughs pursuing cluster development have an opportunity to co-ordinate streams of support between different delivery agencies to achieve more targeted assistance. We were unable to find examples of where the full range of business support offerings, e.g. private consultancies, chambers, the boroughs, academia and trade associations were truly 'joined-up'. There is an opportunity for local authorities to take the lead in bringing together the providers."* Supporting Business Clusters, London Councils
Dr. Christian Ketels	*"Focus on those specific sectors of the economy where an impact is needed. Then integrate policy packages."* TCI global conference, Auckland, 2011
USA	*"Maximise impact by leveraging cluster-relevant pre-existing approaches, programmes and initiatives. Specific, targeted cluster-orientated initiatives are clearly justifiable, but equal value and added impact may well come from drawing other, more generally relevant programes into the cluster orbit. For example, workforce training programes and small business finance may all be rightly viewed as 'cluster programes', just as banking regulations, tax credits for venture capital and education policy.* *In this way, 'clusters' and cluster strategies are less a specific program than a framework through which to shape and coordinate disparate policies. Cluster thinking and cluster strategies are more a paradigm than a single program."* Metropolitan Policy Program, Brookings Institution
European Commission	*"Responding to shortcomings in regional innovation policies:* *Fragmentation and duplication of public investments for R&D and innovation within and across regions; Lack of critical masses for innovation activities in regions; Lack of cooperation between knowledge economy actors: science, business, administration, social partners, creative individuals… ; Missed opportunities in cross-border innovation (policies); Priority choices driven by pressure from lobbies - short political cycles - weak strategic approaches - short-term views; Gap between policy documents and policy mixes – inertia; Insufficient drive, immature tools for outcome-driven policies."* The future cohesion policy: Clusters as critical instruments to implement smart specialisation, Claus Schultze, DG REGIO, TACTICS workshop, 2012

World Bank	*"Central level coordinating strategies include inter-ministerial or inter-agency committees that conceptualize, design and respond jointly to cluster-based policy recommendations. These are necessary for public-private dialogues to be meaningful."* Clusters for Competitiveness, A Practical Guide & Policy Implications for Developing Cluster Initiatives, 2009

Addressing fragmented delivery structures is a major challenge worldwide. Denmark and UNIDO have successfully put national-level structures in place to improve coordination.

Two Stand-out Responses to Coordination Failures	
Denmark	*"The updated Cluster Strategy for 2016- 2018 has been drawn up in partnership with the parties in the Cluster Forum, i.e. the Ministry of Higher Education and Science, the Ministry of Foreign Affairs, the Ministry of Business and Growth, the Ministry of Environment and Food, the Ministry of Energy, Utilities and Climate, The Ministry of Health, all six regional growth forums, Danish Regions, Local Government Denmark, as well as Copenhagen, Aarhus and Aalborg municipalities."* Strategy 2.0 for Denmark's Cluster and Network Policy, 2016-18
United Nations Industrial Development Organisation	*"The Steering Committee consists of major national stakeholders that have a direct interest in the cluster development initiatives being undertaken and can provide useful inputs to them. These normally include the Ministry of Industry and Trade, the Ministry of Education, sector specific line ministries, industrial promotion organizations, export promotion agencies, research institutes and universities and development finance institutions and banks."* The UNIDO Approach to Cluster Development, 2013

Role of Public Agencies

European Commission	*"Europe does not lack clusters, but persistent market fragmentation, weak industry-re¬search linkages and insufficient cooperation within the EU mean that clusters in the EU do not always have the necessary critical mass and innovation capacity to sustainably face global competition and to be world-class…"* Towards world-class clusters in the European Union, , SEC 652, 2008
Sweden	*"Public funding is important to the cluster initiatives in order to fulfill their vision, mission and activities, but is often short-term oriented. It is not realistic to consider that the Cluster Initiatives can be funded completely by the active private sector and revenue from external assignments."* Klusterprogrammet 2006-2010, Swedish Agency for Economic & Regional Growth, Tillväxtverket
Professor Örjan Sölvell	*"Cluster development: A small public investment with a big impact."* European Cluster Managers Conference, Vienna, 2012
Canada	*"The role of the (Canadian) federal government in clustering is supported by the approaches taken in other OECD countries. A recurrent theme …the short-term funding was found to hinder the attraction and retention of highly qualified personnel in the cluster initiatives."* Portfolio Evaluation of the Technology Cluster Initiatives, National Research Council

Evolving Public Agency Instruments over a Cluster's Lifestyle	
Embryonic clusters **SME support rather than cluster specific**	Entrepreneurial business mentoring (soft support) for high potential SMEs. Promoting entrepreneurial experimentation. Identifying emerging activity patterns, ecosystems. Removing SME isolation, acting as a broker connecting related firms. Linking specialised assets/knowledge within the region (e.g. R&D, graduates) to local firms.

Growth clusters **Cluster specific support**	Identifying firms within the traded clusters with common agendas. Sponsoring firm networking events. Identifying cluster bottlenecks/system gaps; ensuring public agency coordination and policy continuity across multi-levels. Providing legitimacy to an emerging cluster; establishing institutions for collaboration; long-term support for a cluster organisation. Facilitating joint projects amongst firms, coordinated purchasing. Joint projects with universities, research organisations. Establishing specialised R&D infrastructure and knowledge base; needs driven R&D, training; technology transfer support, university outreach. Providing labour market information, needs driven technical training, skills. Supporting business and academic spin-offs. Industrial PhDs Business finance, advisory services, angel network, seed funding, venture capital. Co-locating related firms: specialised incubator/accelerator, technology park. Cluster labelling, marketing. Internationalisation support: outwards links; exports, export networks, consortia, supply chain links, two-way FDI, talent attraction & retention, student attraction, linking related clusters. Innovation orientated public procurement. Input into policy regulations, technical standards. Traded clusters informing the upgrading of the general business environment
Mature clusters **Niche support**	Internationalisation Engagement around the cluster's hot-spots/higher growth niches … the next generation clusters? Supporting second and third stage entrepreneurs

FDI and Clusters

Foreign direct investment is on the agenda of many countries and regions. In some locations, it is a core economic development strategy. Promotions emphasise 'Central Location, 'Unique Lifestyle', 'Low-Cost', or just 'Open for Business'. This generic positioning can be supported by subsidies and tax breaks. In reality, in many environments this is a high cost strategy offering low returns. Delivery disappointments with this strategy take time to surface, often extending beyond political cycles, and can in the meantime be well camouflaged by PR activity. Success through over bidding can bring a 'winner's curse'. Further, for prospective investors the availability of financial inducements provides an early alert to imperfections in the region's ecosystem.

So what is a smart strategy for attracting and locking-in international investment, particularly knowledge intensive activities?

Quality investors are searching for environments that offer technical skills, related and supporting firms and training institutions. The proximity of a research university may also be important. Innovative clusters signal that their location is an advantageous one for their activity. **Clusters therefore provide a natural focus for quality investment**, as the go-to place that is building their industry's future.

Many European FDI agencies are concentrating marketing efforts (and their after care servicing) on specific clusters. Proactive investment attraction addresses identified capability gaps within those cluster. These agencies also assist outward investment from their clusters, with the development of cluster-to-cluster links supporting such two-way investments.

FDI attraction is then not an end in itself, but overlaps with strengthening the regional economy and the existing clusters. Quality FDI enhances the cluster, bringing in new knowledge, new capital and new international connections. Quality investments boost the cluster's visibility, influence the location decisions of other firms and attract talent, possibly the most important asset of all.

Targeted FDI Examples	
Sweden	Sweden's robotics cluster has developed around ABB Robotics. The company had concerns that a major Japanese competitor might establish a base in 'Robotdahlen'. But such a move would have major benefits to the cluster itself, and probably to ABB, in the longer term. Nearby in Örnsköldsvik, at the 'Biorefinery of the Future' cluster, the mayor went out of her way to welcome a major Indian investment. The Indian textile company had searched the world, seeking to invest in a knowledge centre that offered an alternative to cotton.
Belgium	In Wallonia, each major clustering initiative is supported with a senior expert from Belgium's Foreign Trade and Investment Agency. This person has responsibility for developing the cluster's international promotion strategy, for promotion activities and for attracting foreign investors.
Ireland	IDA Ireland carefully identifies and courts strong companies in narrow niches to persuade them to locate in Ireland.
International Monetary Fund	*"Investment promotion policies should focus specifically on clusters."* Clusters as Driving Engine for FDI, WP/05/193
Dr. Christian Ketels	*"Clusters can effectively communicate the unique advantages a location offers, much better than general attributes like 'open for business' or 'entrepreneurial' "* Clusters and Competitiveness: The Case of Catalonia (1993-2010) Gascón, Pezzi and Casals
Canada	*"The increased importance of the innovation-based economy has led many regional policy makers to shift from big-firm-hunters to regional cluster or agglomeration builders."* Open for Business: Strategies for improving Ontario's business attractiveness, Institute for Competitiveness & Prosperity, 2015.
USA	*"The best way to create more jobs in a state is to grow them at home, rather than poach them from elsewhere: Some 95 per cent of all job gains in a year in an average state come from the expansion of existing businesses or the birth of new establishments. However, the usual recipe of tax credits, R&D, training programs, and physical infrastructure is not sufficient, by itself, to spur such "organic" job creation. States also need to cultivate their industry clusters. Properly designed, cluster strategies are a low-cost way to stimulate innovation, new-firm start-ups, and job creation by helping to link and align the many factors that influence firm and regional growth."* Job Creation on a Budget: How Regional Industry Clusters Can Add Jobs, Bolster Entrepreneurship & Spark Innovation, Brookings Institution, 2011
Professor Dani Rodrik	*"What we have come much more to understand about the nature of development policy and the policies that tend to support it is that the key in all these instances is to get your own domestic producers, your own domestic investors, your own domestic entrepreneurs excited about investing in the home economy. That in some sense is the central challenge of development - not how to get exports out, not how to get foreign exchange in – but how to excite your own domestic entrepreneurs to want to invest and to be entrepreneurial in the home economy."* EEA, Vol. 111, 2003/2004
Vietnam	*"We find strong evidence for productivity spillovers from clustering. The effects of these spillovers are found to be particularly large for foreign-owned firms. Our results provide support for spatial clustering policies in developing countries aimed at attracting foreign investment."* Productivity-enhancing manufacturing clusters – Evidence from Vietnam, Emma Howard et al, United Nations University, WIDER Working Paper 2014/071

Industry Parks & Incubators

Many public agencies around the world are engaged with the development of industry parks and business incubators. Some agencies mistakenly view such developments as 'cluster development'. While neither an industry park nor an incubator is a cluster, both can be important aspects of a cluster's physical infrastructure. The physical co-location facilitates connections and face-to-face meetings, generally reduces transaction costs and makes it easier for firms to focus on their core competencies and out-source.

However, physical proximity does not necessarily imply social proximity. Both are needed to create an environment where tacit information flows and a co-opetition culture are widespread. **The real added value of industry parks and incubators lies in sharing know-how rather than sharing physical space**.

Most industry parks (which may be given a more up-market label as a 'Science Park' or a 'Technology Park') and incubators have a limited role in enhancing entrepreneurship and contributing to regional development. Too often industry parks are isolated enclaves. The firms invited to be within an incubator or industry parks need to have commonalities of substance for the intervention to be particularly successful. This then enables a proactive focus on building the connections between the co-located firms, i.e. much more than real estate development.

When introduced, incubators and science parks should be considered as part of a broader economic strategy that is centred on the region's clusters. It is the commonalities amongst the business services offered by the incubator and industry park management that are the key to their success: specialised training; business advice that relates to the specificity of the cluster; and financial, legal and technology support that relates to the narrow needs of specialised tenants.

Examples, Specialised Physical Infrastructure	
Honduras	San Pedro Sula: A dedicated industrial park to attract key global call centres.
USA	North Dakota: Civilian industrial park for unmanned aerial vehicles / drones, near Grand Forks Air Force Base.
UK	Advanced Manufacturing Park, Teesside - Offshore Wind Validation Centre.
UK	Malvern Hills Science Park, with a cyber security focus.

A European Commission report provides a valuable typology of business incubators that links the degree of technology specialisation with the level of management support. Those incubators that have a high level of management support *and* a technology specialisation will be particularly valuable components within a cluster's eco-system.

A Business Incubators Typology				
		Technology Specialisation Level		
Management support		**Low**	**Medium**	**High**
	Low	Industrial estate	Business park	Science park
	Medium	Managed workshop	Enterprise centre	Innovation centre
	High	Multi purpose business incubator	Business & innovation centre	Technology centre

Source: European Commission, Benchmarking of Business Incubators (2002)

While incubators have a very tight geography and industry/science parks are part of a city or region, **special economic zones** have a broader geography and can span a city (such as Shenzhen, **China**) or even a province. Special economic zones (sometimes called free trade zones, freeports, export processing zones, industry precincts or development corridors) are designated areas offering tax incentives and/or lower tariffs and streamlined customs procedures to attract overseas investors. Many have been particularly successful in attracting labour intensive activities. Not unsurprisingly, many special economic zones house clusters of related firms, though this is through evolution, rather than design. I have visited the Antalya Free Trade Zone in **Turkey**, which happens to be by the sea, and is now evolving into one of the Mediterranean's leading yacht-manufacturing clusters.

Examples, public engagement

Today many clusters are receiving substantial public support. Following a competition in **Sweden**, the national technology agency VINNOVA is providing Euros $1 million a year for 10 years to develop their key clusters, including Bio Uppsala; a functional foods cluster in southern Sweden and a process ICT cluster close to Lapland. This national funding is being more than matched from local sources.

France offers 3 years funding to their national clusters, the pôles de compétitivité, with the intent of continuing beyond that short timeframe. **Sweden's** VINNVÄXT programme and the **Norwegian** NCE programme both offer ten-year funding to their priority clusters, with three-year reviews. The focus of the reviews is not so much on a green light/red light decision on whether the clustering initiative should continue but rather providing input for the next stage of the cluster's development. Assuming the clustering initiative is moving forwards and that public funds are not being applied to subsidise the same activities, then public funding should remain in place long term. FIAL headlines

National cluster programme owners such as VINNOVA (in **Sweden**) and Innovation **Norway** do much more than just provide financial support to their clusters. The hands-on role includes regular review meetings with each cluster's management team and board and bringing the cluster management teams together for common forums and workshops. These includes training cluster managers; sharing experiences in working with universities, schools and public R&D institutions; bench learning from other clusters; internationalisation and export development; the practicalities of developing a cluster's brand.

Cluster Excellence Denmark provides a similar support role with on-going learning opportunities for Danish cluster managers. The Kompetenznetze Deutschland initiative of **Germany's** Federal Ministry of Economics and Technology brings together the best-performing innovation clusters in Germany. These are grouped into nine themes and eight regions.

Further funding for many European clusters comes from Brussels where there is a strong focus on linking related clusters across the EU to build the critical mass to address international competition.

In Europe there is substantial reliance on the public sector with the availability of EU funding leading to an upsurge of well-grounded clustering efforts across Europe. Many Latin American countries have national cluster programmes in place. In the US, public agencies tend to play a supportive rather than a lead role with cluster development, though this is now changing with more Washington engagement. Multilateral agencies, donors and NGOs are active across Africa, the Middle East and Asia. However, the time horizons for many of projects are limited.

In Northern Central **Sweden** the three regions of Dalarna, Gävleborg and Värmland are actively collaborating with their clustering initiatives, enabling each initiative to engage within its functional region.

The involvement of national agencies is at times needed to ensure that cluster development is not artificially constrained within historic boundaries.

Public Agencies Following Entrepreneurial Discovery

An example from China

Once a cluster has gained momentum, regional and municipal authorities in China can be very proactive in addressing roadblocks and growth impediments. These public investments follow the development of a cluster; they do not create it.
Investments have included specialised industry parks, logistics centres, integrated training and cluster information centres. Many clusters have established technology support centres and specialised training facilities at local colleges and schools with the support of regional and municipal governments.
At times, as in the Wenzhou shoe cluster, the establishment of minimum standards is in parallel to support for the development of branded products. Specific regulations in the Puyuan cashmere sweater cluster and others have been enacted regarding product quality.

"The success of Chinese industrial clusters is inseparable from local governments' strong support and nurturing. These supports often come during the middle or later stages when the clusters have demonstrated their potential."

Douglas Zeng,

Building Engines for Growth and Competitiveness in China, World Bank

Catalonia The region passed from cluster initiatives very narrowly defined to initiatives with a wider span and not defined by a sector but by a strategy or a market, such as Gourmet Food or Kids.

Cluster Support Programme Example	
City of Fort Collins, Colorado, USA	
Peer networks	Interacting with peers. E.g. CEO roundtables; occupation-specific professional development workshops; industry-specific symposia.
Suppliers & inputs	Better access to supplies or suppliers to reduce costs. E.g. recruitment of suppliers, purchasing cooperatives, and shared storage facilities.
Talent	Increased access to qualified workers. E.g. customized training programs for key occupations, marketing to build Fort Collins brand in industry, informative relocation-oriented website geared at specific talent segments, collaborative recruitment.
Markets	Increased visibility in market segments and improved market penetration. E.g. export/trade assistance, co-marketing opportunities at trade shows, trade delegation trips, and general marketing activities that promote a Fort Collins brand.
Capital	Improved access to capital networks – local and beyond. E.g. local angel investor network, local revolving loan fund, networking opportunities with venture capitalists, events to raise awareness of Fort Collins entrepreneurs.
Industry intelligence	Access to data and market research to inform business planning and strategic decision-making. E.g. shared access to industry databases and new sources, research assistance, industry conferences.

Source: http://www.fcgov.com/business/pdf/cluster_fund_application_2015.pdf

Many of Europe's clustering initiatives have public funding in place for 5, 10 even 15 years. This level of resourcing enables clustering initiatives to have dedicated Cluster Managers in place under long-term contracts.

Canada	Montreal International, a public-private partnership delivering regional services focused on supporting local businesses and implementing a cluster strategy.
USA	Metro Denver Economic Development Corporation, with a focus on eight clusters, offers proprietary market research and analysis, assists companies with site selection, and advocates on behalf of its members.
Chile	CORFO, Chile's national development agency, has over eight years (1) set up, then (2) abolished and finally (3) recreated a 'productive cluster' programme as three consecutive governments have changed political priorities.
Singapore	The Prime Minister announced a Committee on the Future Economy, 2015, to *'identify and design growth strategies for priority clusters'.*
USA	*"Chicago's Plan is centered on six clusters and involves infrastructure improvements, attraction or retention of jobs through incentives, creating demand-driven and targeted workforce development and aligning capital access, training and networks to accelerate business growth within clusters."* The Missing Link: Clusters, Small Business Growth and Vibrant Urban Economies, JP Morgan Chase & ICIC, 2014
Spain	The Basque Country has over two decades of cluster development experience. Each clusters receives a grant of up to Euros 240,000, from the provincial government annually as a contribution towards the cluster's operating costs, covering around half of these costs.
Sweden	Nationally supported are receiving around Euros 1 million annually, with this funding level being at least equalled by local partners, funding is in principle locked in place for ten years,
Norway	Norway's Centre of Excellence clusters are receiving around Euros 500,000 annually from Innovation Norway. Norway's shorter-term Arena programme offers some Euros 200,000 a year financial support for a 3-4 year period.
Mexico	Nuevo Leon State, Capital: Monterrey, Population 5 million. 11 clusters under development: Nano, Bio, Aero, Medical Services, Energy, Automotive, Home Appliances, Multimedia, Logistics, Sustainable Housing, Agriculture. Each initiative has a focus on HR and on commercialising innovation; some have cluster-specific incubators.

A typical **European Union** cluster programme is supporting 12-20 clusters in a country, with an annual budget of Euros 5-10 million. Whilst there is considerable variety amongst cluster organisations, typically each is working with 100-150 firms; the cluster organisation has 3-5 staff and receives around Euros 500,000 annually in public funding.

Sweden's Paper Province is a clustering initiative that has not received funding from national agencies. This initiative was successful over 10 years in received funding of Euros 400,000 a year, with one-third of this coming each year from regional public support, one-third from business and one-third from EU funding.

Advice to Regional Agencies

Many public agencies have roles to play in cluster development. Even when clustering initiatives are largely funded by national agencies or donors, sustainability is enhanced when those initiatives are regionally driven. Advice to regional public agencies follows.

Cluster development - a marathon	Be patient for results … cluster development is not a sprint. Long-term public engagement brings business interest, high quality boards and professionally competent cluster managers. Ensure policy continuity.
Provide early legitimacy	Introduce to your region the merits of cluster engagement. Carefully use your convening power. Supporting data collection. Ensure open, transparent, fact-based. Supporting the establishment of a cluster board, offering high-level participation. Ensure the initiative is not artificially limited, e.g. to SMEs, to an ethnic group, within political boundaries. Ensure not competing with industry associations, private sector. Link local businesses to the clustering initiative. Link local residents to new job opportunities.
Careful cluster selection **Establish a cluster portfolio**	Don't try to create clusters; clusters are natural occurrences. Diligently understand the region's distinctive assets. Go with the strong, not the ambulance cases. Including some experimental, more embryonic clusters. What is being created is the clustering intervention. Avoid the 'wishful thinking' clusters. Unfashionable clusters may well be very relevant to the region's economy. Ensure that cluster engagement comprehensively addresses the region's traded economy. Simultaneously engaging with a number of clusters within a region. Avoid over dependency, lock-in to existing clusters. Use clustering efforts to inform the upgrading of the general business environment. Enabling cross-cluster, the systemic, agendas to be identified from the bottom-up.
Flexible resourcing	Resourcing the cluster organisation Co-funding
Clusters are not islands	Ensuring engagement beyond the cluster. Linking within the region. Linking related clusters nationally. Linking globally, including to other knowledge centres.
Designing clustering initiatives	Differentiating each cluster. Linking with other clusters, within the region and beyond. Encouraging cross-sectoral collaboration. Seeing the big picture. Local agencies informing/influencing national agendas. Ensure (1) baseline data is gathered, (2) tight alignment between businesses and the soft infrastructure, (3) collaboration within and beyond the cluster, (4) that the clustering initiatives are outward looking, (5) that the Board is not reduced to an advisory role. A governance structure in place that is led by the private sector Expansion in the range of products/services being offered, leading to diversification. Addressing the white spaces between clusters … where new clusters emerge. Ensure that clustering support is not duplicating other public funding.

Cluster Ignition Team	The team that starts addressing coordination failures. Evolves into an on-going Technical Support Team.
If you build it, they may NOT come	Infrastructure investments support but do not create a cluster, e.g. precincts, technology centres & parks, innovation hubs, incubators, special economic zones … Simply renaming (e.g. from industry park to Innovation Corridor) certainly does not create a cluster.
Don't shelter or favour	Don't shelter against new competitors, technology changes, and market changes. Don't favour individual businesses with subsidies, tax breaks. Don't relax competition or environmental legislation.
Align the *clutter*	Prioritising and integrating public support. Ensure central government structures don't inhibit local teamwork.
Remove firm isolation	Removing the *clumps*, building the social connections, a co-opetition culture. Identifying opportunities for collective action. Ensuring firms
Regular communications, reporting	Firms are closer to the market than public agencies. Monitor performance, evaluate impacts. Seek evidence of behaviour changes. Communicate regional priorities/issues to higher-level agencies. Over communicate to politicians; ensure they have opportunities to engage with the clusters.
Provide flexible funding	Welcome other public agency/donor support, but that support should not determine the existence of the clustering initiative; view additional support as a temporary bonus. Able to adjust the funding / resourcing to changing conditions, e.g. a promising technology failing to deliver. Clustering initiatives may merge or sub-divide. Ensure bureaucratic processes in releasing public funds don't sap private sector energy.
Process support equally important	Not just funding support. Training cluster managers, briefings to cluster Boards, linking clusters within the region and further afield.
Clustering as a centre-stage strategy	Not yet another economic development project A holistic, integration approach. Use FDI attraction as an in-fill strategy.
A participant, not the leader	Even if you are the main funder, it is not your cluster. Don't predetermine the cluster's strategy. But do engage as a senior participant, bringing your knowledge and perspectives. Cluster development is an organic process, be comfortable in learning-by-doing.

Long-Term Public Support	
United Nations Industrial Development Organisation	*"Rushing to get short term results ultimately tends to lead to failure. Enough time needs to be allocated to the project (generally no less than three years) for the culture of cooperation to take hold."*
Germany	*"Research has shown that clusters receiving sustainable financing (public and private) over a longer period tend to develop better than those without it."* German Institute for Innovation and Technology, IIT Perspective #9, 2012
France	*"The French experience shows that the sustainability of clusters is very closely related to a long-term public support, leading clusters to maturity and in the very end, to autonomy. In such a naturally gradual process, clusters should not be restrained nor compelled to self-financing within short periods of time."* TACTICS, Where the Cluster Winds are Blowing in Europe, 2012

CHAPTER 3.3

ACADEMIC UNDERPINNING

Any internationally competitive cluster, whatever the specialisation, has knowledge foundations.

As knowledge conduits and creators, academic institutions underpin strong clusters and have a central role in further extending the cluster's knowledge base.

INVITED FOREWORDS

PER ERIKSSON

Former Vice Chancellor, Lund University, Sweden; Previously Founding CEO, VINNOVA, Sweden's national innovation agency

In order to develop a world-class university, it is very important for the university to interplay with industry and the public sectors represented by the political leadership. This is needed to form an internationally attractive university region. It is not easy to form a world-class university without a region that has a truly knowledge based industry sector where you can interact, cooperate and exchange competence and people, and maybe most importantly deliver bright graduates. You can also use these relationships and trust to link up to international cooperation and the exchange of competent people, forming a win-win situation. The interplay with the public sector is also important in order to provide an attractive region with good international schools, good housing, communications, culture, science parks, incubators and so on.

Of course you need to have matching competence between the university and industry sectors in one or more areas. In addition you need to have complementary competence outside these areas in order to influence with new and different views and ideas. With good trust between the different actors you can also engage more proactively (such as jointly undertaking market foresight studies) and of course working together to handle crises and challenges. This forms a truly triple fold win-win situation for the university as well as for the industry and the public sector. This will certainly support the development of an attractive region with a world-class university, industry, public sector and living conditions. The examples and advices given in this chapter are therefore very valuable.

DR. FRÉDÉRIC MIRIBEL

Director, Invest in Lyon–Aderly, France; TCI Director

The involvement of Academia is mandatory in the French clusters, the Pôles de Compétitivité. Indeed, to benefit from government support, any R&D project launched by a cluster has to count at least three partners: two companies and one academia. This explains why around a quarter of the cluster members are academic institutions: national or local research laboratories, universities or other secondary training institutions. The idea is to have local academia fully immersed with local business activity, in line with current trends in the cluster, and shaped for the future.

The Lyon Urban Truck and Bus Cluster - LUTB - led by VOLVO/Renault Trucks and IVECO/Irisbus, has many on-going projects with engineering schools (INSA, Centrale, Université de Lyon) and laboratories (LET, IFSTTAR, CPE). Around 60 projects have been approved, representing M€200 investment, of which a third is financially supported by public funds. Meeting together in think tanks, they have defined a technological road map foreseeing the future of transport in urban areas.

The clustering initiatives are also influencing our training programs. At LUTB for instance, industrial partners were becoming more and more concerned with hybrid engines and not satisfied with the traditional break down between Mechanic and Electric engineering at INSA engineering school. Hybrid is by definition a mix of competencies. The school has then crossed the bridge between the two disciplines and adapted its training program to the needs of this emerging technology. LUTB is considering the establishment of a chair on automotive and transport at the University of Lyon, to adapt the educational system to their technological roadmap. Local companies will benefit from sharp and well-adapted competencies.

At the high school level, clusters can have an important influence. At AXELERA cluster on chemistry and environment, the large chemical companies needed to change the image of the sector to the young public. The clusters have organized special communication events towards high school students to explain the crucial role of chemistry in the development of clean and green technologies (solar PV, soil remediation, materials, clean fuel, recycling).

In a country such as France, where Academia and business have been separated for so long in the past, mentalities are changing fast thanks to the cluster approach.

TONY CAUGHEY ONZM

Past Chairman, Ambassador, Young Enterprise Trust, New Zealand

There is an important but under recognised link between local high schools and cluster development. The interface between schools and business can be a minefield. Some teachers are outstanding. Others have no appreciation of how students can be taught to be self-employed or be alert to where the quality jobs are likely to be within their community.

New Zealand's Young Enterprise Trust has run business programmes in schools for over 30 years with 50,000 students participating each year. In one programme, final year students create a student company assisted by a business mentor from the local business community. They design and make a product or service, which they sell, hopefully at a profit. Numerous examples exist of where the product is aligned to a local cluster, such as fruit sauces in a food cluster. In another programme, local business people are invited into schools to judge a 3-day business programme where the students design a product and prepare a marketing plan. Students learn and the schools are better connected to their local business communities.

I firstly offer general comments regarding academic underpinning, and then comment individually on the roles of universities, public R&D, vocational training institutions and high schools.

Strong Clusters, Strong Knowledge Centres

All go-to clusters, whatever their field of activity, are knowledge hubs. The cluster's development is underpinned by new knowledge that is relevant to and absorbable by the cluster's firms. High value knowledge is sticky to a place. Its circulation is dependent on tacit information flows through personal connections.

Urban Studies	*"While global knowledge flows are certainly important to the competitive success of local firms, the local knowledge/science base represents a major generator of new, unique knowledge assets. Local universities and research institutes constitute an important part of this base as 'anchors' that generate highly skilled graduates, spin-off start-ups, and new, publicly available knowledge (often developed interactively with others)."* David A. Wolfe & Meric S. Gertler, 2004
Centre for the Study of Rural America	*"In college and university towns across America, a mutual dependence exists between schools and the community."* Dr. Stuart Rosenfeld & Katherine Sheaff

Porous Boundaries

Innovative clusters have open, porous boundaries between academia and business, facilitating two-way information flows. Porous boundaries make possible the signalling of new training and research needs and for co-development. They reduce the lag time between business needs and knowledge supply. Mobility between academia and business, including the involvement of academic staff and students in company projects, helps the circulation of ideas. Key enabling technologies (KETs) are more relevantly developed through porous partnerships that are bottom-up than through top-down ivory tower research.

The development of porous boundaries and knowledge spill overs is furthered by co-location and a shared physical infrastructure, such as a business incubator, specialised testing and other common user facilities being co-located with a knowledge facility. However, physical proximity does not automatically lead to social proximity. Dialogue evolves as personal trust is established across boundaries.

Regions with isolated research facilities fall behind. Close partnerships with participating firms enable needs-driven curricula and research projects to be developed, pre-competitive research undertaken and for future R&D requirements to be defined. Innovation does not come from academia in isolation … through dialogue with the cluster's firms, education providers and R&D institutions, ensure that industry issues are prioritised and remain relevant. A further dimension of collaboration between academia and the private sector is local businesses partnering with academia in mentoring students.

As tacit knowledge is embodied in people (not institutions) awareness is needed by both academia and business on *'Who Know's Who?'* and *'Who Knows What?'*. **Informal exchanges centred on trust** are more important than formal exchanges in circulating tacit knowledge. Businesses, especially SMEs, need to identify the individuals with relevant knowledge and who sees value in engaging with local firms. Personal exchanges will alert firms to promising academic breakthroughs long before they are formalised through technology transfer licenses. Cluster managers have important roles in building these bridges.

Canada	*"(Cluster development) approaches have been adopted to stimulate laggard regions, to reinforce highly performing ones and to diversify older industrial areas into higher technology ones. Almost all of these approaches involve some type of partnership between academia and government R&D laboratories, which supports the role of NRC in clustering."* National Research Council

Enhancing the Regional Specialisation

Along with physical and social proximity, strong clusters have technological proximity. Specialised R&D institutions and technical training facilities support many clusters, at times complemented by specialised courses at local high schools. Taken together, these capabilities continue to deepen the regional specialisation. A world-leading cluster is likely to have university faculties and R&D programmes that stand out on a global scale. These support a global reputation and act as a magnet attracting faculty members and students. FDI and skilled migrants are also attracted to a region through its research infrastructure. The smaller the cluster, the more visible are the knowledge institutions and the more important is their contribution to the cluster's on-going development.

USA	*"How much should community colleges specialize? What's the right balance between addressing individual needs and desires, and developing distinctive place-based programs to match the strengths of a regional economy? Although specialization may seem to be a counterintuitive strategy in a global and changing economy, place still matters to businesses, and they continue to cluster around common interests. Colleges that want to be place-based as well as globally responsive have to make hard choices in the allocation of their resources, and that may mean disproportionate attention to certain occupations and industries."* Dr. Stuart Rosenfeld & Cynthia Liston, Cluster Hubs, Putting Learning in Context, Community College Journal, 2007

Alignment with the Local Absorptive Capacity

Academic institutions can produce the seeds for new products, new processes and new firms, even the seeds for emerging clusters, but the region must offer a fertile environment for those seeds to flourish. A danger is that the new knowledge … and the new students … generated by the local academic infrastructure flow out of the region to more fertile locations. Research and training must be of relevance to the companies in the surrounding region. Training increases mobility and graduates will exit the region if there are not local opportunities.

In an innovative cluster, the competencies of the local academic institutions are closely aligned with the cluster's strengths, the *'matching competence'* that Per Eriksson refers to in his foreword this chapter. The cluster's firms have the absorptive capacity to utilise the locally developed technologies, ideas and students emerging from academia. The emphasis is more on innovation through doing-using-interacting, rather than supply driven and the commercialisation of research results.

Canada	*"One of the potential barriers to success is the lack of receptor capacity for the results of advanced research."* Portfolio Evaluation of the Technology Cluster Initiatives, National Research Council
USA	*"A major challenge facing the educational establishment is aligning curricula with actual and future workforce needs. Two states, Tennessee and South Carolina, have successful strategies that coordinate educational initiatives with targeted industry clusters."* Industry Cluster Pathways: A Focused Approach to Regional Workforce Development, Susan Elkins et al, SAM Advanced Management Journal, 2016

Alignment through Local Teamwork

It is not always easy to achieve teamwork and alignment amongst the academic institutions in a locality. Porous boundaries are needed, not silos, leading to integrated solutions that reach across a range of academic institutions and educational providers.

Institutional teamwork also implies navigating the boundaries between academic institutions, business and government, the other two triple helix components. Effective teamwork between the three partners leads to identifying gaps in the knowledge and training that is being provided and in accelerating knowledge dissemination.

Bridges to External Knowledge

Academics in contact with peers around the world play an important role as bridges to external knowledge bases. By linking the cluster into knowledge centres around the world, academics can draw in knowledge that is relevant to (and absorbable by) the cluster's firms. Such academic connections can also lead to the development of international links for the cluster's firms and promote the cluster specialisation and expertise.

In traditional (conservative, sleepy, long established) clusters, it is even more important to be aggressively attracting new knowledge from beyond the cluster.

The presence of high profile academic institutions with specialised competencies can be an important consideration for international firms that are exploring alternative locations, and in attracting global research stars. Academic institutions also attract student talent to the cluster for specialised degree courses. On graduation, these students may choose to stay in the region and pursue entrepreneurial ventures or join a local company, possibly a company they have been exposed to through a project.

Proactive Engagement with the Cluster

Academia is a senior partner in the cluster development process. Active participation is a win-win that can take many forms. Academics connected to global knowledge hubs add value to a cluster's governance Board, bringing new perspectives, fresh knowledge, additional connections and further resources. Representatives from academic institutions benefit through active engagement with the cluster's task forces and development projects. This can particularly help in detecting emerging SME needs.

Academics who are engaged with a cluster may be based at post-secondary institutions, be researchers who are leading programmes of relevance to the cluster, be involved in technology transfer or technical training, be with high schools or testing facilities.

Universities as Inside Partners

University of Cambridge	*"What R&D theory shows is that the best way you can seed innovation is if all the stakeholders are in the same place. Having co-location of the different stakeholders accelerates knowledge-sharing and development of new products and services in a way that you can't do if they're scattered."* Professor Navi Radjou

A university has the opportunity to have a powerful impact within a cluster, as a provider of human capital, a generator of new firms, and a supplier of technological and managerial expertise and as a stakeholder in building a more open, collaborative culture[20]. The role of a university as a knowledge centre is particularly critical for new and emerging clusters, such as biotech and nano tech.

Universities underpinning clusters	
1. Generating talent	Skills availability is often the #1 inhibitor to the growth of a cluster. The university as an educator, generating of 'fresh' specialists, technical knowledge workers and business managers meeting regional needs. Relevant cluster-specific curricula developed in partnership with the local firms.
2. Research	University as a generator and disseminator of relevant research, with extensive formal and informal links with local firms, ensuring knowledge spillovers. Needs-driven technology & R&D support rather than curiosity driven research. Consultancy services to local firms. A conduit, bringing state-of-the-art knowledge from other relevant centres into the region. Firms engaging with the university in sponsoring research, offering student awards, in-company projects for students and summer internships.
3. Engaging with society	University well informed on the regional economy, a bridge builder, directly interacting with local society. Central actor in knowledge exploration and tacit knowledge circulation within the community. Supporting the creation of firms, encouraging entrepreneurship, research based start-ups. Delivering advice for political leaders and the general public. Some universities have extend this role, taking the lead with cluster development.

All universities are active in the first role, but more as training institutions than as new knowledge generators. Relatively few universities around the world are active in the second role with the focus on needs-driven research, and even fewer in the third role. These three roles can be broken down further:

Practical student projects: Industry sponsored research. Undergraduate and postgraduate students engaged on practical projects with the cluster's firms, offering firms the opportunity to identify possible recruits and students the opportunity to identify possible employment openings.

[20]These comments draw on (1) Bramwell, A and Wolfe, D.A., *'Universities and regional economic development: The entrepreneurial University of Waterloo,'* Research Policy 37 (2008), (2) Stankeviciute, J., and Jucevicius, R., *'The role of universities in the development of regional knowledge-based clusters: The collective learning perspective,'* European Conference on Educational Research, Hamburg (2003), (3) Hershberg, E., Nabeshima, K., and Yusef, S., *'Opening the Ivory Tower to Business: University-Industry Linkages and the Development of Knowledge-Intensive Clusters in Asian Cities,'* World Development Vol. 35, No.6 (2007). For an excellent video on Prof. Michael E Porter addressing *'Colleges and Universities and Regional Economic Development: A Strategic Perspective'* see www.isc.hbs.edu/firm-strat-non-profit.htm

New Zealand	*"Employers can 'try before they buy' in that they can see how the student performs and how well they fit into the company culture. On the student's part, they get on-the-job practical experience and an opportunity to make themselves indispensable!"* Chris Mitchell, CEO, ICT Axcel Institute

Labour mobility: The two-way movement of people between the academic and business worlds. Academics spinning off to set up their own businesses…and if the start-up is unsuccessful, being welcomed back with fresh experiences. Businesses being invited to participate in university activities, industry experts used to teach new technologies, and universities offering full time workers the opportunity to take advanced degrees.

Physical infrastructure: The development of on-campus science parks, incubators and common user facilities to support interaction with the university's science base, creating a more open environment for knowledge exchanges. Opening up laboratories and testing facilities for business use.

Consortia for development of new technologies: Bringing together academic research groups, corporate labs, start-up firms, testing facilities and government laboratories. The development of pre-competitive, needs-driven R&D projects through dialogue with the university.

Technology transfer and industrial liaison: Successful technology transfer is more than a one-way movement of knowledge out of a university to businesses. It implies long-term relationships and the co-evolution of solutions based on two-way partnerships, integrating the academic/technical knowledge of the university and the practical/market knowledge of the firm. The firm is an equal in this relationship, not the junior partner. Successful licensing contracts, particularly exclusive licenses, often have a tight geography that enables the licensee to have frequent and on going access to inventor knowhow. When universities move beyond the placement of developed knowledge, they are better positioned to cover their technology transfer overheads.

Development of world-class facilities: The development of specialised facilities/departments in technical areas of relevance to the cluster. This is likely to include the recruitment of world-class academics.

University of Cambridge, UK	*"One of Cambridge's great strengths was its local networking and this remains important. What we see today is an equally vital and complementary enthusiasm for international links. I am sure that the years ahead will see us collaborating – and competing successfully – with other centres of excellence around the world."* Vice-Chancellor, Preface to "The Cambridge Phenomenon Revisited", SQW, 2000
Carnegie Mellon University, USA	*"The commercialisation of technology created by university researchers is becoming increasingly important as a source of revenue, a stimulus to the regional economy and a method of bringing research into practical use. While technology transfer used to consist mainly of patenting, it now includes licensing, research consortia, industrial extension (technical assistance) programs, industrial-liaison or affiliates programs, spin-off enterprises, research parks, start-up firm incubators, consultant services and venture-capital funds. Tech transfer can also include the spread of knowledge through more informal means, such as meetings between academics and industry professionals."* Universities and the Development of Industry Clusters, CMU Center for Economic Development, Payta, J et al, for U.S. Department of Commerce, 2004

Whole-of-university engagement: Whilst technology/science faculties can have central roles in engaging with a region's clusters, the active involvement of other faculties is also needed, not compartmentalised engagement. An integrated approach to engaging with the cluster can involve participation from economics, business, public policy, legal, social studies and medicine. It is not easy in many universities to remove silos and to build the necessary cross-faculty networking around a cluster's priorities.

Internationally linked: the University as a global connector, attracting both knowledge and talent. As a local university is most unlikely to be the sole tertiary knowledge provider to the cluster's firms, links are required with distant universities. The university needs to identify the leading knowledge centres and researchers around the world of relevance to the region's economy, absorbing and interpreting knowledge and relaying back to the companies and students. Many universities are attracting students from beyond the region for specialised courses, including Masters and Ph.Ds., and assisting graduates in finding local employment, or in starting their own business.

Future orientated: through contacts with firms that identify knowledge deficiencies, universities offer insights into future trends, upgrading competencies in an uncertain environment.

Examples of University Engagement

MIT, Harvard, Cambridge (UK) and LMU Munich are four major universities that have provided on going foundations for knowledge intensive clusters. **Stanford University** was founded by business leaders and has underpinned the development of Silicon Valley. Each US state has publicly funded agricultural and technical educational institutions (the land-grant universities) with well-established regional economic development traditions.

University of Waterloo, Canada	*"As the regions economy evolves from one based on traditional manufacturing to one increasingly focussed on information / communication technologies and advanced manufacturing, the University of Waterloo has played an increasingly important role. Business people and economic development representatives commonly credit UW as being the impetus for the development and growth of the regions technology cluster." "Research and development and the presence of a skilled labor force trained through quality educational institutions are repeatedly cited as essential elements in the development and marketing of competitive industry clusters. Based on our analysis of UW, the ability of CTT firms to compete effectively in the global technology market can be directly attributable to the continued availability of high quality talent provided by the University. It is in this role that the University makes its greatest contribution to positioning the region for continued growth and prosperity."* Canada's Technology Triangle, PwC, Economic Clusters: Universities as Catalysts for Development
Bergen University Norway	Bergen, Norway has become the world's leading centre for subsea technology, attracting students globally for a B.Sc. and Masters in *Underwater Technology*. These degree courses enhance the cluster's knowledge base and are an additional means through which Bergen is placing itself on the world's subsea map.
Newcastle University, UK	North East England's subsea cluster has developed in partnership with Newcastle University a M.Sc. in *Pipeline Engineering*.
University of Nordland, Bodø, Norway	Offers Masters and Ph.D. programmes (in English) in Aquaculture and *Marine Ecology*, further developing the aquaculture cluster's competencies, extending the cluster's international reach and providing ready-to-go graduates for local firms.
Karlstad University, Sweden	Värmland, Sweden has over a decade of cluster development experience. The municipal authority and university co-finance ten professorships in areas prioritised by the regional clusters.
Mid Sweden University, Östersund	Östersund is home to the Peak Innovation clustering initiative linking tourism, sports and the outdoors. At the Mid Sweden University is the *Swedish Winter Sports Research Centre* whose laboratories have become a gathering ground for specialist researchers from around the world. Close links between researchers, coaches, elite athletes and performance technicians supports the development of novel ideas into new products.
Oxford Brookes University, UK	Companies in the world-leading motor sports cluster have developed and sponsored a motor sport-engineering course producing a pool of qualified engineers. This benefits all companies without reducing the competition between them.
Plymouth University, UK	A world-leading surf cluster is in Plymouth UK. Plymouth University is the only university globally offering a *Surf Science and Technology* degree.
Adelaide University, Australia	South Australia's Barossa Valley has earned a global reputation for its fine wines. The nearby University of Adelaide has created undergraduate and postgraduate degrees in viticulture, oenology and wine business.
Laurentian University, Canada	Hard rock mining's 'Silicon Valley' is Sudbury, Ontario. Sudbury is Canada's largest centre for post-secondary *mining education*.
University of Technology, PNG	In Lae, Papua New Guinea, the University of Technology is playing a leading role in the development of PNG's ICT cluster.
University of Göttingen, Germany	The mathematics faculty at University of Göttingen has been at the forefront of mathematics for centuries. Today, this small city is home to many of the world's leaders in *measurement technology*.

Tuttlingen University, Germany	Tuttlingen is a world leading medical instrument cluster. The university offers the only *MBA in Medical Devices & Healthcare Management*, with a curriculum co-developed with local firms.
University of Arizona, Tucson, USA	The world's leading optics cluster is in Tucson, Arizona with 150 firms. The College of Optical Sciences at University of Arizona has earned its position as *'The world's premier optical institute'.*
South Seattle College, USA	Underpinning for Seattle's smart building technology cluster, integrating expertise in cloud computing, big data, and IT to increase energy efficiency in the built environment, comes with the South Seattle College launching a *sustainable building science* degree. The program combines technical systems understanding with internship opportunities and management skills.
Colorado School of Mines, USA	Colorado's cleantech cluster includes 1,500 cleantech companies and the Colorado School of Mines, the only US University to offer doctoral degrees in all key energy fields.
Clemson University, USA	The Charleston, South Carolina auto cluster includes BMW, Robert Bosch, Cummins Engines and Daimler. The Clemson University's International Center for Automotive Research has a graduate school in automotive engineering.
Izmir University of Economics	The aviation and space cluster in Izmir, Turkey has facilitated an *aircraft technology school* at the local university.
School of Advanced Industrial Technologies, France	ESTIA, Bordeaux is engaging with several regional clusters: Aerospace Valley (aeronautics, space), Avenia (energy, environment), Sporaltec (sport industries), Eurosima (Board sport industries), ADEISO (Electronics and IT) and EUSKAL EUREKA (construction, civil engineering).

President Obama	*"We are looking for businesses and universities that are willing to partner together to help their region -- help turn their region into global centers of high-tech jobs."* May 9, 2013
Purdue University, USA	*"Smart communities and regions are no longer chasing footloose factories with a butterfly net full of incentives. Instead, they are turning to their universities as engines of economic growth."* Dr. Ed Morrison
USA	*"Universities can be a powerful force when they effectively serve the development needs of local communities."* David A. Sampson, Universities and the Development of Industry Clusters, U.S. Department of Commerce
Sweden	*"Contacts with the university have revitalised our entire organisation. They have added a perspective that we have not thought of before."* CEO, Triple Steelix Cluster, Borlänge [21]
UK	*"Explore university linkages. Universities, as providers of learning and research, generally tend not to see themselves as part of the business infrastructure. This contrasts distinctly with the Norwegian and Swedish experiences where there is a strong focus on supporting local businesses."* Supporting London Business Clusters, London Councils
UK	*"Universities are less important for supplying ideas & technologies than for supplying specialist skills. A good university is useful, particularly in developing competence & attracting talented people to that location."* Martin Smith, Head of Technology & Innovation, PA Consulting
Lithuania	*"It is easier to work with US or Australian universities than a local one."* CEO, Laser manufacturer
European Commission	*"Some universities are viewed as being 'in' the region but not 'of' the region where they are located."* Guide to Research and Innovation Strategies for Smart Specialisation, 2012

[21] As quoted in Jan Messing (2011), 'The Triple Steelix Initiative after 2014'

East Africa: Universities Taking the Lead

A number of East African universities stand out on a world-scale with the lead they have taken in engaging with local society through a clustering agenda. In **Tanzania**, the University of Dar es Salaam's Engineering Faculty has been the initiator of the national clustering programme. In **Uganda**, the Technology Faculty at Makerere University, Kampala has taken the lead in establishing a cluster support programme. In **Mozambique** the Department of Engineering at Eduardo Mondlane University, Maputo has been the first mover on cluster development. **Rwanda's** National University at Butare has viewed cluster development as the route through which it's teaching staff can actively engage with their local community.

The East African universities have been able to engage thanks to the financial backing of Sweden's aid agency, Sida, and the knowledge backing of Sweden's national innovation agency, VINNOVA. I have had the privilege of supporting the Swedish team. The universities have encouraged their staff with technical expertise that relates to the local clusters (such as engineering, mushroom growing, geology) to act as the facilitators for relevant clusters. University staff have been trained for their roles as cluster facilitators. Many students are engaged on practical cluster projects as part of their studies.

The clusters that are under development are not just technology intensive and include medicinal mushrooms, metal fabrication and leather processing. Over fifty clustering initiatives are underway in East Africa. Each country has established a National Steering Committee that is chaired by a senior university professor. These triple helix committees include senior representatives from ministries and private sector organisations, facilitating whole-of-government and NGO engagement around the priority clusters.

Experience gained in setting up the *'Innovation Systems & Clusters Programme – East Africa'* has been drawn on for the establishment of the Pan African Competitiveness Forum, with the encouragement of TCI Network and the African Union.

One difficulty in East Africa, as with many other universities, has been in securing the energetic engagement of all the relevant university faculties (including economics, business and law) to engage around the cluster development programmes.

Universities on the Outside

Professor Kevin Morgan	*"Universities masquerade as innovation agents, while they are knowledge silos."* Cardiff University
Professor Örjan Sölvell	*"Many business people, particularly in SMEs, would laugh at the idea of approaching their university to see if they have some skill or new technology that the firm could put to use."* On Strategy & Competitiveness, 2016

A number of the universities I have met around the world play a limited role in the development of their local economies, missing out on opportunities to make their teaching and research more relevant and to participate in opening career opportunities for their graduates.

Some universities are unengaged from business, erecting barriers that are detrimental to research finding its way to industry. Some have proved to be difficult business partners, with bureaucratic processes and little value attached to commercial deadlines. Others are theoretical and detached from the practical issues of their local communities … more interested in the basic Research rather than the Development side of R&D and needs driven R&D. Some universities are simply allergic to 'business profitability'; others choose to be externally/globally focused rather than aligned with their region's community. Working with prestige research institutions and international firms has more appeal than engaging with local SMEs.

Certainly, it can be difficult for a university to engage with groups of small firms and to identify collaborative agendas. It can also be difficult for a university to earn a position as a contributor within a cluster if there are a number of strong, innovative anchor firms in place. Yet engaging with the local clusters supports the university in developing the niche competencies that subsequently attract attention from further afield. Targeting basic research that has long-term benefits to local clusters develops both the international reputation and keeps the university relevant to the home community.

University - Business Activity Examples
Joint curricula design, with involvement of core and support firms.
Joint curricula delivery, company staff (and company facilities) involved with teaching.
Formal knowledge transfer, through hosting visiting scientists, arranging conferences and symposiums.
Informal knowledge transfers, participation at cluster networking events, frequent interaction with the cluster's firms.
Researchers, doctoral students and professors working for a limited period in companies, engaged on real-life projects; placements or internships of students in companies, especially SMEs.
Universities opening up specialised instruments/laboratories/test facilities to firms that may only need occasional use.
Equity investments by universities in spin-off firms.
Encouraging alumni to return to the region.
Encouraging large firms/multinationals to embed their R&D within the region.

Public Research Institutions

I am using the term 'Academia' to also include publically funded research institutions. Examples of close alignment between public research institutions and local clusters include:

- Ottawa, **Canada's** high tech cluster has grown out of a long established communication's laboratory, Bell Northern Research.
- The Newfoundland, **Canada** Oceans Advance cluster benefits from having within its region the world's largest water testing tanks, owned by Canada's National Research Council.
- Nelson, **New Zealand** is home to three quarters of New Zealand's seafood industry. The nationally funded Seafood Research Unit is based on the Nelson waterfront.

At times a publicly funded R & D centre is an integral component of a cluster or even, as in Ottawa, provides the foundations for a cluster. Many public laboratories are active in alerting their regions to their available research through conferences, showcase events, open days and public databases. Other public research institutions go further and are pro-actively supporting their local clusters, with needs-driven research that is prioritised through dialogue with the cluster's firms.

Even when public investments in laboratories and institutions are substantial, in many countries these institutions remain remote from the businesses in their region, generating technology solutions that are unable to be absorbed by local firms.

R&D Institution – Business Activity Examples
Development of pre-competitive technology platforms in partnership with the cluster's firms.
Commercial partnerships /licensing arrangements.
Encouraging spin-offs.
Making available specific facilities for use by the private sector.
Hosting conferences, symposiums and visiting specialists.
High-level participation with the cluster's Governance Board.

Technical, Vocational and Community Colleges

Post-secondary education institutions go by different names in different countries and include the community colleges that are found across the US and Canada, the polytechnic type institutions (as in New Zealand), Australia's Technical and Further Education System (TAFEs) and South Africa's Technikons/Universities of Technology. In many countries there is a moving line between applied institutions and universities.

These colleges often have more flexibility than universities in offering long term and short term specialised courses, developed in partnership with business and offering these at times to suit the students. Classroom education is blended with on-the-job training. Many colleges are also making available their laboratories, workshops and testing facilities for local SMEs.

Two of the following quotes draw on the extensive writings of Stuart Rosenfeld of Regional Technology Strategies Inc., North Carolina, with an example of a proactive community college in a US hosiery cluster, followed by comments on the benefits of close alignment.

Community College Journal	*"North Carolina produces about 60% of US hosiery and most of this comes from the area in and around the city of Hickory. Catawba Valley Community College's Hosiery Technology Center is a hub of training and information for this cluster. Created in 1989, the staff creates curricula and trains workers and managers and, perhaps even more importantly, brings companies together on technology and business trends affecting this vulnerable industry. The center offers testing services at a lower cost than any one firm could provide and the center coordinates with the North Carolina State University on hosiery related research and development needs (e.g., colour quality standards). The center has also taken a lead in easing the transition of the hosiery workforce to largely Latino and other immigrant populations by creating English as a Second Language training that is taught in the context of the hosiery industry."* Dr. Stuart Rosenfeld et al, Targeting Clusters, Achieving Excellence, 2003

Community Colleges / Cluster Connections	*"At colleges linked to clusters, faculty relationships to businesses help ensure that curricula are relevant and that new workforce entrants will be well prepared.* *Second, community colleges are major sources of management training and technical assistance for smaller companies that are less able to afford consultants.* *Fourth, colleges are storehouses and disseminators of information about technologies, benchmark practices, market opportunities and technical advisors for the clusters, particularly for SMEs that have limited internal capacity.* *Fifth, well-prepared students can become catalysts for change within an industry—if given the opportunity by their employers."* Dr. Stuart Rosenfeld, Community Colleges / Cluster Connections, CCRC Brief, 1999
The Main Street Economist	*"While all educational institutions seek to better the world by educating their students, some regional colleges are now taking a more proactive role in developing their communities and regions."*

A number of US community colleges (such as at Catawba) have taken the lead in cluster development and act as the cluster manager. This is in part responding to the college's wish to take a leadership role within their local community and in part to ensure that the college develops specialised offerings that are tightly aligned with the cluster's needs.

US Community College Activity Areas	
Skilled, professional workers	Driven by the needs of employers in the region. Programmes and curricula that are continually adapted. Linking theory with real experiences. Offering a range of specialised courses developed in partnership with the cluster's firms, i.e. needs driven. Attracting students from beyond the region, in particular international students, to specialised training courses, Assisting students connect with local firms, with the aspiration that some will stay in the community. Flexibility in the timing of courses to suit the needs of business. Programmes offered with flexible scheduling.
Innovation & technology diffusion	Technology hubs that provide technical information, review business needs and facilitate interfirm collaboration. Establishing a one-stop-shops for SMEs. Providing a neutral ground for SMEs to meet and explore collaborative opportunities.
Service broker	Placing firms in contact with each other and service providers. Encouraging technology diffusion. Making available laboratories, workshops and test facilities for SMEs, in part responding to their wish to take a leadership role within their community, and in part to tailor their course offerings more closely to business needs. In the US, a number of community colleges have taken the lead with cluster development, acting as the cluster manager.
Know-how repository	Many community colleges are better positioned than universities to reach SMEs … and less threatening.
Wellspring for new business	Supporting entrepreneurship through education, incubation and technical support. Training within the context of a local cluster is more effective than generic entrepreneurial training and provides an early opportunity for entrepreneurs within the cluster to meet.

Drawing on: Dr. Stuart Rosenfeld

High Schools

High schools often have an under valued role in building a region's competitiveness. Many offer specialised training that relates to the local clusters as this is where the most promising job prospects for school leavers will be … the more skilled and higher paying jobs. In a forward to this chapter, Dr. Frédéric Miribel refers to the activities of a French cluster in reaching out to the local high schools.

High Schools and Clusters	
Norway	Bodø's aquaculture cluster is working with local high schools to promote an exciting industry with international opportunities. There is collaboration between cluster firms and schools to build regional pride, to share knowledge about aquaculture and to safeguard recruitment, ensuring that the local aquaculture firms have: *'Access to the brightest heads and the best hands'.*
Sweden	As a new high school was being developed within the functional region of Robotdahlen, Sweden's robotics cluster, robotic workshops were incorporated into the Västerås school's design with the objective that at least half of the students would be girls.
Sweden	Each girl leaving school in Borlänge is presented with a high quality deck of cards by Triple Steelix, illustrating the range of local jobs being undertaken by women within the cluster.
New Zealand	A new school at Hobsonville, located alongside the Auckland marine cluster, will be closely connected the local marine firms.
New Zealand	Dunedin's engineering cluster, facing skill shortages, developed a web site to attract school leavers: *'Discover your Career Path with Engineering'.*
New Zealand	In Hawke's Bay, alongside one of Heinz's five global food production centres, school children are developing food products as part of a local Enterprising Technology programme.
China	The world's largest footwear cluster in Wenzhou has 300,000 employees. The regional government is actively fostering the development of specialised talent at the local high schools.
Australia	Margaret River is one of Australia's prime wine growing regions. High school students are exposed to their cluster every day … the school is surrounded by a vineyard owned by the school.
South Korea	A local high school in Daejeon has a focus on mechatronics, one of the city's lead clusters.
Poland	Aviation Valley, Rzeszow, recognising the importance of the future supply of skilled labour within its region, is engaged with a range of educational activities, starting at primary school level.

These and many other schools have specialised training that relate to their local clusters. As students are exploring career options, they develop an awareness of the economic activities that are attracting wealth to their region and are starting to prepare to engage.

High Schools - Business Activity Examples

Provision of specialised training and courses that relate to the cluster, e.g. engineering, woodworking, textiles or tourism, with specialised equipment, workshops in the school.
Sharing or co-locating specialised facilities such as technical workshops with the community, enabling the school's assets to be used after hours for adult learning opportunities and prototype development.
Undertaking projects with the cluster's firms, with raw materials, equipment and advice provided by the firms.
Competitions that relate to the cluster, e.g. furniture or a fashion design competition.
Organised familiarisation visits by the school to cluster firms.
Blue Collar Career Fairs … informing school levers on job opportunities. A practical tip: Don't arrange for the business owner to talk to students at school. Send the students to the business and let them get hands-on[22]:

- The students will learn a lot more from doing than from listening.
- The business owners will learn from watching how students try things and will get a chance to observe potential employees.
- Students will learn more about at least one cluster business, first hand.
- Students get a chance to picture themselves as future business owners.
- Getting students & teachers outside the classroom to build community ties.

At a more general level, the quality of local schools is an essential element in attracting and retaining key employees in a community, especially mobile professionals and their families, and therefore underpins the competitiveness of any cluster. Entrepreneurship education is included in the programme of many schools.

[22]Drawing on Becky McCray's excellent newsletter, Small Biz Survival, Oklahoma

Advice for Academia

- Looking for world-class status for your institution? Then carefully find and build a niche that relates to the strengths of your local economy. Find the individuals within your institution with the passion to engage with your local community.
- Build the global connections. Link with relevant global knowledge centres. Absorb external knowledge and interpret it for your community.
- Be receptive to new market driven needs. Stay abreast of new developments. The local knowledge base will evolve over time.
- Create porous boundaries so people and ideas circulate. Ensure some academic staff has recent industry experience. The development of close relationships and porous boundaries between academic institutions and the cluster's firms is a win-win.
- In removing boundaries, interpersonal relationships are more critical than formal arrangements.
- Catalyse business - academia linkages through the creation of common physical infrastructure for these linkages: shared facilities, shared R&D centres.
- Porous boundaries are also needed amongst the region's academic players: connecting universities + vocational training + high schools + publically funded R&D.
- Cluster workshops, joint visits, joint projects, conferences, technical symposiums … all tools for supporting knowledge diffusion.
- Consider Cluster Open Days that encompass universities, public R&D centres and vocational training institutions. These help in lubricating the local knowledge flows ... and reaching out to the community.
- **Be proactive; Be flexible; Experiment.**
- **Take an interest in your region.**

Danger Signs

- A key constraint to business growth continues to be skills availability.
- Graduates quickly exit the region.
- Universities remain remote from the clustering initiative, even excluded.
- Schools develop their agenda's oblivious to industry skill needs.
- Businesses see little value in engaging with academia.
- R & D and skills provision are supplier driven, not needs driven.
- Local students have little interaction with the cluster's firms.
- Little mobility of staff between the academic and business worlds.
- Major initiatives by academic institutions (e.g. establishing a Centre for Excellence in a narrow technical field) are launched before full consideration of the needs of the cluster's firms

PART 2

CLUSTER DEVELOPMENT IN TWELVE STEPS

INVITED FOREWORDS

MARIA ENGHOLM

Former Process Leader, Triple Steelix cluster, Sweden

At Triple Steelix we have a strong passion for the development of our region and its businesses. Success in our cluster work requires that the municipalities and The Regional Development Council view the focus area we represent as a priority area.

Fundamental to our work has been building trust. With that trust, Triple Steelix has been able to provide an independent arena for meetings, an arena to explore and develop the unique knowledge that we have about steel, steel processes and steel services.

JUAN MANUEL ESTEBAN

Basque Government, Spain; Past President, TCI Network

In any field, working on the "What" is a prerequisite for action, but successful execution needs a focus on the "How". It is the "How" that makes the real difference between success and failure with clustering initiatives. It is clear from examples from all over the world that a successful clustering initiative depends on sound performance on the ground.

I've had the opportunity of experiencing this during many years in Basque Country where a successful cluster policy has been implemented since the 90's.

The ingredients of the magic recipe? Among others, pragmatism, shared vision, leadership, involvement of actors, persistence and perseverance, financial and non-financial governmental support, wise governance, careful choice of cluster managers, and last but not least, well defined strategies.

Working on the combination of these ingredients is what makes cluster issues so challenging and exciting. Enjoy the "Twelve Steps Way", the magic of the "HOW"!

NIGEL GWYNNE-EVANS

Chief Director: African Industrial Development,
Department of Trade and Industry, Pretoria, South Africa

Initiating and managing a cluster process is akin to an art form. Ifor Ffowcs-Williams is without doubt, the world's leading cluster "artist", combining decades of research and hands-on management, with oversight and guidance to literally hundreds of initiatives and programs, spanning numerous countries on every continent. The 12-steps, and Ifor's insights and guidelines into planning, launching and enhancing the momentum of cluster initiatives has provided a practical base that has played a not-inconsiderable role in their success as an instrument of industrial policy.

Cape Town, South Africa has had a long-standing cluster programme that is coordinated by the regional government, spans twelve sectors with more than 5000 member firms, and has played a central role in positively shifting the trajectory of the Cape economy. Ifor can be viewed as the "Godfather" to the programme, sensitively guiding the launch of the first cluster, the Cape IT Initiative back in 1998, and subsequently helping to shape the nature and agenda of the programme at critical points over its development.

Amongst the most important lessons emerging from the management of the programme, is the highly sensitive nature of the relationship between the cluster team and the regional government as a dominant funder. It is vital for government to play a supportive and guiding role, rather than an interventionist one, which can tend to be the case with funders. Ifor's guidance around the need for cluster initiatives to provide a light touch, and to empower and motivate the private sector to step up to the plate, has been invaluable, as has the focus on continually re-inventing the agenda to ensure that it has a balance of "quick wins" and longer term objectives.

Overall the Cape's "Special Purpose Vehicle" programme has more than 150 permanent staff working across the twelve initiatives, and is viewed as the main pillar in its regional economic programme. Without

the wisdom and guidance of Ifor, and the practical approach as contained in the 12-steps, it would almost certainly not have gained the traction that it has. This book builds on his previous handbook and will continue to be an invaluable guide to any practitioner interested in the "art" of clustering and regional economic development.

LLUÍS RAMIS

CEO, Cluster Development, Barcelona, Spain

From my almost 20 years' experience in cluster projects, Ifor is, probably, the person most focused on the key success factors of these initiatives: the people and how people interact in their human relationships.

It is not just business, it's about people and what motivates them. This is the main lesson that I have learnt from Ifor and I know this point is fuelling the spirit of this very recommendable book.

Cluster Development in Action	
Intervention Design Principles	
Not about creating clusters	But about creating clustering interventions that lift business growth, innovation and economic performance. Identifying and then prioritising the mainstream and the embryonic clusters for support. Placing a turbo on a region's existing assets.
Real transformations take time **Relationship building**	Building relationships and systems transformation takes time. Change from the status quo never comes easy. Addressing the physical infrastructure for a cluster (technology park, incubator etc.) can be relatively speedy. Building the specialised knowledge infrastructure takes additional time. Building the social infrastructure, the personal connections, is the most time consuming and complex. Cluster development is no quick fix.
Bottom-up process **Business led**	Each cluster has it's own roadblocks, opportunities, life cycle stage, history, culture. Development strategies need to be individually tailored to suit each cluster, a bottom-up process. Top-down = Low commitment. Triple helix partnerships, moving at the speed of business.
A neutral corner	Removing isolation. Addressing market failure, dysfunction. To nurture relationships, building bridges amongst the triple helix stakeholders, integrating knowledge & insights. Spanning boundaries. Listening. Activating. Empowering. Opening the debate; then building consensus. Participatory planning. Local capacity, not outsiders. Developing (1) inter-firm coordination, (2) private-public coordination, and (3) the most difficult of all, public-public coordination. Building a co-opetition culture, with competitors identifying common agendas.
A voluntary coalition	Needs team engagement, a Coalition of the Willing. No singly person has all the information, or all the answers. Not a few telling the many what to do. Involve those who will benefit most from change. Self-determination, not outsiders parachuting in. Engaging the next generation. Building the community.
Early into action **Get going … and then get better**	Moving beyond talkfests, strategy workshops. Data & analysis needed, but not endless debates. Learning-by-doing, not paralysis-by-analysis. Identifying common headaches. Purposeful collaboration with a portfolio of projects. Listen for the hot spots, the stronger areas of activity. Engage quickly on the low hanging fruit; then broaden scope and complexity. Starting small, but thinking BIG ... short-term actions while exploring long-term directions. As relationships, knowledge and trust develop, the collaborative agenda will deepen.
Thriving on chaos	This is no smooth ride. Innovation is inherently messy. Increase the collisions. From chaos comes new order. It's a co-opetition culture … not everyone is holding hands. Clusters change … new markets, technologies, competitors. Strategic doing, rather than strategic planning. Explore and tinker at the cluster's periphery, with a tight feedback loop. Allow for unsuspected routes; adjust as circumstances change. Strategies will need replacing … what has underpinned success may no longer be relevant. Don't miss the opportunity of a good crisis!

Direction in place	Based on a common understanding of the cluster's eco-system. Forward strategy that is owned by the cluster's stakeholders, not imposed.
Levering partnerships	Engage with partners who can support the cluster's agenda. Lever the cluster organisation's limited resources.
Engaging in the vacuums	A clustering initiative is not competing with industry associations, chambers of commerce, public agencies, private firms. It is a co-ordinating mechanism. As the latecomer, it needs to find its own space to add value. If it cannot, it should not exist.
Blowing the trumpet…loudly!	Whispering does not influence behaviour patterns. Raise awareness of the cluster, inside and well beyond. Increase the cluster's visibility. Continuous communications … and Celebrate!

The Seven Innovation Gaps

Addressing the seven gaps involves the building of bridges on multiple fronts, and provides a checklist on a clustering initiative's activities.

The Seven Innovation Gaps & Responses	
1. Company-to-company gap	E.g. helping firms interact, moving from a clump of firms to dense networks with trust, a co-opetition culture.
2. Education gap	E.g. establishing new training institutes. Co-location of a technical training facility with an incubator and a prototype test facility. Changing curriculums and delivery timings at training institutes.
3. Government gap	E.g. improving alignment between public agencies and business, to move from a *clutter* of agency support to coordination around firm's needs…the most difficult of the seven gaps to address.
4. Research gap	E.g. establishing two-way interactions between academia and business; needs driven research.
5. Capital gap	While access to equity capital is often a national, rather than a regional/cluster agenda, brokerage functions between venture capital providers and high growth SMEs can be introduced, along with improved information flows between banks and firms.
6. Cluster-to-cluster gap	No cluster is not a self-contained system. Linking clusters within the region, nationally and internationally.
7. Global market gap	Reaching out to the world, developing the pipelines e.g. through participation in trade fairs and developing a cluster brand.

Drawing on Professor Örjan Sölvell's Seven Innovation Gaps

Urban and Rural Clusters: Differences

Clusters in urban communities differ in many ways from rural (and generally smaller) clusters. These differences have implementation consequences.

Differentiating Urban & Rural Clusters		
Points of Difference	**Urban clusters**	**Rural clusters**
Cultural	Both knowledge and trust imperfections … isolation and not knowing who is who within the cluster. Limited social contact.	Wide awareness within the community of the cluster's stakeholders. But trust imperfections. Possibly strong historic rivalries.

Scale, Geography	Can be a large number of participants. Many cluster stakeholders may be located within a compact region / suburb.	At the extreme, just a small handful of participants. Can be geographically very extensive, e.g. a tourism or an agricultural cluster. Small number of firms may limit the available details in published statistics.
Cluster characteristics	Greater diversity. Specialised firms with many interdependencies. Presence of a university, specialised R&D capabilities. Presence of related clusters.	Vertically integrated, stand alone firms. Fewer opportunities for out sourcing, sub-contracting. Knowledge infrastructure may be limited to a regional / community college, so more dependent on external knowledge. External stimuli often needed to generate change within thin, isolated clusters.
Cluster association structures and organisation	Evolves over time from informal to a structured organisation. A wider participation base opens up more volunteers to drive clustering projects.	Organisation may stay informal, with a business networking focus. Formal structures can over burden small clusters. Cluster manager may need to lead priority projects.

Cluster Development by Design

There is no single approach to cluster development. The three development frameworks follow (from the UK, from the United Nations Industrial Development Organisation and from the Balkans) that have many commonalities with the approach I use.

Ecotec's UK Cluster Development Methodology	
1. Mobilisation	Building interest and participation.
2. Diagnosis	Identifying and defining the cluster. Then identifying the strengths and weaknesses of the cluster.
3. Collaborative Strategy	Identifying the actions to promote the development of the cluster, in association with the main stakeholders in the cluster.
4. Implementation	Implementing those actions.
5. Assessment	Monitoring and evaluating the results. Reviewing the content of the strategy.

Prepared for DTI London, 2003

UNIDO's Cluster Development Methodology	
1. Cluster selection	Identification of the cluster(s) to be assisted
2. Diagnostic study	An action-oriented analysis of strengths, weaknesses, opportunities and threats of the cluster
3. Vision building & action planning	Formulation of a vision and a corresponding development strategy shared by the entire cluster;
4. Implementation	Management & coordination of the activities in the action plan. Establishment of horizontal and vertical networks.
5. Monitoring & evaluation	Qualitative and quantitative outcomes of the project

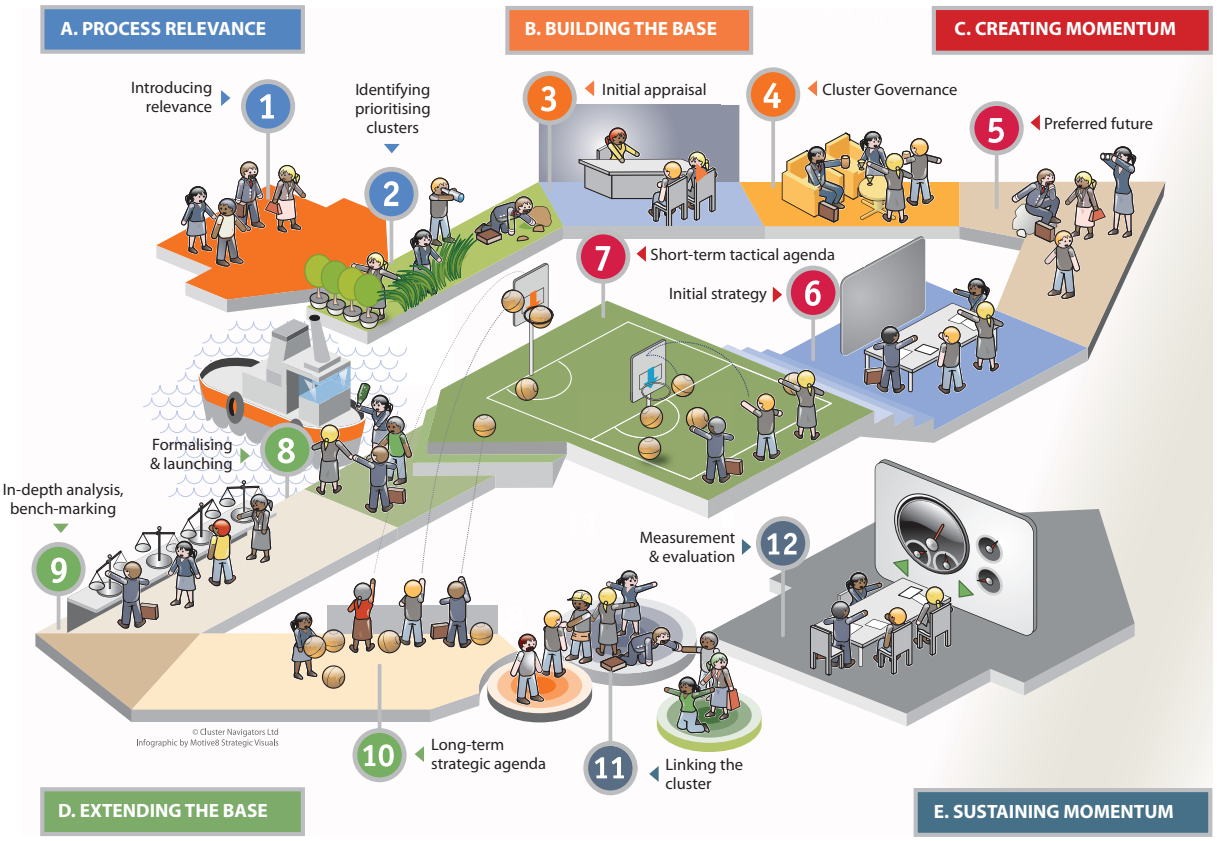
Balkan's Cluster House Methodology	
Advice to Cluster Managers from Serbia	
1. Know your cluster	Identify the firms, institutions. Talk to the cluster stakeholders about their challenges, barriers… their pains & needs. Dialogue with experts: industry federations, trade councils. Prepare SWOT analysis. But don't leave the analysis completely to external experts, build personal relationships with the key people. Balance between gathering robust data and 'let's do it', early engagement.
2. Map stakeholders	Finde the *enthusiastic* partners in the partner institutions. Identify areas of common interest. Establish the first board, the 5-6 founding fathers, creating ownership and drafting the cluster's mission & vision.
3. Define strategy & scope of the clustering initiative	Goals should be SMART … Specific, Measurable, Achievable, Realistic and Time bound with clear deadlines. Activity Goals (e.g. number of conferences) and Effect Goals (e.g. number of international investors). Focus on a limited number of services. Track & communicate the differences the initiative is making.
4. Define financial set-up	Financing the cluster organisation…public funding & different member categories? Sponsorship? Project funding.
5. Define organisational set-up	Centralised cluster organisation? Or decentralised, working through partners?
6. Evaluate and communicate	Measuring, documenting; both hard data and success stories. Frequent dialogue with stakeholders, feedback. Adjust to market and political realities.

Source: Local Economic Development in the Balkans, Guide to the Cluster House Model, Nis, Serbia, 2012

As Werner Pamminger from Clusterland Upper Austria has emphasised, moving from "temporary-non-critical projects" to "permanent-success-critical projects" takes time and, most importantly, trust. The Twelve Step route I now introduce draws on the experiences of many, including my TCI colleagues and my exposure to over 1,000 clusters around the world. This approach is centred on learning-by-doing, building early engagement with low-hurdle projects and then scaling up as trust develops.

Cluster Development in Twelve Steps	
1. Introducing Relevance	Positioning cluster development as a centre-stage strategy. Establishing long-term engagement for development.
2. Identifying, Prioritising	Shortlisting the clusters (established and embryonic) already attracting wealth from beyond the region.
3. Initial Appraisal	Analysis with an internal focus. Identifying constraints and opportunities.
4. Cluster Governance	Business led, with public agencies and academia in support.
5. Preferred Future	Broadly setting the direction.
6. Initial Strategy	Identifying the early action projects.
7. Short-term, Tactical Agenda	Engaging with a portfolio of 'low hanging fruit' projects that provide early benefits.
8. Formalising, Launching	Establishing a legal structure for the cluster organisation. Launch to celebrate initial successes.
9. In-depth Analysis	External focus, a fundamental appraisal of the cluster's competitive position.

10. Long-Term, Strategic Agenda	More substantive projects underway. Aligning with other agendas, e.g. public resources, academia.
11. Linking the Cluster	Leverage through linking with related clusters within the region, nationally and internationally.
12. Measurement & Evaluation	Is the cluster's competitiveness being strengthened? Is the clusteringintervention making a difference?



While the Twelve Steps provide a practical and tested framework for active engagement in a chronological order, the Steps do not necessarily have to be sequentially addressed. E.g. for a particular cluster, an immediate, tactical initiative could involve collaboration with other clusters in the local community.

In the twelve Chapters that follow, checklists are provided for each Step to review progress and identify aspects that may require attention.

The indicative timeframe that follows assumes that resourcing for long-term cluster engagement is in place (**Step 1**) and that a priority cluster for engagement has been identified (**Step 2**). It also assumes that a dedicated Cluster Manager has been appointed and is in place at the start of the first month.

Each cluster will take its own journey; some of these Steps will overlap time wise. They will not require equal time and effort. For the initial analysis process with a large cluster, more time than that indicated below will likely be needed.

Cluster Development, Indicative Timeline	
Month 1	Establishing Cluster Ignition Team. Informal meetings with senior cluster stakeholders. By end of the month holding a kick-off cluster muster meeting.
Month 2	Extensive individual meetings, covering the triple helix. By end of month, first workshop covering **Step 3**, Initial Appraisal. And **Step 4**, establishing the Governance Group, underway
Month 3	Second public workshop covering **Steps 5 & 6**, Preferred Future and Initial Strategy.
Month 4	Third workshop on **Step 7**, Short Term Tactical Agenda. Establishing initial project teams.
Month 9?	Cluster launch, **Step 8**, announcing some initial successes. **Step 9**, in depth cluster analysis, benchmarking underway.
By Month 18	**Step 10** underway, Long Term Strategic Agenda. And **Step 11**, Linking the cluster
Month 36	First detailed Measurement & Evaluation underway, **Step 12**

Supporting quotations	
Professor Elinor Ostrom	*"There is no reason to believe that bureaucrats and politicians, no matter how well meaning, are better at solving problems than the people on the spot, who have the strongest incentive to get the solution right."* As quoted by John Stossel
Mark Zuckerberg	*"Move fast and break things." "Making mistakes is OK."*
Luigi Orsenigo	*"Clusters are simply not born with all the necessary ingredients in place."* Clusters and Clustering, Felldman and Braunerhjelm, The Genesis of Industrial Clusters, Oxford, 2006
Charles Landry	*"Think big and start small as being incremental allows flexibility to be built in."* *"Starting with easier, cheaper, shorter term initiatives helps prepare for the difficult, more expensive, longer term projects."* Cities of Ambition
Becky McCray	*"Gather Your Crowd, Build Connections and Take Small Steps."* smallbizsurvival.com
Ed Morrison	*"To design and build a cluster, you need to accelerate the collaborations quickly and move ideas into action. This is where Strategic Doing comes in. It is a lightweight, but powerful strategic discipline that forms and tests collaborations quickly. This discipline build trust at scale."* Newsletter, 2016 economicdevelopment.org
Sweden	*"Find the **BIG QUESTIONS** that are common."* Mats Williams, Former CEO, Paper Province, Sweden
Denmark	*"It is easier to cooperate in **smaller** groups of firms."* Lars Albaek, Baltic Sea Cluster Development Centre, Bornholm, Denmark
World Bank On Brazil	*"Facilitating private sector collaborations for collective efficiency—organizing and facilitating private and public institutions to arrive at a common cluster vision; identifying opportunities for growth and collaboration; promoting joint actions such as co-information, co-learning, co-marketing and co-purchasing; and jointly building economic foundations such as R&D capacities, infrastructure, skills upgrading and public–private sector support institutions."* Competitiveness and Growth in Brazilian Cities: Local Policies and Actions for Innovation, Edited by Ming Zhang
Charles Handy	*"It is one of those paradoxes of success that the things and the ways which got you to where you are, are seldom the things to keep you there."* The Empty Raincoat
UNIDO	*"In incipient clusters, small producers advance by taking small riskable steps in coordination with others in the cluster."* Industrial Clusters and Poverty Reduction
Inter-American Development Bank	*"In advanced countries where there is a rich menu of public support programs, Cluster Development Programs (CPDs) tend to almost exclusively finance coordination activities*

	and strategic planning. In countries, regions, and provinces where the offer of support is weaker and less varied, CDPs should finance a more diverse set of the cluster firms' needs." *"The kind of support offered by CDPs varies also in relation to the relative maturity of each cluster. The more mature a cluster is, the less it would need common public inputs, such as a technological center, a laboratory, or other soft infrastructure that they most likely already have, but would probably benefit from support to overcome coordination failures among firms and with other public and private entities."* Impact Evaluation of Cluster Development Programmes, 2016
World Bank On China	*"The Special Economic Zones and industrial clusters have made crucial contributions to China's economic success. The key experiences can best be summarized as gradualism with an experimental approach; a strong commitment; and the active, pragmatic facilitation of the state. Specific lessons include the importance of strong commitment and pragmatism from the top leadership; preferential policies and broad institutional autonomy; staunch support and proactive participation of governments, especially in the areas of public goods and externalities; public-private partnerships; foreign direct investment and investment from the Chinese diaspora; clear goals and vigorous benchmarking, monitoring, and competition; business value chains and social networks; as well as continuous technology learning and upgrading."* Chief Economist's Blog, 27 April 2011
USA	*"Establish System Connectivity: Connect local actors including startups, civic institutions, investors, regulators, and established corporations to create a collaborative community that understands the value of entrepreneurial innovation and embraces risk. This is done using go-betweens who can translate across cultures and bridge gaps."* Innovation That Matters, How City Networks Drive City Entrepreneurship, US Chamber of Commerce, 2015
Asian Development Bank	*"Establishing a business cluster is a bit like a railway journey. At some point in time the train needs to leave the station and start traveling toward its destination. The reality is that the clustering approach cannot wait for everybody to board the cluster train before it leaves. That is why the process needs to be designed to have further stations down the track where others can get on board. A train also has different carriages, and companies with like-minded interests can board the carriage of their interest. The final job is to minimize the derailments that will occur from time to time as quickly as possible to ensure that the industry starts moving again."* Competitive cities in the 21st century: Cluster-based local economic development, Choe, K., and B. Roberts
United Nations Industrial Development Organisation	*"Empowering project beneficiaries by engaging them in decision-making and encouraging them to take on responsibilities for the accomplishment of cluster development activities will increase their commitment to the initiative."* *"It is clear that the motivation of the entrepreneurs can only be safeguarded if they see tangible benefits in the short-term. A cluster initiative needs to move quickly into action to maintain momentum by generating visible benefits. Progressively, as the strategic priorities of the cluster are identified and trust levels increase at the local level, the initiative can move into longer-term, higher-risk activities. Some key but complex issues may need to be broken down into small-sized tasks and milestones that can be more easily achieved by the cluster."* Cluster development for pro-poor growth: the UNIDO approach
Harvard Business Review	*"A co-creative strategy creates value by constantly enhancing experiences for all stakeholders. Uses the initial strategic goal as a starting point and lets the full strategy emerge over time. Focuses on the interests of all stakeholders and how the ecosystem can maximize the size of the pie. Achieves advantage through the increased engagement of stakeholders and by continually building new interactions and experiences, which lead to higher productivity, higher creativity, and lower costs and risks. In the co-creation paradigm, strategy emerges slowly through a process of discovery by the individuals in the firm."* Ramaswamy & Gouillart, Building the Co-Creative Enterprise, October 2010
Deng Xiaoping	*"Cross the river by feeling for stones."*
Jack Welsh	*"In real life, strategy is actually very straightforward. Pick a general direction … and implement like hell."*
Winston Churchill	*"Plans are of little importance, but planning is essential."*

CHAPTER 4 STEP 1

INTRODUCING RELEVANCE

This first step introduces the relevance of cluster development as a centre stage strategy for regional economies.

While clusters arise through natural market forces, *clustering* is a deliberate process.

As such it requires sponsorship.

INVITED FOREWORDS

VYACHESLAV GERASHCHENKO

Deputy Dean, Kyiv Mohyla Business School, Ukraine

How does a country that is not among the top places in competitiveness rankings achieve large-scale development? How do we draw on our history, cultural traditions, special skills and knowledge in developing a High Road Strategy? How do we launch a cluster development approach in a country where almost no one has heard of clusters?

In Ukraine we started in 2013 with special courses for businessmen and municipalities` leaders, programs for future cluster managers, strategic sessions with groups on cities and regions development, visits to and visits by international experts – these have had a cumulative effect.

Today the Ukrainian map is being enriched with cluster initiatives on a range of smart specialisations.

MEREIA VOLAVOLA

CEO, Pacific Islands Private Sector Organisation, Fiji

Doing business in the Pacific is not easy. Trade imbalances are huge and are in favour of external trading partners. Cost of doing business is high and businesses are dominated by SMEs. With distance to market a huge challenge with small-scale productions, cluster development for small economies is a natural fit. With proper set-ups and coordination, SMEs businesses can overcome their trade challenges by working together with key stakeholders in clusters. It makes business sense and can make a difference in small-scale economies.

We in the Pacific have witnessed what cluster development can do through our Pilot projects and the opportunities are enormous.

What Does a Clustering Initiative Do?

The initiative acts as a catalyst, a connector and a convener. It supports groups of companies as they engage in new areas: entering new markets, developing new products and processes and engaging with new technologies. It brings together the cluster's triple helix stakeholders, overcoming coordination failures. It initiates and supports joint actions that flow from the cluster's development agenda. It enables activities that would be difficult to address through the cluster's stakeholders acting individually. It is a deliberate intervention to raise business competitiveness … the cluster's development is not being left just to market forces and to chance.

Cluster development cannot create a cluster from a zero base. There needs to be a nucleus for the growth of a cluster; local seeds are needed to which a 'clustering fertiliser' can then be applied. As identified in Chapter 1.1, the seeds for a cluster are diverse.

Cluster Origin Examples

Availability of a local raw material such as a timber resource, a mineral or a crop.

A 'knowledge centre' such as a government funded R&D institution, a specialised university faculty.

A local tradition or a cultural activity such as music or hand weaving.

A chance event, e.g. an entrepreneur relocating to a community and starting what becomes an anchor firm.

A university professor in a specialised discipline stimulating start-ups.

Presence of a related cluster, e.g. marine engineering competencies emerging from a fishing cluster.

A specific local demand, e.g. an environmental competencies emerging from the clean up of a rust-belt community.

Cluster Development Centre Stage

Cluster development is at times introduced to a region as yet 'another project', alongside a range of other economic development initiatives. Alternatively, cluster development is positioned as an over arching framework, the lens that integrates a wide range of economic development agendas:

- Upgrading technical and management skills; workforce development;
- Embedding lead / anchor companies within a region;
- Developing supply / value chains;
- Business retention, economic gardening;
- SME development; new business start-ups and spin-offs; business mentors; angel support;
- Investment attraction; migrant attraction; talent attraction;
- Export development, internationalisation;
- Women and gender equity; minority inclusion;
- Income distribution;
- Specialised incubators; Industry/Science/Technology Parks;
- Stimulating innovation; Productivity improvements;
- University - business collaboration;
- School – business collaboration;
- Improving access to capital, seed funding, venture capital, financial advice;
- Rural development; Community development;
- Regulatory and compliance issues;
- Land use;
- Regional identity, regional branding;
- Physical infrastructure: bandwidth, transport and logistics, water, energy supply and reliability, waste disposal, common user facilities.

With this wider approach cluster development is positioned not as 'a project' but much more significantly as a high profile centre stage strategy for economic development.

Initial Resourcing

Resources are needed in the early stages to support a cluster development activity with a dedicated cluster manager, and for small-scale, immediate projects. While cluster development is not resource intensive, an initiative with less than 2-3 years of locked in resourcing at start date is vulnerable. Cluster development is fundamentally about changing behaviour patterns amongst firms and support organisations and this does not happen quickly. If resources are only available to support an analysis process, or for shorter-term engagement, then a cluster based approach is not recommended.

Well resources clustering initiatives are more likely to establish the cluster's development priorities prior to engaging on projects. Such initiatives will be in a stronger position to attract competent management for the necessary long-term engagement and to attract the attention of respected business leaders who may well be sceptical as to the benefits.

Public funding should be provided to continually move a cluster's development agenda forwards, not to subsidise the same on-going activities. When the clustering initiative keeps moving forward with it's competitiveness agenda, there is a valid argument for on-going, long-term public support.

Early stage activities and resourcing requirements	
Steps 1 & 2	Introducing to a region the relevance of cluster development and shortlisting the initial cluster pilots. This should not be resource intensive … though paralysis-by-analysis does occur. National agencies / external consultants can support with data analysis, sharing international experiences and providing a neutral corner to open the local conversations.
Step 3 Initial Appraisal	Extensive face-to-face discussions at the interviewee's premises, not mail-out or on-line questionnaires. Funding may also be required to support inward visits to the cluster from technical, market experts. Hosting regular meetings of the cluster's stakeholders will assist in removing isolation and in developing a common spirit. Possibly supporting an early team bench-learning visit to a similar cluster. Such visits generate awareness of a clustering approach and speed up mobilisation.
Steps 3-6 Cluster workshops	Through Steps 3 – 6, a series of workshops will be held so room hire and other costs may be incurred. One of the cluster's stakeholders (a university, school, regional economic development agency) may offer such facilities.
Step 7 Short Term, Tactical Agenda	Some of the cluster's initial projects will require small scale funding. E.g. a joint learning visit to a trade fair; designing an immediate training programme; developing the cluster's web site; bringing in visiting speakers for social functions. This resourcing should be made available without too high a hurdle and with speedy response.

The financial requirements of a clustering initiative divide into two categories:

1. **Resourcing the cluster organisation** and small-scale activities and projects. During the initial 36 months or so of a clustering initiative a public agency (or a NGO, an aid donor or a multilateral agency) may well cover most of the costs. It is important during that adequate funding is in place so the initiative can focus on pursuing its mandate. A clustering initiative with more than one funding source is stronger; this could be co-funding through a number of public agencies.

   Considerable efforts would be needed at the early stage to secure funding from the private sector, especially SMEs, as benefits will be far from clear. There are merits in introducing early in the process an annual 'membership fee', even if it is initially a token. There are trade-offs: a high membership fees will result in fewer members but a tighter focus; lower fees will open up membership to more but carry the danger of a loss of focus. Some of the cluster's stakeholders, such as schools, may be unable to financially contribute but should still be considered as 'members'. Alongside membership fees may be additional financial support coming through 'Cluster Sponsors' such as a local bank, training institute or raw material supplier.

Businesses and other stakeholders contribute time and in-kind contributions rather than $ during the early stages. Over time, the proportion of public funding for many European clusters decreases to around 50% - 60% as private sector commitments build.

2. **Resourcing the specific projects** that emerge as the cluster's forward strategy. Small scale, short-term projects are usually financed through the cluster organisation. More substantial projects may be facilitated and co-ordinated by the cluster manager, but resourced by other partners, e.g. developing specialised handling facilities at the local airport; a cluster specific incubator attached to a core knowledge facility; establishing workshop facilities at a high school that relate to the cluster's needs; establishing a Master's degree course at the local university. A successful clustering initiative seeks multiple opportunities to leverage the resources of others.

As will be seen, cluster development is much more than a public agency simply commissioning a report on the cluster's situation. Unfortunately some agencies, including multilateral organisations and aid donors, at times view cluster development as consultants generating reports for others to action.

Who Sponsors a Clustering Initiative?

As an intervention, a clustering initiative requires sponsorship. This is usually a public agency with a focus on economic development and innovation, at times a national agency but more frequently an agency with a **regional focus**. In Europe, co-funding for clustering initiatives has come (1) through EU programmes, (2) through programmes introduced by national agencies and (3) by regional, provincial and municipal governments, with some clusters receiving support from all three levels.

As well as public agencies, business organisations and academia have taken the lead in sponsoring cluster development in different environments. In Columbia, Chambers of Commerce have taken the lead in sponsoring clustering initiatives. In the South Pacific it has been the Pacific Islands Private Sector Organisation. In Uganda and Tanzania, a university has stepped into a vacuum and taken the lead in developing a national clustering programme. Community colleges in the USA have frequently stepped forward.

Short-term sponsorship has also come from multilateral organisations (including The World Bank, UNIDO, UNDP, Inter-American Development Bank, USAID, Swedish AID and others), from donors and NGOs.

While different triple helix stakeholders have taken the lead in diverse environments, an essential aspect of successful clustering initiatives is partnerships and close collaboration between these three groups of stakeholders. A clustering initiative that is primarily attached to one element of the triple helix is exposed. In most environments it is beneficial to have early (and high-level) government endorsement that provides legitimacy to the initiative. However, clustering initiatives are vulnerable when private sector leaders are unwilling to step forward and the initiative remains owned by a public agency.

Garnering Support

At a national level, as cluster development centres on changing behaviour patterns and mind-sets, there are benefits in resourcing a substantive effort to introduce the merits of cluster development to business, public agencies and universities. A national team of change agents that are supporting the front-line cluster managers can bring knowledge, new insights and international experiences, providing technical and process support and acting as motivators and advisors. This small team also has a role as high-level connectors, linking, for example, similar clusters in different regions of the country and internationally.

A wide range of cluster participants, including education and technology providers, transport and banks, will need to be introduced to the merits of clustering as a cornerstone strategy. The team can usefully take the lead using a variety of approaches, including presentations at conferences, meeting the key influencers and proactively working the media. Establishing the necessary culture shift towards acceptance of the benefits of 'co-operating to compete' requires a long term and coordinated approach.

In many regions early support for a clustering intervention quickly falls into place. I have used the three-stage approach that follows in a region with limited social connections and trust between the senior political, business and academic leaders. This process could be short-circuited in less extreme environments.

Introducing Cluster Development	
1. One-on-one meetings	A series of individual discussions with the region's influential leaders, e.g.: • From business: the local Chamber of Commerce; relevant industry associations; senior CEOs; • Political leaders: the Mayor, elected representatives; • From academia: university rector, technical training institutions, public R&D centres, high schools; • Trade Union leaders; • National and other public organisations and NGOs with offices in the region with economic development roles, e.g. education & training, technology transfer, export development, SME support, investment attraction, agriculture, tourism ...
	It was emphasised during these meetings (1) that cluster development was not 'picking winners', but identifying and then building on a region's wealth-creating assets, and (2) that a key to success will be close triple helix teamwork.
2. Mobilisation presentations	Tailored PowerPoint presentations held with business groups, political & academic leaders, introducing each group to the merits of cluster development, drawing on relevant international examples.
3. Common discussion	Finally, all senior parties brought together to ensure a common understanding across the community on the benefits (and difficulties!) of collaborative engagement and to obtain their public commitment to the cluster approach. It was the first time that such a group of senior participants had met to discuss the development of their region's economy.

Kick-starting a Clustering Process	
United Nations Industrial Development Organisation	*"Prior to launching the cluster development project, representatives of institutions at all levels, i.e. national (e.g. Ministry of Industry, university deans etc.), regional (e.g. regional development agency, chamber of commerce) and local (e.g. municipalities) need to acquire a shared understanding of concepts and methodology related to cluster development. This facilitates future interaction in that it endows them with a 'common jargon'. It also helps create consensus on the objectives of the initiative, make resources available and identify synergies among actors."* UNIDO Service Portfolio, 2009
Inter-American Development Bank	*"When Cluster Development Programmes (CPDs) are introduced, it is necessary to have a period during which other public institutions engaged in industrial policies are prepared to participate in this type of program. The standard design of CDPs involves awareness-raising activities, but these activities should have a broader scope and attempt to mainstream the program's approach to also encompass other policy instruments. This is probably a very tall order for any new CDP, but necessary if its potential to become a platform from which to coordinate all industrial policy tools is to be achieved."* Impact Evaluation of Cluster Development Programmes, 2016
Sweden (National level)	When launching the national cluster competition, extensive briefings were held throughout the country to build high-level awareness and mobilisation. Strong media campaign with headline: *'400 Million Kroner available'* (Euros 40 million). Information packs distributed to 750 organisations throughout Sweden … national organisations, municipalities, trade unions and universities.
Sweden (Regional cluster)	Peak Innovation tourism/sports/outdoors cluster … initial information efforts covered 500 presentations, seminars and individual meetings with around 10,000 people.

What does a clustering initiative NOT do?

- Does not invent a cluster.
- Does not mirror what public agencies are already doing.
- Does not duplicate or replace what established industry associations are already doing.
- Does not compete with the private sector.
- Does not provide consulting services for a fee.
- Does not prepare reports for others to action.
- Does not sit still.

Step 1 Check List: Introducing Relevance

- Is cluster development being introduced as a centre stage strategy for economic development, coordinating a range of agendas including SME development, training needs, investment attraction, export development?
- Has a sponsor, or better still sponsors, been identified who are able to offer support for a minimum of 2-3 years? While cluster development is long haul, and supporting organisations may have short-term funding horizons with exit points, early resourcing and endorsement provides a major impetus.
- The primary funding need is for the cluster organisation lead by a cluster manager. This person is a change catalyst and connector, not an analyst.
- Is the cluster manager going to be in place to start the clustering initiative?

Danger signs

- A clustering initiative dependent on voluntary support is in danger of early burnout.
- The resources available to support an initiative are measured in months, not years and are insufficient to support even a part time Cluster Manger. Short term, underfunded initiatives are likely to wither before an impact is made; subsequent resurrection will have the difficulty of facing sceptical businesses.
- The selected Cluster Manager is a backroom analyst, not a business developer and is viewed as a junior support officer, the cluster's 'secretary'.
- Senior business leaders show little interest, unwilling to step forward to lead.
- Cluster development is being introduced as:
  - A framework to kick start a totally new activity; to develop a 'wishful thinking' cluster;
  - Just another economic development project, an add-on activity;
  - A quick way of generating new jobs … or a quick way of generating (short-term) PR.
  - External consultants coming in to write yet more reports for others to action.

CHAPTER 4 STEP 2

CLUSTER IDENTIFICATION

Most regions are home to a number of clusters.

Identifying these clusters requires a combination of observation and hard data.

Choices may then be needed as to which merit support.

INVITED FOREWORDS

DR. GÖRAN LINDQVIST

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Some cluster initiatives begin as a local project driven by a group of companies in some sector. At first they cooperate around a specific problem, and then gradually it evolves into a more elaborate cluster collaboration. For such initiatives, identifying and prioritising a cluster is not needed: the cluster is given from the outset.

However, the situation is very different when government and other stakeholders in a country or region decide to use clusters as a tool to stimulate economic growth. Funding has been secured, resources have been mobilised – and then the question arises: which clusters should we target?

The problem is not to figure out which clusters would possibly benefit from a cluster initiative, because the answer is that any cluster would. The most well-established and well-functioning cluster could still be strengthened further by a cluster initiative. And a tiny, struggling embryo of a cluster could improve its chances of growing into something big if they got some help to organise themselves. So there is never any lack of potential targets.

The need to prioritise comes from the fact that resources available for cluster support are limited, which means that it boils down to a question of how to get the most bang for the buck. Which potential clusters would benefit most? Where would we get most value compared to the investment we make in cluster development? Should we support cluster A or cluster B? Are there perhaps also some other clusters to consider? If we are going to make a short list of clusters, what is the long list? And what is a "cluster" anyhow?

In the early phases of cluster development projects, questions like these are calling for answers. Identifying clusters is a tricky business, and how to prioritise them is a difficult decision to make. Readily available data sources, such as the European Cluster Observatory, can be of some help by providing data that is comparable across countries and sectors, but they can only give a part of the picture. In the end, each cluster development project will also need to collect their own information and make their own tough choices. This chapter is about how that can be done.

JAMISON STEEVE

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Cluster development should be market led and supported by government policy. Given limited public resources, governments must first identify those clusters that are poised to grow and scale – no small task. Then they must prioritize these clusters. Both of these actions require great political will and tough decisions. But refusing or failing to do so can lead to wasted efforts and limited results.

The phrase "picking winners" is often touted as a selection strategy. Yet determining who these winners are can be a difficult exercise. Having data is integral to this process and mapping tools, such as the US Cluster Mapping Portal or the recently announced Canadian Cluster Map, are an excellent starting point to show not only where clusters are located, but also the hard facts about their growth and innovation potential. Other methods are also discussed in this chapter.

Along with the necessity for data is the need for government alignment. In Canada, the federal government, in its 2016 Budget, announced an $800 million Innovation Agenda, part of which will be dedicated to the creation of a Canadian Cluster Map and the strengthening of innovation networks and clusters, among other initiatives. The Ontario government has also offered assistance to clusters through its Partnerships for Jobs and Growth Act (2014). Alignment between the federal and provincial governments on the role of clusters in driving innovation and economic growth is a great beginning. Moving beyond the political rhetoric around clusters, identifying and then prioritizing them will be much harder. This chapter presents concrete and practical steps that will underpin a transparent process for publicly supported clusters.

So … do we have a Cluster?

The debate continues as to what exactly constitutes a cluster in terms of critical mass, competencies, components and geography. This debate is unlikely to be resolved as clusters come in many different forms and surface in non-traditional categories. While each cluster is unique, the essential ingredients of a cluster are likely to be in place if the questions on this checklist can be answered positively:

Do We Have a Cluster?

- Does the cluster sell its products / services to other regions (as opposed to within its own region)?
- Are the cluster's firms geographically concentrated?
- Is the concentration of firms in this area significantly higher than in neighbouring areas?
- Is there a clearly definable core activity in the cluster? Could be a technology that underpins a number of activities.
- Does the cluster have locally based suppliers of specialised inputs, machinery or services?
- Are there locally based supporting institutions (e.g. a university, government agency, R&D institute, vocational training centre, industry association) that cater specifically to the cluster?
- Would outsiders say without prompting that the region is known for this activity?

Drawing on: Cluster Competitiveness Report www.clustercompetitiveness.org

There is nothing on the checklist that relates to the presence of a 'cluster organisation', reflecting that a cluster is a natural occurrence. A regional specialisation / agglomeration will not necessarily be recognised or described as a 'cluster'. The interdependency amongst firms may not be sector specific … it may relate to a common technology platform, to an ethnic or cultural attribute or to a common served market.

This checklist helps in identifying a region's mainstream and well-established clusters but not necessarily the more embryonic, the start-up clusters. These can emerge from an existing cluster and in the early stage can be in its shadow.

Segmenting a Regional Economy: the Traded Clusters

As cluster development is about building on existing regional assets, how do we identify patterns amongst those assets that suggest the presence of clusters? Firstly, we need to segment a regional economy into two broad (and unequal) segments:

1. **Domestic side.** The jobs that are primarily centred on **servicing the local economy**, such as health care, teachers, vehicle repair, house building, hairdressing and retail. In a developed economy these domestic activities can account for two-thirds / three-quarters of local jobs, in a less developed economy possibly 90% or more of jobs relate to the local economic activity, including the informal economy. As a generalisation, these jobs and firms are not exposed to competition from beyond their region.
2. **Traded side.** These are the jobs that are **attracting wealth into the local economy** through the activity of firms with customers in more distant markets. These are the firms that are supplying products or providing services (including tourism services) to customers in or from other regions. The customers may be in neighbouring regions or in international markets. Typically a quarter, occasionally a third or even more of the local jobs are in this category. As the firms are supplying a larger market, they tend to be faster growing than those servicing the domestic side of the regional economy. Wage levels are noticeably higher in these traded clusters than in the domestically focused activities. Patent levels, an indication of innovativeness, are significantly higher within the traded clusters than the domestic activity. Productivity per employee is higher within the traded clusters; there is more entrepreneurship; new start-ups are more likely to succeed. Investors from beyond the region, particularly international investors, are more likely to be interested in participating in the traded clusters. As the firms are serving markets in other regions and countries, these firms are exposed to competition from other regions … and are free to choose their preferred location. The have the option of servicing their customers from possibly a more conducive region, should they choose.

The location of **resource-based clusters** is determined by the resource availability.

Composition of Regional US Economies			
	% Employment	**% Income**	**% Patents**
Traded clusters	25%	37%	96%
Local (domestic) clusters	72%	62%	4%
Resource-based clusters	4%	<1%	<1%

Source: Michael E. Porter, Economic Performance of Regions, Regional Studies (2003); Updated via Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School (2008)

A similar pattern can be seen across the Atlantic where the European Commission has identified 2,500 traded clusters in Europe. Taken together, these clusters account for more than one in three European jobs and over half of wages.

The traded and the local industries have very different roles in raising regional prosperity. Growth on the domestic side of a regional economy is driven in part by population growth, in part by growth from the traded side. As the traded side of an economy grows through servicing external customers, more demand will automatically be placed on the domestic side. It is the traded activities that drive wealth creation and it is here that economic development activities should focus.

It is most unlikely that a totally random collection of firms is successfully trading beyond the region. There will be commonalities, though, as we will see, detective work may be needed to discern patterns.

So, having defined what we are looking for, where do we start?

Drive-by Cluster Identification

In the Foreword to Chapter 2, Professor Michael Enright highlights: *"The most important reason to focus on clusters is because they are there."* So, where are they? Some clusters are self-evident, such as these examples from my travels around the world:

Driving on the main freeway south of Portland, Oregon I came across this sign: ***"Welcome to Linn County, Grass Seed Capital of the World".*** Later I learnt that Linn Country grows some 70% of the world's temperate grass seed.

As I drove into **Isparata, Turkey**, I passed a large (concrete?) rose in the centre of the main roundabout, celebrating the region as a major supplier of roses to Europe. Similarly, driving into **Sialkot, Pakistan** the main roundabout has a tower with surgical scissors and soccer balls embossed, the region's two wealth creators and lead exports.

The ***"Welcome to Blaenau Ffestiniog"*** sign in Wales is appropriately made of roofing slate, acknowledging the region's worldwide reputation. Further south in Wales is Hay-on-Wye (population 1,500), the ***"Town of Books"*** with 30 book shops and presenting itself as the world's largest second hand book centre. Hay-on-Wye has become home to one of the world's top Literary Festivals, attracting 250,000 annually. Bill Clinton and Jimmy Carter have attended.

Across the world, a small rural town welcomes road travellers to ***"Australia's Horse Capital".*** On the main street in Scone, New South Wales, next to the Thoroughbred Arms pub, is a life-sized statue of a famous thoroughbred horse. Driving into Tamworth, New South Wales, I was greeted by an ***"Australia's Music Capital"*** sign. Torquay, Australia welcomes surfing visitors from around the world to ***"Surf City".*** Two of Australia's global surf brands, Rip Curl & Quiksilver, originate in Torquay. Latrobe, Tasmania attracts tourists as the ***"Platypus Capital of the World".*** An earlier visitor to the region was Charles Darwin, intrigued by the origins of these egg-laying mammals.

Drivers entering High Point, North Carolina pass the world's largest chest of drawers, proclaiming the ***"Home Furnishings Capital of the World".*** Socks dangle from a drawer, symbolising the region's second economic activity, hosiery. Manzano, Italy celebrates the region's primary industry, chair manufacturing, with a 30-meter high chair in the main square.

Barrington, Nova Scotia welcomes visitors to the ***"Lobster Capital of Canada"***; not far away is Shediac, New Brunswick professing to be the ***"Lobster Capital of the World".*** (Could both somehow be right??). Oxford, Nova Scotia proudly welcomes travellers to the ***"Blueberry Capital of Canada".*** Lanark County lays claim to being the ***"Maple Syrup Capital of Ontario".***

Havelock, close to my home in New Zealand, is the undisputed ***"Greenshell Mussel Capital of the World"*** and shouts this out to all travellers. Hawke's Bay, New Zealand welcomes visitors to ***"Wine Country".***

In northern Iceland on a wintry morning I drove passed the ***'Velkomin i Skagafjörð'*** sign, portraying a horse.

And should that sign be missed while galloping by, the main street of Saudhárkrókur has a proud statue of an Icelandic horse.

Just in case the traveller comes from another planet, Napa Valley, California broadcasts its claim to fame on the main highway coming in from San Francisco with: ***"WELCOME to this world famous wine growing region".*** Grasse in Provence, France welcomes visitors with large, colourful kerb-side signs: ***"Bienvenue à Grasse, capitale mondiale du parfum".***

At a very local level, street names can identify very local clusters, as I experienced when visiting the Old Quarter of Hanoi: Hang Gai (silk street), Hang Bong (cotton), Hang Mam (fish sauces); Hang Bac (silversmiths, jewellers), Hang Bo (baskets), Hang Quat (fans) and Hang Huong (incense).

At a national level, Grenada in the Caribbean celebrates on its flag what was the country's main cluster and export earner, nutmeg … unfortunately disastrous hurricanes have substantially have set back the country's fortunes.

At times we unnecessarily struggle with *"Do we have a cluster?"* when the answer can be in front of us, and often with sharp clarity, particularly in smaller communities.

Cluster Identification … a Google Eye View

An alternative route to cluster identification is through virtual travel with Google. I use the Internet in three ways for cluster identification:

1. Using Google Images

This is a fast-track route to identifying what may be a region's economic specialisations, its clusters.

Before my first visit to Puebla, Mexico I inserted into Google's search engine the names of regional towns that I was absolutely unfamiliar with and checked out 'Images' for those places. Filtering out the (many) tourism photos and the cathedrals etc., it was quickly apparent that **Chighahuapan** produces glass Christmas tree decorations and **Herrera** onyx items, that **Huauchinango** was a centre for cut flowers and **Zacatlan** for manzanas (apples). I invite you to check out Google images for **Tultepec** for a pyrotechnic experience.

Similarly, check out Google images for **Murano, Venice** and glassware is everywhere; for **Burano, Venice** (again after excluding the many tourism photos) hand woven lace comes through.

Looking up images for **'Húsavík, Iceland',** for **'Vava'u, Tonga'** and for **'Kaikoura, New Zealand'** clearly shows the reason why these small and remote communities are international tourism destinations … the migrating whales.

A quick Google image search identifies **Young, New South Wales'** claim to fame as the *"Cherry Capital of Australia".* **Batlow, NSW** more quietly announces that it is *"Famous for Apples".* **Kingaroy, Queensland** is the only claimant for *"Peanut Capital of Australia".*

2. Identifying *'Non Standard'* academic offerings

A second Googling route for cluster identification from a distance is to look for out-of-the-ordinary training offerings and university specialisations within a region. Often these relate to a competitive point-of-difference within the region, and this can be in very specialised, niche competencies. This search route demonstrates that many clusters are more specific that traditional 'sector' descriptors:

Examples, 'Non-standard' Academic Specialisations	
Alice Springs, Central Australia	Indigenous creative arts
Aberystwyth, Wales	Green biotechnology
Bergen, Norway	Subsea technology
Bodø, Norway	Aquatic biosciences
Catawba Valley, North Carolina, USA	Hosiery
Halifax, Nova Scotia, Canada	Marine microbial genomics
Hólar, northern Iceland	Aquaculture, equine
Nelson, British Colombia, Canada	Ski resort management
Nelson, New Zealand	Deep sea fishing, seafood processing

Östersund, Mid Sweden	Winter sports technology
Plymouth, England	Surf science & technology
Sudbury, Ontario, Canada	Precambrian geology
Tuttlingen, Germany	Medical devices & healthcare management
Zanzibar, Tanzania	Seaweed farming

3. Search for 'XYZ' Museums

A third Googling route. Want a clue as to where potatoes are a particularly important crop? A Google search for *'potato museum'* identifies two: Idaho, USA and Prince Edward Island, Canada.

Looking for optics clusters? Jena, Germany has its ***"Optical Museum"***; Tucson, Arizona its ***"Museum of Optics"*** and St.Helens, UK the ***"World of Glass"*** museum.

For shoe clusters? Well, skip over the Imelda Marcos shoe museum in Manila and you will see Northampton, England: ***"The largest collection of historical footwear in the world"***. If your interest is ski boots, look for ***"The Museum of the Boot"*** in Montebelluna, Italy. Looking for a perfume cluster? Here is a clue … the only ***'International Perfume Museum'*** in the world is in … Grasse, France.

But caution, a museum may be all that is left of a once dynamic cluster, such as the silk museum in Macclesfield, England. I have visited a pottery museum in Medicine Hat, Alberta that is the only remnant of a cluster that once produced 75% of Canada's pottery. In contrast, the Potteries Museum in Stoke, England continues to be part of a very vibrant pottery cluster.

These three 'Google' routes can signal the presence of an economic activity that may merit closer investigation, and may provide the nucleus for a cluster development engagement. But lets explore some more systematic approaches to cluster identification.

Top-down Cluster Identification … Quantitative

A review of secondary data, the published statistics, will start to highlight the concentrations of economic activity within a region, identifying the traded clusters, in particular the clusters that are growing faster than other sectors within the region and outpacing the same sectors nationally. Approaches for this analysis will vary according to the depth of published statistics that are available.

The most frequently used technique is using **location quotients (LQ)** to highlight regional concentrations of economic activity. A LQ identifies the extent to which an economic activity is over or under represented in a region relative to its presence in the country (or state, province) as a whole. A location quotient could indicate that whilst 5% of all the country's firms are located in a region, 50% of firms in the ABC sector are located in that region, giving a very strong location quotient of 10, meaning ten times the national average.

Other LQ options are to use employment statistics, wages data, industrial and agricultural production data, R&D activity, new investments, patent data or education / training data to highlight local concentrations. Location quotients would need to be above 1.25 or 1.5 to merit interest, indicating a local representation that is 25% or 50% above the national average. However, LQs can be deceptive when looking at a large region, as the activity may be geographically concentrated within the region. Further, published statistics may not be sufficiently granular to differentiate e.g. between cotton and leather within an apparel cluster, or between active sports wear, eveningwear and hosiery.

Input-output analysis is occasionally useful if quality data is available that has a regional focus. This can highlight local concentrations and demonstrate buyer-seller linkages.

Shift-Share analysis explores changes in economic activities over time. Employment, production or GDP data can be used. Sectors that are growing proportionally faster over time than other sectors are highlighted. The data is often summarised in visual charts. Whilst such charts attract media attention, they can be at too general a level to be meaningful for economic engagement.

A review of regional **patent activity**, when available and relevant for the sector, can help reveal specialisation patterns. Another approach is to identifying the sectors that offer **higher pay** compared with others in the region and compared to national averages. **Export statistics** are occasionally available on a regional basis, or **shipments**

through a regional port or airport. If published statistics are unavailable, an alternative approach is to **rank the local firms by size** (by number of employees, or revenues, or exports) and then identify common aspects. This approach can surface commonalities in technology or markets.

Some regions bundle a number of economic activities together to achieve the scale needed for public attention. Biotech, medical devices, wellness and regional healthcare can be brought together as a 'life science' cluster or even an 'advanced manufacturing' cluster. But with such broad clusters, deep specialisations are unlikely to surface and there may be relatively few opportunities for substantive collective engagements to lift competitiveness.

A number of information sources have developed over recent years that support cluster identification. The European Cluster Observatory offers a Cluster Mapping tool with an advanced data set on clusters and regions in Europe. It provides statistical information from a wide range of sources, both on the geographic concentration of various industries and indicators of economic performance.

In the US, Porter and the team at Harvard's Institute for Strategy and Competitiveness have prepared employment and wages data for each US region as part of an extensive Cluster Mapping Project. Similar Canadian data is available from Toronto's Institute for Competitiveness and Prosperity.

Cluster Databases	
Clustering Initiatives, Cluster identification data	
Global	http://www.tci-network.org/initiatives
Europe	http://www.clustercollaboration.eu/cluster-mapping http://www.clusterobservatory.eu http://www.cluster-analysis.org
France	http://competitivite.gouv.fr/identifier-un-pole/cartes-des-poles-468.html
USA	http://www.clustermapping.us/
Canada	www.competeprosper.ca/clusters/overview .
Mexico	http://www.icluster.inadem.gob.mx
Japan	https://www.jetro.go.jp/en/invest/region/icinfo/
Russia	http://map.cluster.hse.ru (in Russian)

In addition, in many locations, **published or academic studies** are available that have gathered data on the current and future prospects for a region's key sectors/industries. These studies may be from a training or workforce development perspective, an export development view, or preparing a regional investment attraction prospectus. The reports may well be filed away in different offices. Such studies can provide a useful regional overview and a starting point for cluster identification.

CAUTION! BEWARE OF OVER ANALYSIS OF 'HARD' DATA. A major difficulty with published statistics is that cluster activities are not that well captured. In actuality, the available data can be very soft. Published statistics are gathered by traditional sectors, not the wider concept of clusters. The published employment statistics for a furniture cluster are unlikely to include component suppliers, packaging suppliers, furniture designers, exporters, freight forwarders and training institutions.

Further, the economic activity within many services clusters, such as the Wellington, New Zealand seismic engineering cluster, simply does not register in any published statistics. Data for 'new economy' activities is often not as detailed as for traditional manufacturing. Embryonic clusters can be so small that they defy statistical based analysis techniques. In many countries the challenge with published statistics is accentuated by the contribution of the informal economy.

In addition, the geographic boundaries used in published statistics relate to political regions, not the functional region of a cluster. Clusters may be very narrowly contained within a region or stretch across regional and even international borders.

Using primarily a location quotient approach, twelve clusters have been identified in **London**, including 'Textile & Apparel Supply Chain', 'Business Information, Management Services & Support', 'Auxiliary Services to International Finance', 'ICT', 'Health & Medical Research', 'Media Services & Creative' and 'Machinery/Heavy Equipment Manufacturing & Related' [23]. This statistical analysis approach was not sufficiently granular to surface a number of the

clusters where London, and in particular regions within the city, have an established international reputation, such as finance and insurance in the City of London, antique auction houses in the West End, men's wear on Jermyn St. and medical services centred on Harley St.

Ed Morrison	*"Data can provide powerful insights into the strengths of your economy, or it can bog you down in a sea of numbers and charts. Understand how to use public data to identify clusters … the data are one the web and easily available."* Newsletter, 2016 economicdevelopment.org
Greg Landry	*"Different analytical techniques provided different views of the change occurring in specific economic regions. Utilizing a variety of analytical techniques can provide valuable background information when building development strategies."* Extending the Regional Analysis Toolkit, Nova Scotia, Canada, 2016

While a top-down analysis of published data can deliver 'hard' evidence, this approach is insufficient in itself. It needs to be complemented with a more qualitative, bottom-up perspective.

Bottom-up Identification … Qualitative

The second, **and more valuable route**, to cluster identification is through primary data gathering. This bottom-up approach is particularly useful in highlighting the niche clusters that are not identified through published statistics. This includes clusters such as artisanal or organic foods; an arts/crafts cluster; green building; nano technology; or service clusters such as tourism, heath care, wellness, sports, education, retirement, translation services or management consulting. Most of these clusters are overlooked by conventional data analysis. A bottom-up approach will also more clearly identify the distinctions between clusters that at first glance can appear similar.

Specific descriptors provide a much more valuable starting point for cluster development than broad, generic terms. There are strong benefits in starting narrow rather than broad.

A starting point for a bottom-up approach to cluster identification is a series of individual discussions with a diverse group of 'wise persons' who know the firms and the local economy well. A series of 25 + interviews may be necessary.

Cluster Identification from the Bottom-up
Tapping into Local Knowledge
Economic and trade development agency professionals at the national and local levels; SME support agencies; employment and training agencies; regulatory agencies; NGOs;
Chambers of Commerce and other local business associations; business mentor support organisations;
Incubator and Technology Park managers; university technology transfer specialists; academics who have reviewed the local economy;
Training providers and technology centres that are focussing on specific aspects of the local economy;
Mayors, political leaders; union leaders;
Bankers, financial institutions, business angels, freight forwarders/logistics providers, lawyers, recruitment agencies, printers and others who are in contact with many local firms; and
Trade journalists and newspaper editors with an overview of the regional economy.

Narrowing the Cluster's Competency Boundary

The business scope of the cluster also needs to be clarified. What are the specific competencies of the regional firms? Politicians and public funders of clustering initiatives tend to prefer broad definitions that encompass many firms (and voters). However, firms are interested in working with other firms facing with similar problems and similar opportunities.

Part of the journey of cluster development is comprehensively understanding within broad cluster descriptors (such

[23]Supporting London Business Clusters, Final Report, 2011

as 'Technology', 'Advanced Manufacturing', 'Light Manufacturing', 'Smart Manufacturing') the niches where the firms are particularly competitive. These hot spots can take time to clarify, but this is where development agendas should focus. Some of the clustering initiatives underway around the world are unrealistically generic and thwart the chance of finding common strategies of substance.

Cluster Identification	
From the Generic to the Specific	
Generic	**Specific descriptors**
ICT	IT for remote mining; Process control IT; Tourism management IT
Timber processing	Wooden chairs; Kit set houses; Building components
Horticulture	Cut roses; Carrot seeds; Organic carrots
Tourism	Adventure tourism; Medical tourism; Convention tourism; Whale watching
Engineering, Metal working	Oil & gas engineering; Marine engineering; Agricultural engineering; Defence engineering

Over half of the UK's regions claim they have ICT, creative industry, biotechnology and food & drink clusters. These claims may well be valid for each region … providing the region has its specific smart specialisation within these generic descriptors.

Catalonia	*"The initial study was too general. One of the clusters identified was Tourism. An analysis more oriented towards governmental action would have indicated that at least four tourist clusters could be identified, with quite distinct characteristics, needs, interactions, clients and strategies: urban tourism (essentially for the city of Barcelona), coastal tourism (the Costa Brava and the north of Maresme), sun and sand tourism (the Costa Daurada) and mountain tourism with its winter and summer variants."* Professor Antoni Subirà, Past Minister of Industry, Catalonia; Chair, TCI's Board of Advisors, Clusters and Competitiveness: The Case of Catalonia (1993-2010) Gascón, Pezzi and Casals
Less Favoured Regions	*"Less-favoured regions do have the potential to develop and benefit from smart clusters, not by imitating research-intensive urban regions but by recognizing their local talents, assets, and capacities to innovate and the interdependencies that define their current economy and offer their best prospects for the future."* Dr. Stuart Rosenfeld, The Nexus of Innovation and Clusters in Less Favoured Regions, EU DG Regional Policy, 2012

It can take time to identify the specific competencies within large clusters. These competencies, and their cluster support programmes, will not be static over time. **Catalonia, Spain** has moved to a series of new generation clustering initiatives within a common end-user market. For example, from 'Home furniture', 'Home textiles' and 'Home lighting' clusters to 'Home equipment'; from 'Children's clothes', 'Children's publications' and 'Toys' to a 'Kid's cluster'. **Baden-Württemberg**, **Germany** is undertaking a transformation of cluster initiatives from traditional to broader activities, e.g. from 'Automotive' to 'Mobility'. **Finland** has an evolving focus from industry-based clusters to thematic clusters, such as from 'Construction' to 'Living' and from 'Medical' to 'Well being and healthy aging'.

Establishing the Cluster's Geographic Boundaries

The functional region of a cluster needs careful consideration. Tight geography is a key to trust building, tacit information flows and lower transaction costs. However, this tight geography can result in mismatches between political borders and a cluster's functional region. Politicians are naturally obsessed with their boundaries, and economic development programmes are delivered within those boundaries.

Nonetheless, these administrative boundaries are less important than **economic linkages**, which are not inhibited by political boundaries. The functional region of a cluster relates to the natural interconnections of firms and support organisations and will primarily align with commuting patterns and the region's labour market. All clusters have a unique geography, with a self-determining catchment area. The functional region will probably be much smaller

that that of a country or state/province, the usual unit for determining economic policy.

Some clusters are limited to a few city blocks, such as finance in New York (Wall St.), in Toronto (Bay St.) and in London (Threadneedle St.). Many creative clusters are concentrated within inner cities, such as lower Central Park, Manhattan and Ultimo, Sydney. New York's garment cluster in midtown Manhattan covers just eight city blocks. In contrast, Central Sweden's Steel & Engineering cluster extends to 16 municipalities. Forestry, agriculture and tourism clusters can have an even broader geographic spread but are likely to have a nodal service point. Many clusters straddle rural – urban boundaries. At the extreme, clusters in rural northern Canada and the Australian outback can have 2-3 hour catchment areas.

Most clusters have a tight **geographic focus** with the majority of the firms and related organisations being within 45-60 minutes travel distance of each other, or possibly a 30-40 km radius.

Political boundaries were set in history and are increasingly irrelevant when establishing the functional boundaries of a cluster. Two Canadian potato-growing clusters, in the provinces of Prince Edward Island and New Brunswick, have become increasingly integrated with the opening of a connecting bridge.

International borders are becoming less relevant as determinants of a cluster's boundaries. The opening of the bridge connecting Copenhagen (Denmark) with Malmo (Sweden) over the Øresund Straight is changing that region's economic geography and has led to the establishment of an IT Øresund clustering initiative (Cluster 55°); a Food Øresund cluster; and Øresund Biotech. Straddling the Dutch-German border is the Twente plastics cluster. Straddling Alsace in France, South Baden in Germany and Northwest Switzerland is BioValley, one of the world's leading life sciences regions, with centres in Strasbourg, Freiburg and Basel.

Not all of a cluster's elements need to be located within the cluster's functional region. Suppliers and at times knowledge institutions can be further afield. The Uppsala Bio cluster in Sweden has important links to universities and venture capital providers in Stockholm, some 50 km to the south.

As with understanding a cluster's specific competencies, it can take time to establish the geographic boundary of a cluster. The functional region needs to be small enough to be tight and to provide a community 'feel' and yet large enough to have the critical mass to address key issues. Further, a cluster's geographic boundary is not a stable concept: it will be influenced over time by changes in personal preferences and travel conditions, the development of new transport routes and the on-going advance of communication technologies.

United Nations Industrial Development Organisation	*"There is no universally accepted way of establishing the exact boundaries of a cluster. What is perceived as close in one location may represent an insurmountable distance in others; distance can be influenced by the availability of transport facilities, as well as by cultural identity and social values."* The UNIDO Approach to Cluster Development, 2013
Asian Development Bank	*"An extended urban region is defined by spatial spheres of economic influence, not administrative jurisdictions. City cluster development takes advantage of economies of scale in extended urban regions, thus increasing the intensity of economic activity."* Urban Innovations, City Cluster Development: Triggering Inclusive Economic Growth, 2008
Nordic Analysis	*"Entrepreneurs thrive at city-level, often in neighbourhood clusters within cities, and it's these rather than countries that are the relevant entities when it comes to optimising for innovation and startup activity."* City Initiatives for Technology, Innovation & Entrepreneurship, 2015

Go with the Strong Clusters

Assuming a shortlist of potential clusters has been developed, which of these will merit early attention? A first response is to go with the strong. If the overall objective is economic growth and high value job creation, this will be achieved more by accelerating the already well-developed and **dynamic clusters** than through supporting those that are struggling.

A focus on the strong clusters does not imply a concentration on the loud, well-articulated voices from within the community. Dying clusters can be very accomplished at securing political support to postpone what may be inevitable. Mature clusters are likely to have industry associations in place and to be politically well connected. **Emerging clusters** may have yet to establish a voice and a clear presence; engaging with such clusters can be the key to ensuring that path dependency and regional lock-in to a few mature clusters are avoided.

For a cluster that is in difficulty, explore carefully the reasons. Are the problems primarily external to the cluster, such as rapidly changing technologies, declining markets or low cost suppliers emerging? Or alternatively, are the issues internal to the cluster, such as a lack of co-ordination? Look closely within clusters in overall decline: are there growth niches, hot spots with fast growing businesses … perhaps an emerging cluster?

The focus for engagement should be on accelerating the strong clusters. It should not be on protecting and preserving the weak, the ambulance cases.

Uruguay	*"Uruguay had a bumpy start. One problem was the selection of the first clusters to be supported. The methodology and some political pressures led to choosing clusters in sunset economic sectors, with severe structural problems related to competitiveness, and a long history of old style, ineffective industrial policies and protectionism. Only when the selection process was improved and the program managed to capture the interest of clusters with better potential did the pace of implementation improve"* Impact Evaluation of Cluster Development Programmes, Inter-American Development Bank, 2016
European Union	*"Cluster programmes will have the highest rate of return if they are targeted at clusters that have the strongest ability and willingness to renew and upgrade. Ability is reflected by the success that clusters have already achieved in their line of activities, or by capabilities to move into a new field. Willingness is shown by the ability to organise collaboration within the cluster and by a strategy that clearly outlines activities to upgrade competitiveness and leverage government engagement. The most efficient use of taxpayers' money is not achieved by focussing on either the strong or the weak, but by focussing on the dynamic."* European Cluster Policy Group
USA	*"If Cities Want to Succeed, They Need to Focus on What Makes Them Distinct."* Aaron Renn, 2014 www.governing.com

And Engage with the Emerging Clusters

All clusters start small and often emerge from an existing, at times mature, cluster. These clusters can be particularly difficult to uncover, yet are a key in building a regional economy. Insights to the presence of emerging clusters can come from identifying the hot spots within mature clusters, from reviewing patent data (including patent citations), from evidence that serial entrepreneurs are engaging, from reviewing merger and acquisition activity (especially by external investors) and from reviewing specialised offerings at tertiary institutions.

Germany	*"From a policy maker's point of view, emerging industries, independent of how they are defined, are highly important. They yield the highest potential for the growth and competitiveness of firms, especially SMEs."* Institute for Innovation and Technology, IIT Perspective #9, 2012
United Nations Industrial Development Organisation	*"Sectoral specialization is also to be looked at in a dynamic and visionary way, as it can change over time when entrepreneurs are able to reinterpret traditional skills and crafts to move into new production activities such as a furniture-producing cluster evolving into an ecological housing hub or a local community shifting from artisanal fishing to a hub for sailing."* Cluster development for pro-poor growth: the UNIDO approach
European Union	*"It is important to ensure that clusters are defined in terms of the new market and knowledge relationships needed for emerging sectors to thrive. It is even counter-productive to reinforce traditional sectoral clusters as these may inhibit the necessary mobility."* Aho Report, 2006

'High Tech' is Highly Irrelevant

There are no specific clusters, 'high tech' or otherwise, that a region should focus on for growth. The focus needs to be on improving the competitiveness of the existing clusters, whatever they may be. The clusters that matter are the clusters that are already present, not the aspirational clusters.

There is a real danger in public agencies over focusing on high tech industries, seeking to build the next Silicon Valley. 'High-tech' is a vague and imprecise descriptor that is of little relevance when it comes to identifying clusters

for engagement. Clean-tech, green-tech, biotech, ICT, nano-tech along with creative clusters are viewed as 'new economy and innovative' and are placed high on the wish lists in too many regions. Public funds should not be invested in such broad 'hot sectors' unless there are deep competencies and assets within the region to build on. These competencies need to be specialisations within the broad categories. **Costly public investments in 'Clusters of the Future' too often fail**. And many 'high-tech' clusters account for just a very small proportion of employment within their community.

A world-class cluster, whatever its field of activity, will be technologically sophisticated relative to its (weaker) competitors. High performance apparel, furniture, vegetable seed or processed foods clusters are as much 'high tech' as software or electronics.

Agriculture clusters with large employment should not be ignored, as their competitiveness will determine the income of a large proportion of the population.

> *"... there is no such thing as a low-tech industry. There are only low-tech companies – that is companies that fail to use world-class technology and practices to enhance productivity and innovation."*
>
> **Professor Michael E. Porter**

What is NOT a cluster?

As the term 'cluster' has become increasingly popular, it has become over used. When public support is available, many economic development activities are quickly dressed up as 'clusters'.

What is NOT a Cluster?

- A real estate development, e.g. an industry estate; an industry, science or technology park; a precinct; a hub; a business incubator;
- An export processing zone; a special economic zone; a free trade zone;
- An industry, a trade or a professional association;
- A business consortium/alliance, a cooperative, an export network, a supply chain.
- A large branch plant, a mine.

But each of these may well be an important element within a cluster. Co-location does not automatically lead to connectivity and co-creation. The knowledge infrastructure and the social connections are more fundamental to a cluster's competitiveness than the physical infrastructure. Two further distinctions: (1) a cluster's functional region (i.e. the cluster's geography) is usually broader than that of an industry park or an export-processing zone, (2) the spread of competencies within a cluster (i.e. the cluster's specialisation) is usually narrower than those found on an industry park, or even a 'science / technology park'.

Prioritising Clusters for Public Support

I have yet to visit any corner of the world that does not have some local capabilities that are attracting wealth to its region. So how might we priortise these capabilities for support?

All successful clustering initiatives are built on solid economic foundations. The cluster has not been 'invented', it is not a 'wannabe' cluster, it is not a politician's dream, and it is not a marginal contributor to the local economy. Clusters that merit support will already has developed the competitiveness to attract customers from beyond

their region. The cluster may reflect national sector/economic priorities though this is not essential. The cluster's functional region may well extend over political boundaries[24].

The clusters should **draw on the region's strengths**. These assets may be centred on a specialised competency amongst the firms; a specialised capability at a university or public R&D institution; a common technology platform that underpins a range of firms; or a cultural or traditional strength such as music or textile weaving.

There needs to be **critical mass for engagemen**t with a cluster. Large clusters provide more options for growth, more options for fresh combinations amongst the cluster's stakeholders. The cluster should include a range of firms with some commercial connections between them. This is often visible as a supply chain. There should be sufficient scale for specialised services and inputs to develop over time. Many of Germany's clustering initiatives have 60-100 active organisations.

The cluster's competency may well be in what is considered an 'un-sexy' area, but in terms of underpinning the local economy it can be central. Import substitution candidates may be considered, particularly if they are support for an export activity.

A positive feature in terms of raising competitiveness is having links within the region to **related clusters**. Importantly, shortlisted clusters should have a clear **commitment from their senior stakeholders** to work together in establishing collaborative agendas to their mutual advantages.

The relative importance of the cluster needs to be considered. The cluster needs to be a major contributor to the local economy, or have the clear opportunity to make a substantial impact in terms of employment and exports. A potential cluster that accounts for just 1% of local jobs, even if it grows rapidly, will have marginal impact on a region's economy-wide employment and growth.

A cluster that is of importance to a regional economy may be of marginal relevance to the country as a whole. Húsavík, Iceland and Kaikoura, New Zealand are small communities with populations of around 2,000. Both have strong whale tourism activities that attract thousands of international tourists. Whilst these whale tourism clusters are the key economic drivers in each of their communities and clearly merit regional prioritisation, the clusters may not be of sufficient significance to merit national attention and support.

If this is a first clustering initiative, it can be preferable to focus on relatively new economic activities rather than well-established traditional ones. These could also be the clusters that are less complex, offering opportunities for earlier impact and provide demonstration and learning opportunities for the more complex.

The approach to cluster identification outlined here is **not** to start by identifying high growth export markets. Many countries have identified such opportunities and then encourage their regions to focus within those areas, taking the region into such areas as nano technology, biotech and ICT. The difficulty with this top-down method is that many other locations around the world are also going after the same targets. Numerous US states have a 'biotech cluster' under development, often with unrealistic expectations. Many of the 'Silicon Somewheres' will struggle to develop unless there are unique assets in their region.

There is a futility in public investment for cluster development that cannot be embedded in the region. In a regional Australian community, the mayor asked for my help to develop an 'IT Cluster like Silicon Valley' when the main IT competency in town was in computer retailing and servicing. Medina (Saudi Arabia), Markaz (India) and Palmerston North (New Zealand) have each positioned themselves as a 'Knowledge City' but without clear differentiation as to the type of knowledge. Specificity is needed that relates to the region's assets.

European Commission	*"Better to identify the existing regional strengths than to identify high growth markets."* Claus Schultze, European Cluster Conference, Vienna, 2012
Stevie Wonder	*"Ya gots to work with what ya gots to work with."*

"Find out who you are, and do it on purpose."

Dolly Parton

[24]Drawing on the recommended 'dos' in cluster implementation from a Council of European BioRegions workshop, October 2011 www.cebr.net/strategy

While most regions are home to more than one traded cluster, these clusters are unlikely to be equal in terms of meriting public support. A comparative assessment is therefore needed of the potential candidates.

The criteria to be used in ranking clusters for support should relate to the economic development priorities of the region. Job creation may be a key issue for one region. In a region with high employment, the development of higher value jobs could be the key determinant[25]. Wallonia, **Belgium** has prioritised those clusters where it has a leading edge on a European basis (or global) and then focussed significant resources on those clusters.

Cluster Prioritisation Criteria, Examples
How important is the cluster to the local economy today? How important might it be in five-ten years time?
The cluster's current exports from the region and possible growth.
Current and potential employment growth; quality of jobs.
Number of firms; opportunities for start-ups and spin-offs; opportunities for commercialising institutional based R & D.
What % of national activity (indicators could be employment, turnover, exports, number of firms) is undertaken within the region?
The quality of soft infrastructure currently in place…the publicly funded infrastructure, especially specialised education / training / R&D facilities, a specialised university faculty and any specialised physical infrastructure. Is this a *clutter* of support?
How smart is the smart specialisation?
The cluster's culture: degree of interaction and networking already taking place amongst firms and between firms and support institutions. Is the cluster more a 'clump' at this stage of its development?
The commitment, the urgency and the motivation of senior cluster stakeholders to move forward as a team. Do the leaders have a sound understanding of the opportunities and challenges facing their cluster? Is there willingness by private sector leaders to engage with the cluster manager in addressing change?
The existence of appropriate and effective associations. Are other organisations already engaged with cluster type efforts?

The prioritisation of the clusters should be undertaken transparently. A workshop format is ideal, with discussion drawing on the hard facts that can be gathered (current exports, number of firms, employees etc.) and then centred on the qualitative assessments (judgements of future growth, comparative soft infrastructure quality). For practical purposes a maximum of five or so criteria should be selected and then weightings attached to each criteria.

Members of the group working through the cluster prioritisation could include the Board and senior staff of the local economic development agency together with others with an overview of the local economy and able to make comparative judgements, such as local bankers, journalists and political leaders. A shared understanding of the region's assets and characteristics, of the economic drivers, needs to be developed.

The table below is an example of what might emerge from such deliberations. Firstly and most importantly the criteria are debated and decided on and then weights (maximum points) are attached to the criteria. This weight then becomes the maximum number of points that are allocated to the cluster that is the strongest for that criteria, with the other three clusters judgementally receiving a proportion of the maximum weighting.

[25]The criteria that are used to rank the clusters should subsequently also be used to review on an ongoing basis the level of resourcing for each cluster initiative (they are unlikely to merit equal resourcing) and as a guide to establishing the Baseline Data for each cluster, the cluster's performance indicators.

Prioritising Clusters for Engagement: An Example					
Criteria	**Weights**	**Cluster**	**Cluster**	**Cluster**	**Cluster**
	Max Points	**A**	**B**	**C**	**D**
Current importance to the local economy	20	15	3	7	20
Assessment of growth potential	25	25	20	12	5
Number of SMEs	20	8	5	20	3
Local availability of specialised knowledge: R & D, university …	20	17	20	4	15
Availability of business champions	15	10	5	15	5
Total points	100	75	53	58	48
Final rankings		**#1**	**#3**	**#2**	**#4**

European Commission	*"Fragmentation and proliferation of cluster initiatives often leads to dispersion of forces and financial resources as well as to less cooperation and fewer synergies between them.",* Guide to Research and Innovation Strategies for Smart Specialisation, 2012
CLUSTRAT, Europe	*"Cluster policy should be selective, not supporting all the existing clusters but aiming at favouring the development of the formation of production systems that have the characteristics of a good cluster, i.e. advantageous inter-firm relationships, entrepreneurial firms, and effective institutions."* New Cluster Concepts for Central Europe and Beyond, 2014
Ontario	*"Focusing limited public resources on supporting the clusters with the largest export and growth potential. "* Institute for Competitiveness & Prosperity, Toronto, 2016
Flanders, Belgium	*"Smart specialisation is largely about the policy process to select and prioritise fields or areas where a cluster of activities should be developed: let entrepreneurs discover the right domains of future specialisations."* Jan Larosse, Department of Economy-Science-Innovation, Flemish Government, Clusters new trends and their challenges for implementing RIS3, 2012
Caribbean	*"Competitiveness initiatives in emergent sectors are more successful on average, than those for established industries. Clusters formed in established industries are more prone to becoming a government lobbying effort." "Sectors that are science or technology driven are typically more successful than those in traditional industries."* Cluster Best Practices for the Caribbean, Inter-American Development Bank, 2010

Four case studies follow on how countries/regions have prioritised their clusters for engagement.

Case Study 1: Brazil

Industrial policy in the States of Minas Gerais and Sao Paulo has centred on local productive arrangements (Arranjos Productivos Locais, or APL).

Cluster Selection Criteria, Brazil	
1	Capacity to and possibility of operating and collaborating with other local organizations, such as universities and suppliers of machinery & equipment.
2	Form and degree of development of the APL: the number and maturity of participating organizations; the existence of a local governmental institution capable of coordinating collective actions; and the quality of linkages between firms and other actors.
3	Socioeconomic relevance of the main activity of the APL e.g. impact on GDP, exports, and level of employment.
4	Capacity to generate new opportunities for social and economic development.

Source: Campos et al. (2010) in Impact Evaluation of Cluster Development Programmes, Inter-American Development Bank, 2016

Case Study 2: Northwest England

The Northwest Regional Development Agency in 2006 reviewed which clusters should be supported for development.

Cluster Selection Criteria, Northwest England	
1	Significant in terms of value added
2	Significant in terms of value added/employee
3	Sub-sectors with global growth potential
4	Internationally tradable
5	Amenable to intervention
6	Strong cross-sector potential
7	Nationally/Regionally significant

Source: Contribution from Bill Greenhalgh to TACTIC paper, 'Where the Cluster Winds are Blowing in Europe', 2012

Case Study 3: East Africa

In Uganda and Tanzania there was a need to prioritise the clusters that merited selection as the first pilots for engagement. Both countries had broadly constituted National Steering Committees in place that drew together academic, government and business interests, the triple helix. The criteria used by these Committees for pilot selection included:

Cluster Selection Criteria, East Africa	
1	Current and potential activity levels within the cluster
2	Existence of champions committed to change
3	Government's priorities for economic development
4	Potential for collaboration between business, government and academia
5	Gender considerations
6	A geographic balance across the country through considering each cluster's functional region
7	A sector spread, covering primary (especially agriculture), manufacturing and services.

Following the successful pilots, wide cluster engagement has developed in Uganda. Some of the following 45 clusters are based on a local raw material, others based on a local demand[26]. The capital city, Kampala, (population 1.2 million) has 13 clustering initiatives underway: Cultural Tourism; Education; Furniture; Garment & Textiles; Health; ICT Software; Katwe Metal Fabrication; Management Consultancy; Mushroom Cluster Urban Kampala; Performing Artists; Poultry; Print & Packaging and Vegetable seeds. The two clustering initiatives in Jinja (population 100,000) are adding value to local agricultural resources: Leather Processing and Maize Millers.

Other regional clusters under development include: Northern Uganda: Chilli; South Western Uganda: Dairy, Katwe salt processing; Kayunga: Pineapple processing; Luwero: Basketry, Beans, Fruit & Vegetable processing; Kakira: Bio Fuel-Ethanol; Kaliro: Building & Construction, Fish Farming; Kapchorwa: Coffee; Masaka: Pineapple, Tree Planting, Fish Farming; Teso: Citrus, Groundnuts; Mukono: Building Materials; Wakiso: Super goats; Karamoja: Gemstone Mining; Mpigi: Coffee; Soroti: Millet; Kamwenge: Fish; Gulu: Organic Cotton; Pallisa: Fish, Cotton; Butaleja: Cotton, Rice; Nakaseke: Cassava; Nsambya: Furniture.

Case Study 4: Papua New Guinea

Five potential clusters were initially shortlisted for Papua New Guinea's first cluster pilot: ICT, Coastal fisheries, Music, Biotech and Agro-food.

Cluster Selection Criteria, Papua New Guinea	
1	Importance to the local economy
2	Current exports and growth potential
3	Current and potential employment growth and quality of jobs
4	Number of firms and existence of 'business champions'
5	% Contribution to national activity: employment, exports, turnover etc.
6	Quality of soft infrastructure in place, including publicly funded such as education, training, R&D support, specialised physical infrastructure
7	Present culture of the cluster and the degree of networking/interaction between firms and other institutions
8	Commitment, urgency and motivation of senior cluster stakeholders to advance with the cluster
9	Donor/NGO interest in supporting the cluster

Source: Regional Cluster Initiative in the Pacific, PIPSO, Fiji, 2015

Following the review, ICT was selected for the pilot. A deciding factor was the *"dynamism, motivation and commitment amongst the ICT sector representatives and the entrepreneurs interviewed during the consultations."*

Identifying Through Competition

One difficulty with these systematic, top-down, approaches to cluster prioritisation is that this can invite paralysis-by-analysis and procrastination. In one country that I am familiar with, politicians have had the final say, bringing a delay of 24 months in reaching the final selection, resulting in businesses loosing interest in cluster development. There is also danger in the pre-selection by a handful of people of their preferred clusters, which could be the ambulance cases.

A well-tested alternative route to cluster prioritisation is through a public competition to select the 'best dressed' proposals. This is a bottom-up, open calls approach that gives proposers the flexibility to prepare their most innovative proposals. The proposers have the opportunity to define the cluster's field of activity and the functional region, which may naturally stretch over political boundaries. Open competitions have been used in Norway, Sweden, France, Germany and other European countries to select the clusters that garner public support.

The organising agency needs to carefully stipulate in advance the competition criteria. **Sweden's** national innovation agency, VINNOVA, was one of the first to launch such a competition.

[26]Thanks to Dr. Yasin Ziraba, Executive Board Chair, Pan African Competitiveness Forum, Kampala

Selection Criteria, Sweden's National Cluster Competition	
1	Proposals need to come from functional regions (rather than political regions) and be based on a clear identification of the regional priorities
2	Proposals need to identify the senior regional leadership centred on a well developed Triple Helix with a shared vision/strategic idea
3	Strong research and innovation environments need to be demonstrated with research organisations being fully involved in the process
4	Strong commitment from the business community needs to be demonstrated
5	Insight into the existing and future business logic is required
6	A focus on innovation based SMEs

Following the first call for proposals in Sweden, only three out of some 150 proposals were accepted. However, around one third the rejected proposals had garnered sufficient energy and commitment that they found other resources to pursue their initiatives. In this way the national competition stimulated significant behaviour changes, encouraging the alignment of local interests around the development of their priority smart specialisation.

Innovation **Norway** invites fresh proposals annually. In their comprehensive evaluation process, Innovation Norway looks at the cluster's resources; the relationships and cluster's identification; the cluster's position and potential. Innovation Norway also looks at the ownership/leadership of the clustering initiative, the goals, strategies and impacts; and the quality of the implementation plan.

In **France** following a well publicised national competition, 67 out of 105 proposals were accepted and became France's 'Poles de Competitive'. Subsequently, additional clusters have been added. Similarly, in **Columbia** the government organised a contest to decide which clusters to work with first. The government based its selection on the potential of an industry and the willingness of its leaders to commit time and people to the effort.

Well-established clustering initiatives have an advantage in these competitions, as they are likely to have a mechanism through which a detailed proposal can be coordinated and submitted. This advantage can be balanced through a preliminary step in the competition with short proposals initially being invited so that the demands are not too onerous. The proposals that are successful at this first hurdle receive feedback and a grant to help them prepare a more detailed proposal for the final competition.

The competition approach has had a broader impact than simply resourcing a few winners. The underlying objective is to stimulate behaviour changes, encouraging regions to identify their competitive assets and then to engage around those strengths.

National Cluster Competitions
European Experience
Cluster competitions stimulate **behaviour changes**, incentivising regions to identify their growth assets and then to engage as a triple helix team in developing those assets.
High profile competitions have attracted wide interest, especially from business.
Winning national competitions has given the winners a considerable **image lift** in their home country and internationally.
Co-funding of clustering initiatives is a well-tested principle.
Many European cluster programmes offer financial support that extends beyond election cycles.
As well as financial support, programme organisers place emphasis on **process support**, e.g. training the cluster managers, briefings for the cluster boards, developing cluster-to-cluster links.
Many of the clustering initiatives that failed to win national support have **found other means** to resource their initiatives. This positive result is not an unintended consequence. It is built into the programme design.

OECD	*"Public actors may use selection mechanisms that are both competitive and non-competitive. Competitive selection is most appropriate for policies with significant resources and has the benefit of identifying programmes with the best potential impact, with a 'label' signal that serves to attract and re-focus public resources. Non-competitive procedures are best suited for light support to cluster organisations in their initial stages."* Innovation Policy Platform, 2010
Germany	*"The competition takes an open-topic approach. We do not select clusters according to a specific field such as health or energy, or according to a certain technology. Rather, we look at how the cluster is structured, what level of innovation it intends to achieve, and what strategy it is pursuing to achieve this goal. For example, we consider whether it plans strategic, regionally focused cooperation along the entire inno¬vation chain – from the laboratory to the workbench to the salesroom. We look at the cluster's strengths and consider its potential for development. But first and foremost we ask: Can your cluster trigger a clear and sustainable burst of development and is the cluster economically viable in the long term?"* State Secretary, Federal Ministry of Education and Research, European Cluster Conference, 2010
Sweden	*"The strategic concept behind the call process is to ensure that, as far as possible, those players whose proposals do not "win" decide to implement their proposals in any case without VINNOVA's financial support."*

Establishing a Portfolio of Clustering Initiatives

Building a region's economic prosperity on just one cluster is inherently risky. Most regions are fortunate in having more than one cluster that merits development, reflecting more than one local specialisation that is attracting wealth to the region.

A well-balanced regional portfolio of clustering initiatives should include emerging (i.e. higher risk) clusters, growing, mature and transforming clusters. The portfolio should not be limited to the current strong clusters, nor limited to 'high tech' clusters. A regional basket of clusters are likely to have varying degrees of technology intensity.

Cluster Portfolio Examples	
Linz, Austria	Through its dedicated Clusterland organisation, Linz, Upper Austria is supporting eight clusters and networks dealing with automotive suppliers, plastics, furniture & timber construction, health technology, mechatronics, human resources, design & media and environment technology.
Gävle, Sweden	Gävle, northern Sweden, refers to it's *Cluster Suitcase*, with six specialised competencies: Fibre Optic Valley; geographic information systems (Future Position X); Triple Steelix; Interactive TV; RF measurement technologies and industrial IT solutions (FindIT).
Värmland, Sweden	Värmland's clustering initiatives have grown over a decade to cover paper technology (The Paper Province), packaging (The Packaging Arena), ICT (Compare), steel and engineering, tourism (Visit Värmland) local food (Nordic Innovation Food Arena) and wellness and care. These clusters cover 300 firms with a turnover of 3 billion Euros and account for 30% of the local workforce.
Izmir, Turkey	Turkey's 2nd largest commercial centre is developing four clusters: organic products; fruit & vegetable processing; chemicals; industrial ventilation, air conditioning & appliances. Two potentials: logistics & wedding dresses/special apparel.

In each of these regions, engaging with the priority clusters provides the foundation **for the regional innovation system**, the portfolio of activities that are the drivers of the region's economy. Businesses that are the confluence of two or more regional clusters are able to draw on the capabilities of a broad range of related firms and support institutions and therefore can be solidly embedded in the region.

It is recommended there is engagement early on with **more than one cluster** from within a region. This reduces the risk of over dependency on any one clustering initiative (and some initiatives do fail, others drift). It also avoids any accusation of 'picking the favourite'. A broader engagement will provide some healthy competition between clustering initiatives and presents the opportunity to later identify from the bottom-up the more systemic cross-cluster issues (see Step 11) that are influencing the **region's innovation system**.

The clusters that are prioritised for initial support can be usefully termed the region's 'Cluster Pilots', indicating that other clusters could be selected later and that experiences gained by engaging with these pilots will subsequently benefit the other clusters.

The level of resources applied to each of the shortlisted clusters does not need to be equal. Differential resource allocation between clustering initiatives should increase over time.

Cluster Sponsor's Check List: Cluster Identification

- In identifying the clusters, has the analysis gone beyond published statistics by systematically gathering 'wise persons' insights?
- Do the identified clusters build on the region's existing assets and strengths? Are there clear 'seeds' to which 'clustering fertiliser' can be applied?
- Have emerging clusters, the more embryonic clusters, been fully considered?
- Have the shortlisted clusters been prioritised for engagement? Has this information been made available publically?
- Alternatively, is a competition being introduced to select the priority initiatives?
- Is there engagement on more than one cluster, to provide an opportunity to identify from the bottom-up cross cluster issues (see Step 11) and to introduce an element of competition between initiatives?

Danger Signs

- Dreaming about creating a cluster from scratch; a focus on wishful thinking and 'wannabe' clusters.
- Emphasis is on chasing growth sectors, not on building from the region's existing assets.
- The cluster's borders are too wide in terms of geography and competence.
- Alternatively, the selected clusters lack critical mass and are too minor to have any overall impact on the regional economy.
- Ignoring some local clusters as they are viewed as 'old economy'.
- An over dependency on published statistics for identifying clusters.
- Confining cluster boundaries by political boundaries.
- The key determinants in selecting clusters for development are:
  - The favourites of a few within the region, especially those with a strong political voice;
  - The favourites of distant funders;
  - 'High tech' clusters;
  - Protecting the dying clusters, the ambulance cases;
  - The 'availability' of high-growth export markets, rather than building on the fundamental strengths and capabilities within the region.

CHAPTER 4 STEP 3

INITIAL APPRAISAL

With a priority clusters now identified, a short and sharp appraisal of the cluster's competitive position is undertaken. This inward looking activity is preparing a platform for action; it is not a major piece of analysis. Sufficient data is needed to gain agreement on the current situation.

This Step starts the cluster mobilisation process. The cluster manager is personally introducing the clustering process to the cluster's key stakeholders, securing their involvement and starting to identify the cluster's leaders.

INVITED FOREWORD

WERNER PAMMINGER
Managing Director, Clusterland Upper Austria Ltd.

It is a combination of many factors that makes cluster initiatives successful. In this book Ifor Ffowcs-Williams describes in a detailed and comprehensive way which strategies you can pursue. In this context I highlight two aspects that have particular impact on the positive development of cluster initiatives:

1. *In Upper Austria we learnt by experience that an efficient **Customer Relationship Management** (CRM) is one of the secrets of our success. Documenting customer data is one component of CRM. More significantly it provides a consistent orientation of our company towards our customers. Regular personal contacts with our cluster partners are crucial in order to be in touch with the latest trends of the respective industry. This is the only way we can match our services with the needs of our partner companies.*
2. *Another decisive point for the success of clusters: The association of all cluster initiatives in a region under **one umbrella organization** (like Clusterland Upper Austria Ltd.) brings many synergies by means of central services (such as infrastructure and accounting). Furthermore we see the main advantages: Cross-cluster collaboration and innovation is greatly facilitated. Particularly in this point I support this chapter's observation that the lack of a common organizational infrastructure in a region will make cooperation much more difficult.*

Cluster Analysis in Two Steps

In dividing the cluster analysis process into this Step 3 (an inward looking Initial Appraisal) and Step 9 to come (an externally focussed In-depth Analysis), I acknowledge a mistake I and many have made … going overboard with early cluster analysis. The approach I am introducing here quickly identifies immediate issues and then engages around those issues. The approach is one of learning-by-doing rather than paralysis-by-analysis.

At Step 9, a detailed analysis of the cluster's competitive position is undertaken, drawing on information from beyond the cluster's stakeholders.

Cluster Analysis in Perspective	
United Nations Industrial Development Agency	*"One of the main failures in cluster projects is to spend most of the effort in developing new studies, diagnostics and analysis of the economic environment and the cluster in particular. A lot of those profound analysis end up in libraries and under desks and few are transformed into practical development for the cluster."*
Brookings Institution, USA	*"Go beyond analysis and engage in dialogue with cluster members. Many policy makers and practitioners treat research on and analysis of clusters as the only elements of a cluster strategy. In fact, they are only a starting point for a cluster strategy."* Making Sense of Clusters: Regional Competitiveness & Economic Development, Joseph Cortright, 2006
Mesopartners	*"When you start with a cluster initiative, your main concern should be people and relationships, not practical cluster activities. Never start a cluster initiative with a clearly defined list of activities you want to launch within the first x months. You may have such a list in the back of your head. But the main focus of your work in the initial phase will be around building credibility, relationships, and trust. You need to engage local stakeholders, since you cannot succeed without their buy-in and ownership of the initiative; this includes identifying and involving strong local champions. In order to achieve that, you will have to understand the concerns, problems and aspirations of local actors, so that you quickly move to small practical activities that create quick wins."* Meyer-Stamer, J. and Harmes-Liedtke, U., How to Promote Clusters

Cluster Manager Leads the Appraisal

It is critical that the cluster manager undertakes the appraisal rather than out sourcing this work. Extensive involvement in interviewing the cluster's stakeholders provides the cluster manager with an early opportunity to establish rapport with the cluster's stakeholders and for those stakeholders to get to know the cluster manager. Both sides will be assessing each other, evaluating if the other is a person they could have a long-term relationship with.

The alternative is for the cluster manager to receive a diagnostic report written by an outsider: a consultant, an MBA student or an academic. When this happens, and it occurs in too many countries, an early relationship-building opportunity will have been lost along with the insights that come from direct engagement. The cluster manager beneficially partners with others in the interviewing process, but is taking in the lead.

In this Handbook, I am using the terms 'cluster manager' and 'cluster organisation' interchangeably. In a number of countries with well-resourced clustering initiatives, the cluster manager is leading a small team of professionals. In Sweden most of the larger clustering initiatives have a full-time team of three or more people who between them have the core skills required: facilitation/process management, media management/PR skills and (dependent on the cluster's development priorities) possibly marketing / internationalisation skills and familiarisation with the cluster's technologies. Many EU clusters have a team of four or five people; a few clusters have a staff of 20 or even more people in the cluster development team.

In other situations the cluster manager is working with a leaner team and whilst the manager is the sole dedicated resource for a cluster, the person may have close support from a range of specialists within an economic development agency, such as in skills/training, FDI attraction and angel networks.

In small communities, a cluster manager may have responsibility for running two or three clustering initiatives. An intensive 2-3 month may be necessary to get up to speed with each cluster and to make the necessary personal connections with the cluster's key stakeholders.

Establishing the Cluster Ignition Team

Cluster development is a team activity. One of the most difficult elements is collaboration amongst a cluster's support agencies, especially **public – public collaboration**. This is not easy with different institutional cultures, professional backgrounds and often Ministers. But as it is central to moving from a *clutter* of support organisations, an early start should be made to building this critical collaboration. The cluster manager should therefore bring all relevant support organisations together as soon as possible. According to the cluster, cross-agency support can include representatives from relevant public agencies (export development, investment attraction, R&D, local government …), from private sector organisations (Chamber of Commerce, industry association, growers association …), possibly union and NGO representatives, and from academia (a technical specialist from a university, representative from a vocational training institute, possibly a high school teacher …).

At the start of a clustering initiative, I call this group the 'Cluster Ignition Team'. As the initiative matures, it evolves into the 'Technical Support Team'. These teams are not in place short term, and their roles are active ones. Team members could usefully join the cluster manager for some of the analysis interviews so they directly learn about the cluster's issues. They should participate in all cluster workshops and events and participate where relevant in the Cluster Action Teams (CATs) that will later emerge.

Inter-American Development Bank	*"Do not use the roundtable for public-public coordination and discussions."* Two to Tango: public-private collaboration for productive development policies, 2016

An Overt Agenda …

The 'open agenda' for the initial appraisal is to assemble information regarding the cluster's current competitive position. It is important that this is fact based, not a scattering of poorly informed opinions or a groupthink summary of myopic views. A common understanding is needed of the real issues and opportunities facing the cluster.

All clusters have a diverse range of stakeholders. With different backgrounds and knowledge bases, these stakeholders are likely to have different understandings and perspectives on the cluster's current situation, the 'NOW'. These perspectives need to be coalesced through the gathering of facts and dialogue into a cluster-wide understanding. If different stakeholders continue to have differing opinions on the current situation, then major difficulties can be expected when it comes to establishing the cluster's forward direction. A common reason for the failure of clustering interventions is an inability to unite around the forward agenda.

… And a Covert Agenda

The 'under the table' agenda is to start mobilising the cluster's stakeholders towards collaborative projects. Cluster development implies much more than analysis … it is about changing behaviours. A key component of this mobilisation is to identify the cluster's *shakers and movers*, the leaders who are able to influence others and could work with the cluster manager in building a coalition of the willing. The cluster will likely have a few special people who hold the social power.

Identifying the Cluster's Talent	
The Connectors	Those who know lots of people, who have many weak ties and are curious and sociable.
The Mavens	The knowledge accumulators who are generous in passing knowledge on to others.
The Salespeople	The high-energy persuaders and motivators.

Drawing on: Malcolm Gladwell, The Tipping Point, 2000, Little Brown and Company

All three types are going to be needed to move the cluster's development agenda along. Part of the cluster manager's role is to start identifying this talent within the cluster and later to empower these important people to engage in developing the cluster. The cluster manager will need to ensure that the workload that emerges is spread to avoid the danger of burnout.

Kick-Off Cluster Muster

An early element in the clustering process is often a 'Cluster Muster', a kick-off public meeting (1) to introduce the initiative and the reasons for engagement with the cluster, (2) to introduce the cluster manager and (3) to outline the initial process. This is an awareness-raising meeting and should be open to all with an interest in the cluster;

transparency is key throughout the cluster development process. The cluster muster rounds up the usual suspects who can clearly be identified as stakeholders within the cluster, but also the *unusual strangers* who do or might have influence and interests that relate to the cluster.

The holding of a public cluster muster signifies a point of no return in the clustering process. Expectations for action will flow. The sponsoring agency therefore needs to be satisfied that the cluster merits support and that resources can be committed for its development for a minimum of two-three years. 'A Report' might be considered an appropriate deliverable by a public agency; businesses will be looking for projects and activities that bring benefits.

The cluster muster can raise strong discussion, particularly if the cluster is facing difficulties. At some cluster musters, there is early agreement on an issue to be addressed. The clustering initiative should then move into action rather than waiting for the appraisal to be completed. The results of this activity often can inform the analysis work and such activity demonstrates to the cluster's stakeholders that cluster development is more than writing yet another report, more than attending yet another workshop.

All clustering initiatives have their sceptics, the uncertain bystanders waiting for evidence ... don't wait for all to engage. Fence sitters are likely to engage when relevant action emerges from the initiative.

At the cluster muster the date should be announced for a first cluster workshop. This is when the cluster manager provides feedback on the individual meetings they will be holding with the cluster's stakeholders. Depending on the size and complexity of the cluster, and the time available for interviewing, this workshop may be 6 - 10 weeks later.

Gathering Published Data, Statistics

Following the cluster muster, an early focus should be placed on reviewing the secondary data, the available published and online information that is relevant to the cluster's situation. Background data on the cluster, including technology trends and competing clusters needs to be assessed. Data on market trends and opportunities is particularly valuable. Separate reports may have been prepared by different organisations on a range of aspects, possibly covering future skill needs, export opportunities and investment openings. Use secondary data with caution…this information will probably have been gathered for other purposes. Off-the-shelf studies that are older than three years may be of limited relevance.

In most countries, reliable and up-to-date **published statistics** are often hard to find with the detailed specificity required for cluster analysis. Published statistics are gathered by industries and by political regions, two major limitations when it comes to cluster analysis. As was discussed in Step 2, clusters are broader than industries and include not just the firms exporting from the region but also support firms (such as banks and transport) and the soft infrastructure (including training and R&D institutions). Secondly, clusters may well cover a narrower (or occasionally broader) geographic area than the political region used for published statistics. The functional region of a cluster is very unlikely to exactly coincide with a statistical region. Further, the unrecorded informal sector may account for part of the cluster's activity and employment. Emphasis should therefore be placed on gathering the baseline data for a cluster through surveys rather than an over analysis of published data.

History Matters

It is necessary to unpack the reasons for the emergence and the development of the cluster, identifying the key events that have shaped its path. All clusters have a degree of path dependency.

Understanding the Cluster's History
How did the cluster initially emerge? Did it evolve out of an existing cluster? Or a chance event? Were the initial firms attracted by public subsidies? Have the anchor firms been embedded in the region? Or moved in and then out? What have been the cluster's turning points? How has it grown over time? How has the local specialisation evolved? How have the cluster's international links developed? Have new buyers, new competitors emerged over time? To what extent has public support already been made available? For training? R&D? Investment attraction? An incubator or industry park? Has the cluster already engaged in collaborative activities? If there is an industry association, what has been its development path? What have been its activities and reputation over time? What is the cluster's genealogy? Have employees from one firm left and started another? Can a genealogy chart be prepared for the cluster, identifying predecessor firms of start-up companies and new entrants that have arrived from beyond the region?

"You cant really understand what is going on now, unless you understand what came before"

Steve Jobs

Mapping the Cluster

In addition to gathering the hard data, interviewing the key stakeholders across the cluster enables the cluster manager to:

- Update and validate the data obtained through the desk study and creating the 'real big picture'.
- Understand the demand trends, the marketing channels; production and technology issues; input supplies (raw materials, components, packaging, energy, logistics); environment issues.
- Understand the input supply conditions, such as skills, raw materials, components, energy, freight logistics, finance.
- Understand the cluster's opportunities and constraints; possible leverage points; the extent to which the value chain is covered by the region's firms.
- Understanding the (differing) expectations of business, academia and public agencies regarding the clustering initiative. How does each describe success?
- Identifying the cluster's 'hot spots', the sub-groups that are unlikely to surface through analysing published statistics … the faster growing product and market niches within the cluster.
- Understanding the cluster's existing dynamics and relationships. Assessing the quality of linkages and tacit information flows amongst firms and between the private and public sectors and the extent to which the local players are collaboratively working as a team.
- Promote awareness of the clustering initiative and personally introduce the concept to sceptics … there may be a number!
- Explore activities at the intersection of the cluster with neighbouring clusters. These intersections can be the point where real competitiveness is created with new businesses being developed that draw on a range of local competencies and further clusters are being spawned.
- And finally … to start identifying the cluster's talent, to understand possible motivations for involvement with the developing clustering initiative and assessing possible leaders.

It is important to develop a common understanding of the cluster's current competitive position, gathering, digesting and then sharing the information so that the public and private sector can together act on this information.

This diagnosis should provide an overall picture of the cluster's competitiveness position; understanding the cluster's processes and value chain; the quality and quantity of relationships between the participants and an understanding of the key challenges and opportunities that will help shape the future direction for the cluster. This diagnostic process is just that, understanding and describing the 'NOW', the current situation. The purpose is not to make recommendations or to propose or impose in any way the cluster's forward strategy.

Interviewing Across the Cluster

The principle informants for the initial analysis are the cluster's stakeholders. Many in the early stages of a clustering initiative will be unwilling to fully open up in a workshop setting, especially if competitors are present.

Information gathering is primarily through face-to-face interviewing, with the interviewing list extending right across the cluster. Specialist suppliers to the core firms (e.g. machinery and raw material suppliers, freight forwarders, bankers, patent attorneys, printers, training organisations) can be particularly useful information sources when they are in contact with a number of firms at the core of the cluster. Along with seasoned business veterans, academics, journalists, government and association officials and politicians could have useful overviews of the cluster. Recently

retired executives can be open and frank in their comments. Interviewing new participants (start-ups, spin-offs, new migrants, international investors) in the cluster will provide valuable insights.

A sampling approach should be used in a large cluster. However, I recommend extending the interviewing beyond what is strictly necessary to understand the cluster's situation. The cluster manager is using the interviewing process to introduce himself/herself and the merits of a clustering approach. As there is a covert agenda alongside the overt agenda, there is value in undertaking more interviews than are necessary to just understand the cluster's situation.

Start with Individual Discussions

Face-to-face interviewing will probably account for 80% of the analytic effort … an extensive series of individual meetings with the cluster's stakeholders at **their** place of work … the place where the stakeholder is most comfortable in talking and can quickly bring in others and seek specific information.

The cluster manager needs to meet in person and individually with key people before bringing them together for focus meetings or workshops. A big mistake I have made is bringing competitors into a cluster workshop without having an understanding of their individual issues. For reasons of confidentiality key issues will not always surface in a workshop setting, particularly when there is limited trust.

An early challenge for the cluster manager will be in establishing a comprehensive list of the core and support firms and other participants within the cluster to interview. No 'Yellow Pages' list will suffice and industry associations typically have a more narrow membership base than that of a cluster and cover a different, often broader, geography. A snowball interviewing process is common, with initial interviewees providing contact names for further interviewing.

To understand the issues within a cluster that will shape the forward agenda, the interviewing process needs to be carefully designed. These interviews are much more than data gathering and are an absolutely key component in the cluster development process. Many initiatives struggle later when this aspect is not given due attention.

Cluster development is about change. A starting point is breaking free of familiar thought patterns and easy assumptions. **Careful questioning and carefully constructing the dialogue** encourages the respondent to step back and see things differently. Action is then more likely to follow. A position of authority is not needed to ask powerful questions. Open questions encourage creative thinking … Why? What If? and How? Non-experts can be better at questioning than experts. Asking naïve questions forces people to explain things simply which can help in bringing clarity to a complex issue. The interviewer needs an open mind, to observe closely, and to *listen*. The interviewer is an outsider, not telling the respondent what to do, but helping them see a situation from another angle. Assumptions are challenged and old problems reframed so the respondent is better able to figure out the solutions themselves. Seeing issues from the perspective of the interviewee and finding common ground is the key to connecting during the interview. I carefully select the first interviewees so I can develop my understanding of the sector and the issues.

The Art of Questioning & Deep Listening	
Warren Berger	*"A beautiful question is an ambitious yet actionable question that can begin to shift the way we perceive or think about something – and that might serve as a catalyst to bring about change."* A More Beautiful Question, Bloomsbury, 2014
Dalai Lama	*"When you talk, you are only repeating what you already know.* *But if you listen, you may learn something new."*
Australia	*"My Nguyaru, my grandmother, always told us to listen properly.* *Not just to listen with our ears but with our heads.* *That is what Deep Listening means."* Dr. Doris Paton, Gunnai Nation

The initial interview should not take the form of questionnaire filling. Rather it is a semi-structured discussion with a focus on identifying the problems and roadblocks that face each of the cluster's stakeholders and their opportunities. A personal, face-to-face discussion at the interviewee's place of work is the only option for this interview process. This will gather a much richer information base than a mail questionnaire, an on-line survey or a telephone interview. Prior to meeting with an organisation, the basic published information and statistics on that organisation should have been reviewed, so time is not wasted during the discussion.

It is advantageous to have two people undertaking these interviews, one asking the questions, the second taking

notes. The two interviewers will have an important opportunity immediately after an interview to compare their perceptions. Collaborating with other public agencies from the Cluster Ignition Team can be very beneficial in starting to build a whole-of-government understanding.

The cluster stakeholder's level of openness with the cluster manager will depend on the level of trust. All going well, trust will build further over time, allowing new insights to surface (see Step 9). It is likely that more than one interview will be needed with larger organisations following an initial meeting with the CEO.

Selected topics from the list that follow should be woven into a semi-structured discussion to be held with the CEO of the organisation. Topics will vary from business to public agency to academia.

Interview Discussion Topics	
On opening	How do you describe your business to a potential customer? What is different about what you offer? What changes to your revenues over recent years? Why? Why is your organisation based here? What are the few big events that have got your business/organisation to where it is today? And where is it today?
Markets, customers	Growth in demand? Who are the major customers? What proportion of total demand do they account for? Trends? Growth niches? Are buyers price sensitive? International experience.
Suppliers	Who are the major strategic suppliers? (i.e. non-commodity) Regional? National? International? Are suppliers reliable? Seasonal disruptions? Is competition intense, mild? What are your main supplier headaches? How are suppliers organised? Do cooperatives or others regulate their functions? If so, are they market efficient? Freight logistics? Transport disruptions?
Finance	Is access to debt/equity finance a constraint? Seed? Angel? VC?
Soft infrastructure	How available and effective are industry associations, chambers of commerce, business assistance centres? Do educational institutions supply sufficient number of qualified staff? Who do you turn to beyond your organisation for technical advice? What is the extent of interaction between firms and support organisations?
Trends	How is the sector changing? Which trends are having a major impact? How might that play out over coming years?
Culture	Do firms compete on price? Or differentiated products/services? Do firms share knowledge?
Entries & Exits	Who has entered the industry this year? Who has exited? Any multinationals? What are the main difficulties in establishing a business?
Key questions	What are the one or two things that really drive results for your organisation? What is holding you back from doubling your activity? If you where to invite a few of the clusters shakers & movers to your home tonight, whom would you invite?

On closing	Describe how your organisation might look in a few years time, optimistically but realistically? What needs to change, within and beyond your organisation … structurally, culturally, whatever … to achieve your optimistic scenario? What should start to happen right now to achieve this? How might a clustering initiative help your organisation? What other companies would you like to see based in this region? What other locations might you consider? Would your organisation perform at the same level in another location? Who else might I talk to?
On exiting	What went well this past week? What has been the most interesting thing that you have learnt over recent months? What could we do better?
Other angles?	Looking for further question possibilities? Check out: http://storycorps.org/great-questions/

Following the face-to-face interview, the cluster manager should reflect on these points:

- From what you have learnt from the interview and other insights on the business, which of the following three broad categories would you place the business in?

  A. Clear aspiration **and** capability to grow … possibly 10% of the cluster's businesses.

  B. Lifestyle business that has plateaued.

  C. Business struggling to survive, possibly the Living Dead.
- Does the information and the views align with other sources? Differences?
- Is there clarity over what needs to happen within the organisation and beyond it for growth to occur?
- Is this one of the dominant players within the cluster?
- Is this person well connected within the cluster? Does the person have a perspective that extends beyond that of their organisation? Could this person be a candidate for the cluster's initial governance group?

The richness of insights will also increase over time as trust develops between the cluster manager and the cluster's stakeholders. Undertaking a series of meetings and discussions with key stakeholders will start to provide the cluster manager with allies for subsequent workshops and meetings.

Focus Meetings

Following these individual meetings, there may be value in the cluster manager bringing together small groups of stakeholders for **focus meetings** to explore particular topics in depth. A focus discussion is not appropriate for very sensitive issues or for decision-making. These discussions could involve a group of core firms, or suppliers of a raw material, logistics firms, or for example training organisations. The group for each focus meeting should be carefully selected. It needs to be diverse to draw on and explore a range of experiences and perspectives. At the most two of the possibly 6-10 participants should be from the same organisation.

The cluster manager should be introducing topics during the focus discussion but not taking the lead. Questions should be prepared to initiate/continue the discussion should there be conversation gaps or a need to move the discussion in a different direction. Sufficient time should be scheduled to complete the discussion, which often will extend to unforeseen dimensions. Supporting the cluster manager at a focus discussion should be an observer and note taker.

One focus group discussion could be using a SWOT process to compare the cluster against competitive clusters using selected criteria and identifying performance gaps. A focus group can provides a means to generate discussion on the key criteria for competitiveness and on how the cluster is ranked against a perceived best practice cluster for each of the criteria and why.

SWOT Analysis

A familiar and practical framework to summarise the information from the desk research and the interviews is the preparation of a SWOT analysis covering the cluster's Strengths, Weaknesses, Opportunities and Threats.

- **Internal factors:**

  Strengths: The cluster's characteristics that give it an advantage over other clusters. Skills? Raw materials? Reputation? Location? Support institutions? Collaborative culture? Tacit information flows? …

  Weaknesses: The cluster's characteristics that place it at a disadvantage relative to others. *Clumps* of firms, a *clutter* of support organisations? Out dated production processes? Finance? Infrastructure bottlenecks? Freight logistics? Regulations? …

- **External factors:**

  Opportunities to increase business: Available market niches? Adding value? New technologies/processes? Cluster brand? Linking with other clusters? …

  Threats that could have negative impact: Buyer perceptions? Substitutes? Changing distribution channels? Market/Technology changes? …

A SWOT analysis is a participative workshop approach with the key stakeholders. Data needs be collected through the one-to-one meetings prior to this workshop, with this data providing the basis for the actual discussion.

SWOT Analysis Example, Tourism Cluster	
Strengths	**Weaknesses**
Quality reputation Repeat visitors Historic sites nearby Local cuisine HR training	Short season Short stays Not family friendly Long distance to airport Lack of teamwork
Opportunities	**Threats**
Developing the market in neighbouring countries Developing more facilities to extend visitors stay Enhancing facilities and activities for families and children Weekend out-of-season packages Slip stream national promotion New highway under construction	Reputation decline Other interesting locations in the country, proactive competitors Climate disruptions Economic crisis in main target markets Political disputes in neighbouring countries Currency fluctuations

The analysis can result in simply the compilation of prioritised lists rather than discussion about what is actually important, which is the key aspect. My preference is to work with a small, carefully constructed focus group to develop the SWOT after I have completed the individual interviews. It is too easy to focus on the negatives (the weaknesses, the limitations, the threats) rather than the strengths and opportunities. Too long a discussion on the negatives pulls down the group dynamics psychologically. When points are repeated, invite additions. If the strengths and opportunities are not surfacing, ask the participants why they are continuing to invest their time and resources on their business/activity.

Caution! Avoid Paralysis-by-Analysis

Cluster development needs to be firmly grounded on a factual understanding of the cluster's competitive position. But there is a danger that analysis is over-extended early on in the cluster development process, with time consuming and overly detailed reports being prepared rather than a short, sharp appraisal that is sufficient to provide the base for early action.

Prolonged analysis leads to a reduction of interest, especially smaller businesses that will be seeking early evidence that there is a pay-off. More detailed analysis, such as of training needs, technology changes, competitors, or export markets, should be driven by the specific needs of the task forces that will develop later (Step 7), or can be undertaken as part of Step 9.

Ensure External Input

While the focus of the initial analysis is on listening to cluster's stakeholders, external input is also needed. There are merits in bringing into the cluster during the analysis process specialised technical or market expertise that is relevant to the cluster. Many clusters also undertake at an early stage a study tour to a target market. Such tours can be centred on an international trade show, a convention or a trade conference, with key appointments being made in advance. **Pakistan's** gems and jewellery cluster made an early visit to a world leading accessories trade show in Las Vegas and to a gems and jewellery convention in Bangkok, Thailand.

Such study tours help in building personal connections amongst the home team. These activities can also be a major contributor to mobilising the local cluster's stakeholders through building familiarisation amongst the home team. However, I recommend that detailed benchmarking against other clusters be held until Step 9. Let's get going, and then refine. Comprehensive external information gathering is usually not needed to quickly identify the cluster's immediate issues and roadblocks and engage on a number of initial development projects benefiting the cluster's stakeholders, and to continue the learning-by-doing.

Establishing Baseline Data

Hard data needs to be gathered at the start of a clustering initiative so that change over time can be clearly documented. This Baseline Data should be tailored to suit the specific cluster and could include some of the following aspects:

Examples, Baseline Data
Number of firms; number of new start-ups; number of new firms attracted to the cluster; average survival rate;
Total revenues; export proportion; average growth rate; capacity utilisation;
Employment in the cluster; comparisons with national data; number of new jobs, new trainees; new graduates; new PhDs; presence of world-leading scientists;
Revenues/employee;
Number of specialised service providers relevant to the cluster, e.g. patent attorneys, recruitment and technical consultants;
Number of patents[27]
Number of export markets served; number of firms with international investments;
Number of new or significantly improved products introduced;
Amount of new investment within the cluster; value of venture capital placements;
Sense of belonging to the cluster.

Drawing on: Kristina Dervojeda, PwC, Netherlands

This baseline data will later be used to measure progress. So think carefully what data is gathered for the cluster; what gets measured gets done. The process of gathering the data should not be too complex or onerous. Aim for 5-6 measurements that encompass different aspects. Having too many indicators invites gathering complexity and can result in information overload; too few reduce usefulness. This data is usually gathered through cluster surveys, as published statistics in most countries are not granular enough. In some clusters a local accountancy firm gathers the data required each year through an on-line survey (and provides this service at no charge). When a number of clusters are under development within a region, there should be some commonality amongst the data being gathered for comparison purposes.

As the cluster develops, the performance criteria will evolve. An emerging biotech cluster will have very different measurement systems from a world-class biotech cluster such as Cambridge, UK or San Diego, California.

[27]Take care with patents as an indicator: many innovations are not patented, with wide variations in patenting practices between technologies and industries.

Systematically Capture Stakeholder Information

It is prudent during this appraisal phase to start systematically gathering data on the stakeholders and people, building the cluster's Customer Relationship Management database (CRM). This should include all who have been interviewed, those who come to cluster events and to workshops and all who participate in the task forces that will be formed. The cluster organisation should be systematically accumulating business cards and e-mail addresses, building in all that it knows about a person and an organisation. Names should be sorted by type of organisation and interests and the database used to track engagements over time.

The **Clusterland, Upper Austria** comprehensive CRM system extends to 40,000 firms and 87,000 people. It gathers together all customer contact data, including information from firm visits, event participation, project participation etc. The CRM system integrates Clusterland's newsletter system (with 29,000 subscribers), websites, email traffic and accounting data.

Community relationship management (the equivalent of CRM) software is offered for free by EBase to non-profit organisations 'to manage contact information, membership and financial data, volunteer data, event information and outreach campaigns' (www.ebase.org). ACT! describes itself as the number one customer management system globally (www.thecontactgroup.com).

Preparation of a Discussion Paper, Presentation

Based on the review of published material and the interviews, a short sharp discussion paper on the key features of the cluster is prepared. This is not an all-encompassing piece of original research. The appraisal needs to provide sufficient information to gain the agreement of the key stakeholders on the current situation, the 'NOW' and to remove common misconceptions.

The appraisal should be presented in an executive summary style report, not more than 10 pages in length. (It is more difficult to accomplish this brevity than to present a 100-page report!) The report should be made available to all with an interest in the cluster. It is a public document, as common agreement on the diagnostics is needed before specific development projects are identified. The appraisal should cover the following:

Initial Cluster Appraisal Report	
1. Introduction	Purpose of report; research scope, emphasising that this is an initial appraisal.
2. Executive summary	One page maximum.
3. Cluster's scope	The breadth of products/services covered by the cluster; indications of the clusters size e.g. employment, exports, number of firms; and the cluster's local and national importance. Identify the geographic boundaries of the cluster's functional region.
4. SWOT review	Identifying the key Strengths, Weaknesses, Opportunities and Threats facing the cluster. Identify common roadblocks and opportunities. What are the key drivers that contribute to the competitive successes of local firms? What inputs are available locally, such as natural resources and specialised soft infrastructure? Is there specialised demand locally? Who are the competitors? On what basis do they compete? How embedded is the cluster in the region? Does the cluster have synergies with other clusters in the region?
5. The market	What is the market served by the cluster? What types of businesses are the key customers? Where are the growth niches? What are the major trends?
6. The cluster's culture	Inter-firm competition and co-operation. Do firms within the cluster effectively work together? Or are they isolated from each other, currently a clump? Are key support organisations, such as universities and public agencies aligned to the core and support firms, or a *clutter*?

7. Existing associations, institutions	Associations that actively support members of the cluster and their role, e.g. Chamber of Commerce, an industry association. Do key government institutions provide sources of competitive advantage? Are there specialised training facilities?
8. Cluster map	Cluster map allows cluster participants to see the networks and relationships in the cluster. It can also be helpful in identifying where emphasis needs to be placed in moving the cluster forward.
9. Investment opportunities	Identifying gaps in the cluster system (e.g. specialised packaging capability) that could be bridged by new private or public investment.
10. Baseline Data	The cluster's hard data that will be used to measure progress over time.
11. Appendices	Statistics, reference sources, interviewee lists, published data etc.

This report's objective is not to present all the data gathered during the analysis process, nor to demonstrate the knowledge that the cluster manager has accumulated on the cluster. The objective is simply to provide the foundation for early action. This initial appraisal is not designed to be a totally comprehensive review. This comes later, as part of Step 9.

In addition to the brief report, a PowerPoint presentation summarising the report should be prepared for the first cluster workshop and for discussions with e.g. the clustering initiative's funders and public agencies.

> *"How you gather, manage and use information will determine whether you win or lose."* As quoted in 'The Start-up of You', Hoffman & Casnocha
>
> **Bill Gates**

First Cluster Workshop

This workshop provides an opportunity for the cluster manager to:

- Provide feedback to cluster's stakeholders that have been interviewed as part of the appraisal process;
- Draw in other cluster stakeholders;
- Lead a discussion on the current situation;
- Establish a common understanding across the cluster; and
- Set the stage for the development of the cluster's forward agenda.

This workshop also provides a further important opportunity for the cluster's stakeholders to mix-and-mingle. This social time can be as important as the formal discussion time. An appropriate start time for the workshop might be 15:00, followed by refreshments.

Check List: Step 3, Initial Appraisal

- Has a broad based Ignition Support Team been established for the cluster?
- Has a public cluster muster been held to announce the initiative and to kick-start the initiative? With a loud fanfare? Did invitations cover the triple helix: business, government and academia? At the cluster muster, were some initial priorities for the cluster's development identified?
- Face-to-face interviewing is essential for gathering information on the cluster's current situation, the impediments and the opportunities. Has the base for the appraisal been extensive interviewing across the cluster led by the cluster manager, not an outsider?
- Have published statistics and reports been extensively reviewed?
- Has the cluster's history and its culture been comprehensively understood?
- Do stakeholders coming from different parts of the cluster now have a shared understanding of the cluster's current situation?
- Is the cluster's functional region small enough to be tight, providing a community 'feel', yet large enough to have the critical mass for key issues?
- Is detailed analysis, such as of training needs, technology changes, competitors or export markets being held for more detailed needs-driven research later?
- Is a positive environment being established for the cluster's mobilisation?
- Are the cluster's leaders becoming apparent?
- If relevant, has specialised technical expertise been brought in? Has an early study tour been arranged to a target market, a trade fair, or a related cluster?
- To measure progress, has the cluster's Baseline Data been identified and gathered?
- Has a start been made to building the Cluster Database, the cluster's who's who?
- Has a concise business-friendly report been prepared outlining the cluster's current situation, and a PowerPoint presentation to be used at the first cluster workshop?

Danger Signs

- The cluster manager fails to build active working relationships with other support organisations; no Cluster Ignition Team has been established.
- Insufficient resources / time is available for an extensive range of face-to-face interviews with the cluster's stakeholders.
- Prior to engagement on major projects, there is not clarity across the cluster on the obstacles and opportunities.
- A consultant or academic, as an outsider, undertakes the analysis, provides recommendations … and then disappears.
- The cluster manager is in place after the appraisal has been undertaken.
- No opportunity is provided to discuss the appraisal in a workshop setting.
- Paralysis-by-analysis … preliminary research is over-extended with time consuming, detailed reports being prepared rather than a short, sharp appraisal to provide the base for early action.
- Analysis is viewed as a one-off activity rather than on going as opportunities and needs evolve.
- Just a select few are involved in the appraisal.
- Myopia persists … a group view that is removed from reality.
- No Baseline Data is in place from which to identify change.

CHAPTER 4 STEP 4

CLUSTER GOVERNANCE

The governance of a clustering initiative, the Board, is an independent organisation with active triple helix participation.

The Board is led by business, not a public agency.

Its design is one of the most critical aspects of cluster development.

INVITED FOREWORDS

OLAV BARDALEN

Cluster Programme Manager, Innovation Norway

We attach considerable importance to the Boards of the clustering initiatives for our cluster programs. We view the Boards as a key strategic resource.

The Boards should be given well-defined roles and clear responsibility for the governance of the cluster. The most important roles: to motivate cluster partners for collaborative initiatives; to align different interests and perspectives; to mobilise and manage resources and to continuously revise and refine strategies.

The Board composition should be based on the Triple Helix with business people in the majority and in the lead. Diversity is needed with at least 30% female participation. A maximum of 8 persons, though in the early phase there might be a need for a broader group.

The relationship between the Board, especially the Chairperson, and the cluster manager is important. The Board must support and empower, but also challenge the management. Likewise the cluster manager should challenge the Board by bringing the real strategic, critical issues onto the Boards' agenda. Together the Board and the cluster manager are a critical success factor for the progress of the clustering process.

Seminars are offered for the Boards. These seminars discuss governance models in different phases of the cluster's development, roles and responsibilities, and specific issues for their cluster. All the new clusters accepted into the Arena program will have a governance seminar during their first year.

MANUEL MONTOYA

General Manager, Automotive Cluster, Nuevo Leon, Mexico; TCI Director

At the start of a cluster initiative it is essential to carefully select the President. In the case of the Automotive Cluster of Nuevo Leon, the governor invited the most important businessman of the industry. The prestige of Mr. Enrique Zambrano attracted other leading CEOs and he also won the commitment of the Deans of the three main universities to join the Board.

He introduced rules to ensure the quality of the meetings and the continuity of the initiative: there are 13 seats on the Board and every two years three directors rotate for new ones, the directors cannot send representatives to Board meetings and a vice-president is chosen to be the continuity. These guidelines have been the key to the cluster's success.

MATS WILLIAMS

CEO, Karlstad Innovation Park, Sweden; CEO, Paper Province cluster, 1999-2011

The Paper Province started in 1999 as a project with Board members from the public sector, the lead funder. However, the companies faded away quickly. After two years as a developing project, we established a legal entity with a new board led by corporate representatives but also with the public sector and the regional university. This gave the cluster organisation an urgently needed injection of acceptance.

When establishing a clustering initiative, Board membership is the ultimate critical question. Board members must be well-respected people that can and will make decisions and take action. Look for the empowered change makers. These are not necessarily the highly visible heavyweights.

DR. JAMES WILSON

Orkestra-Basque Institute of Competitiveness, Spain; TCI Director

Governance is a critical issue for any organisation or institution, and indeed for economies as a whole: it lays the foundation for decision-making, which in turn determines the types of outcomes that can be achieved. Clusters are no exception, and this Chapter provides a valuable guide to some key issues in establishing effective cluster governance.

Given the importance for cluster success of trust and of being able to identify sources of common benefit across members, the Chapter highlights an open, transparent and participative leadership style of the cluster board as critical. Alongside other key tips such as the importance of the board being business-led, diverse, balanced across the triple helix, and built over sufficient time, this resonates strongly with my experience with clusters in the Basque Country and elsewhere.

Above all, and strongly reflected in this practical guide, the key to effective cluster governance lies in finding the right people.

Board's Role, Responsibilities

Governance of the clustering initiative is through the Board of Directors, the cluster's leadership team. It is a group of senior cluster stakeholders who choose to have close involvement with the clustering initiative. As such it is an autonomous high-level decision-making and mobilisation entity … much more than an advisory group to a funding agency. The Board is a coalition of preferred leaders who care about the big picture and are willing to integrate their knowledge and insights to jointly engage in building their cluster.

Cluster Board Responsibilities	
1. Determining mission, purpose	Creating and reviewing a statement of mission and purpose that articulates the organisation's goals, means and identifies the cluster's primary stakeholders that are served.
2. Selection, cluster manager	The cluster manager is the organisation's chief executive. At the start of a clustering initiative this person is usually (but not automatically) the initiating cluster manager who has invited the Board members to come together. Subsequently the Board needs to reach consensus on the chief executive's responsibilities and if necessary undertake a search to find the most qualified individual.
3. Supporting, evaluating the cluster manager	Ensuring that the person has the moral and professional support needed to further the goals of the organisation.
4. Ensuring effective planning, coordination	Actively participating in an overall planning process and assisting in implementing and monitoring the plan's goals. Collectively the Board needs to manage the process that creates a clear picture of the future, articulate how that is a better future than the present and to manage the route to get there. The cluster's Board does not, in a conventional sense, set the cluster's strategy, but rather steers the process through which the strategy emerges and then endorses and seeks to resource that strategy. The strategy needs to evolve through a transparent process. The Board's role is primarily coordinating and building alignment across the cluster.
5. Monitoring, strengthening activities and services	Ensuring the resourcing of priority activities that are consistent with the organisation's mission and monitoring their effectiveness.
6. Protecting assets, providing financial oversight	Assisting in developing the annual budget and ensuring that financial controls are in place.
7. Building a competent Board	All Boards have a responsibility to articulate prerequisites for candidates, orient new members and periodically and comprehensively evaluate their own performance.
8. Ensuring legal, ethical integrity	Responsibility for adherence to legal standards and ethical norms.
9. Enhancing the organisation's public standing	Articulating the organisation's mission, accomplishments and goals to the cluster's stakeholders and garnering support from the wider community.

Draws on: Ten Basic Responsibilities of Non-profit Boards, Richard T. Ingram, BoardSource 2009

The Board's Role in a Nutshell

- Opening the dialogue, building the teamwork across the cluster.
- Integrating the cluster's diverse stakeholders into a community.
- Leading the strategy process, but not in isolation setting the strategy.
- Accepting that no one has all the answers.
- Receptive, an intent and empathetic listener.
- Aware, awake … and disturbing the status quo.
- Serving the priorities of others.
- Nurturing and empowering others.
- Creating the future.
- The cluster's steward for the coming generation.

The Board's Style

It is critical that a private, not public, sector culture is maintained for the clustering initiative. The cluster organisation needs to move at the speed of business. The emphasis is on action with a tight feedback loop, on learning-by-doing on multiple fronts rather than extensive analysis and research prior to commitment.

If the cluster's decision-making processes are bureaucratic, small businesses in particular will loose interest. The culture is one of *'Fail Faster; Succeed Sooner'*, exploring options especially at the cluster's periphery, learning which are under performing, culling and reallocating energy from the slower moving initiatives and accelerating the proven initiatives.

In developing the cluster, voluntary action will be required on a wide range of fronts. To achieve this, **an open, transparent and participative leadership style is needed for a cluster's Board** … a command and control management style will not bring the necessary results. The cluster's stakeholders need to be persuaded to contribute, they cannot be ordered. They will follow out of respect.

Developing the cluster may require a fundamental shift in the cluster's culture. Bridge building may be necessary to move from *clumps* and *clutter* to a more integrated system. The Board needs to 'walk the talk' in opening up the cluster, creating and navigating new pathways amongst the cluster's stakeholders.

The Board needs to stimulate the local conversations that draw on *'The Wisdom of the Crowd'.* Enthusiastic leaders are needed who are capable of releasing the energy of others for the cluster's growth. Such a leadership style is unlikely to surface through an old boy's club type structure. The Board is an influencer, not a controller. A federal-type structure is required.

With its triple helix membership, Board members will have differing time frames, experiences, expectations, cultures and even vocabulary. It is inevitable there will be a range of opinions and beliefs amongst the Board members. Differences need to be valued and resolved; confronted, not pushed beneath the surface and lost in silence. Fresh interpretations of the environment and emerging technologies should be opened up and explored, not shut out. As Per Eriksson, the founding CEO of Sweden's national innovation agency, VINNOVA, succinctly put it: *'We learn by fighting'.*

Board members are not in place to protect their own interests. They are there to contribute to the development of their cluster and need to view each other as complementary resource persons bringing their knowledge and perspectives. What is needed for a successful clustering initiative is governance with an **appreciative mind-set** that focuses on *'What do we want, what do we have, what can we do, what's working and why, what do we want to move toward, what is it that matters to us'.* A **deficiency mind-set** that focuses on *'What we don't want, don't have, can't do, what's not working and why, what we want to move away from, what we feel constrains us '* will not unleash the cluster's potential[28].

[28]Drawing on 'New Models for Economic Development', Ed Morrison (Cleveland, Ohio), 2006.

Designing the Board

A wider membership is needed than a customary list with representatives from the largest firms, the lead financial institutions and senior public officials. Leadership with a focus on maintaining the status quo will not be successful in driving transformational change. So who should be on the Board? Two types of senior leaders can help in moving a cluster forwards:

1. Those who bring positive influence to the Board table. These are the leaders who are well connected within and beyond the cluster. They have the ability to attract others to the initiative and to attract additional resources. They will have a reputation within the community for getting things done.
2. Those with in-depth technical and market knowledge.

The majority of directors, and the Chair, should come from the private sector. Candidates for this role will not necessarily be from the largest firms. Government representatives and association officials should not dominate the Board - they can be too locked into their organisation's agenda. No one should be a member of the Board to represent an association, a special interest group or a business. CEOs/Heads of Departments are needed, not second or third level managers. The Board members need to be senior decision makers with a high-level understanding of the cluster's issues, rather than just a marketing, R & D or training perspective.

What is critical is that the selected individuals are well regarded and respected by the cluster's community. To ensure diversity, they should not all come from the same mould with the risks of myopia or groupthink. Many cluster Boards are still male dominated, but gender equity is just one aspect of diversity. All the Board members of a biotech cluster in Scandinavia came from the two local universities. This may provide a cohesive team, but it is hardly a diverse gene pool bringing creative tensions.

Business people bring a market perspective and a 'lets move and learn-by-doing' attitude. Well-connected and respected CEOs from support firms can be very valuable along with leaders from one or two larger core firms and innovative SMEs. Smaller companies may feel more comfortable with a Board that includes non-business members.

Valuable Board members have a dual motivation: that of business development and also community development. The Board is usually no more than 8 - 9 senior people; more if some are frequently travelling. Having business in the lead reduced the risk of incoming politicians with new agendas casting cluster development to one side, as has happened in Chile, in Chihuahua (Mexico) and other places.

However, cluster boards benefit through having participation that extends beyond business, with representation from the cluster's soft infrastructure. These could be senior representatives from public agencies (e.g. a specialist from a ministry or a business support organisation that is active with the cluster) and from academia (e.g. from a university, training institute or a local high school). Academics invited to be Board members should be well respected by the core and support firms and connected to relevant global knowledge centres, bringing in new perspectives. Political leaders can bring connections to schools, to regional companies beyond the cluster and business support agencies.

Designing a Triple Helix Cluster Board		
Options for Consideration		
Core firms	3 people	CEOs, e.g. from a large company/MNC, a medium sized firm trading internationally & an innovative SME.
Support firms	2-3 people	CEOs from well-connected suppliers, e.g. a packaging firm, a machinery supplier, an angel funder, a freight forwarder, an IP lawyer, a recruitment agency.
Soft infrastructure	2-3 people	Participation depends in part on the cluster's forward agenda. Could include: • An academic with links to global knowledge centres. • Head, vocational training institute. • A politician with strong community/school connections. • A representative from the export/FDI agency. • CEO, the region's economic development agency.

The Board members need to be comfortable in working together and in taking personal responsibility for the clustering initiative. Their active commitment is required; this is not an honorary role for retirees or for passive by-standers. For the members of the Board, failure of the clustering initiative is not an option. They are lending their names to a success. Their enthusiasm for their new role should infect others.

Board make-up varies from country to country. In Spain's Basque Country, a government appointed member is on each clustering initiative's Board, but with no voting rights; Varmland, Sweden has adopted the same approach. Clusterland, Upper Austria, has no policy makers or public officials on the management Boards. Bavarian clustering initiatives, with a strong SME focus, consist of 10-11 business ambassadors and one academic.

The cluster manager, as the organisation's CEO, is usually a Board member, often non-voting. The cluster manager represents the broader interests of the community and ensures that the development agenda for the cluster continues to move forward. Public funds are being used to continually develop new initiatives, not to subsidise on an on-going basis the existing activities.

Establishing the Board

Membership in the early stages of a clustering initiative is usually by invitation of the cluster manager or the clustering initiative sponsor, not by election. At the start there can be insufficient information on the cluster's key personalities for an informed election and no formal mechanism through which an election process could be legitimately conducted. It can take time to identify who the preferred leaders for a cluster are. The 'anointment' of leaders should not be rushed. A prior testing in leading task forces/ Cluster Action Teams helps identify who really are the cluster's dedicated movers & shakers.

Selecting the right people for this team (or later encouraging them to stand for election) can be the most challenging and the most difficult decision that a cluster manager faces. It may not be easy to persuade the preferred leaders, especially senior business people, to step forward. Many will legitimately claim they are already busy with other external commitments. The cluster manager may need to be creative in identifying the most appropriate route to open discussions with the preferred candidates.

The Board members are typically unpaid volunteers. By the second or third year, most Board members will be contributing financially to the clustering initiative, as well as contributing their time. Members are expected to engage with the cluster beyond the formal Board meetings.

Insights as to who might be invited to join the Board come in part from the cluster manager individually meeting with the cluster's stakeholders during the analysis process and posing a question along these lines: *"If you were to invite a few of the cluster's 'shakers and movers' to your home tonight, whom would you invite?"* Common names will invariably surface in response to this question. These names may also be associated with community organisations and business/trade associations.

There should be no rush with establishing the Board. The full Board does not need to be in place straight away. The cluster manager may, at the start of a clustering initiative, invite 2-3 people to be part of an initial (and very informal) leadership group. This initiating group grows over time as others are invited to help move the cluster's agenda. As with any group, it can take time for trust to develop and for the group to be fully open with each other on key issues. Over time it may become clear that a candidate for the Board is unable to see an agenda broader than that of the organisation they come from. But it can be very difficult to 'exit' such a person once they have been announced as a Board member.

There may need to be exits from the initial leadership group before it becomes formalised. The cluster's focus could have shifted from 'engineering' to 'marine engineering', with ideally the leaders now coming from the more narrowly defined cluster. The functional region, its geography, may also have evolved with implications for the Board's membership.

Occasionally this governance structure needs to be formalised with haste so that the Board is legally constituted and a bank account opened ready to receive funds from a public agency or donor. Alternatively, to allow adequate time for a more diligent selection of Board members, an established and trusted local organisation (such as an economic development agency, a Chamber of Commerce, or a university) acts as the initial financial intermediary. This preferred approach then gives time for members of the Board to be identified without urgency (see Step 8, Formalising).

The cluster manager at an early cluster-wide meeting and/or through the cluster's e-newsletter should introduce

the members of this group. The cluster manager could indicate that the people have been invited to join an 'interim steering group' to move the clustering initiative along. Over time, a more democratic election process is developed. With small clusters, an informal group may continue long-term. An early measure of the success of a clustering initiative is the willingness of Board members to front up to the next meeting. A warning sign comes when these seniors seek to delegate, or are no-shows.

Chairing the Board

A cluster's Chair is usually a private sector CEO who is appointed or elected by the board's directors. The Chair, particularly in the early formative period, needs to be a well-respected stakeholder with influence well beyond the cluster and positioned to bring external support to the cluster's cause. The Chair should be based within the cluster's functional region.

The Chair has considerable influence on the formulation of the agenda for board meetings, guiding discussions and creating a forum where the directors, with a range of backgrounds and perspectives, bring their (at times differing) views to the table. Disagreements need to be aired and resolved.

Many chairs are closely involved with their clustering initiative and provide a mentoring role to the cluster management team. **The chair publically represents the cluster** to political and academic leaders and to public agencies. As the cluster's Ambassador, the Chair is the public face of the cluster to the media and often to international customers and potential investors.

During the early stages of Board formation, the cluster manager may be, by default, the Chairperson. Rather than a voting process to select the chair, the cluster manager may sound out the views of the Board members once they have seen each other in action round the table and then invite the preferred person to step forward as Chair.

The establishment of Co-Chairs to lead a clustering initiative is not uncommon, symbolising that this is a partnership organisation and immediately spreading the workload. As part of ensuring diversity, one Chair may be the CEO of a lead firm, the second from an academic institution. Other combinations are one urban, one rural; or one private sector, one public agency.

Board & Cluster Manager Relationship

At the initiation of a clustering initiative, there usually is no Board or governance entity in place for the initiative. An important element of the Cluster Manager's early role is to carefully identify who should be invited onto the initial governance group and who should be the inaugural Chairperson.

Up to this stage in the cluster development process, the Cluster Manager is usually reporting to the lead funder of the initiative, such as the regional economic development agency. With the establishment of the Board and the appointment of the Chair, the Cluster Manager will now have a prime reporting responsibility to that Chair.

Supporting Quotations	
Nelson Mandela	*"Lead from the back and let others believe they are in front."*
United Nations Industrial Development Organisation	*"Governance can be understood as the capacity of the cluster to start and sustain joint actions in a systematic and strategic fashion. A sound governance system allows the cluster actors to identify shared objectives, agree on a common strategy for their achievement, articulate collective actions and solve related problems, monitor outcomes and ensure their sustainability over time."* Cluster development for pro-poor growth: the UNIDO approach
Inter-American Development Bank	*"A careful identification and selection of visionary business leaders is often one of the issues that will guarantee the success in the implementation of the program."* Cluster Development Programs in Latin America and the Caribbean, 2011
Charles Landry	*"Leaders explain the direction of travel, but with flexibility in the plan so space is opened for dialogue."* Cities of Ambition, 2015

Dr. James Wilson	*"Leaders need to establish the region as a frame of reference for their thinking and their decisions, alongside the already existing frame of reference provided by their firm, university, government department, or civil society group."* *"It is the willingness and ability to put specific aims and concerns not shared by others to one side and think in terms of the region that distinguishes leaders in this process."* Orkestra, Basque Country
Charles Handy	*"Federalism features reverse thrust organisations in which initiatives, the drive, and the energy come mostly from the bits, with the centre an influencing force, relatively low in profile. The Federal organisation will not work unless those in the centre not only have to let go of some of their power but actually want to do so."* The Age of Unreason, 1991
Margaret Wheatley	*"If we want to be able to get these complex systems to work better, we need to abandon our reliance on the leader-as-hero and invite the leader-as-host. We need to support leaders who know that problems are complex, who know that in order to understand the full complexity of any issue all parts of the system need to be invited in to participate and contribute."* Leadership in the Age of Complexity: From Hero To Host, 2010
USA	*"Cluster strategy should be pursued with humility as a matter of supporting, connecting, filling gaps and removing obstacles to private enterprise while making sure certain public and quasi-public goods are available."* Metropolitan Policy Program, Brookings Institution
Australia	*"I am in this role as I need to influence things that are beyond the boundaries of my firm and because I want to help build this community so my kids will stay here."* Chair, Marine cluster, Queensland
Sweden	*"The Board is a strategic collaborative network that involves the region's main players. The Board's primary task is dissemination and influence within the project, and the coordination of different stakeholders and players in the regional innovation system."* Peak Innovation cluster
Inter-American Development Bank	*"Do not send alternates. Sending alternates is a first signal of dwindling interest in both the public and private sectors. It also slows the flow of information and the advances in agendas, since they then have to be validated by the absent leader."* Two to Tango: public-private collaboration for productive development policies, 2016
Welsh Proverb	*"He that would be a leader must also be a bridge."* A fo ben bid bon

Broadening the Cluster's Resourcing

A marked strength for a clustering initiative is having a broad base of financial / resourcing partners. It is preferable that no one financial contributor is able to unduly influence the cluster's activities. Clustering initiatives need to be owned and driven by the cluster's regional stakeholders, not Ministries and funders based in capital cities or even more distant donor's.

By the second or third year of a clustering initiative some form of membership fee should be introduced. This may be more in the way of a token fee, possibly Euros 50-100 a year. Membership for Slovenia's automotive cluster ranges from Euros 2,000 a year for large firms to Euros 500 a year for small firms and R&D institutions. Firms in some clusters contribute Euros 10,000 and above annually to the cluster secretariat. This income is a contribution to the organisations overhead and secretarial running costs. Flexibility is needed as some cluster stakeholders, such as a high school, may not be able to become formal 'members' of a cluster association.

When projects are benefiting a particular firm, the beneficiary should be directly making a contribution to the costs, for example, when a firm is sending people to a training course or participating in a trade fair.

Organisational aspects

Once momentum with the clustering initiative has been achieved, many Boards meet 4-6 times a year. Boards often meet at different locations around the cluster, with Board members taking turns in hosting. Distributed leadership sees many Boards allocating specific roles and responsibilities to members.

The Board should host an Annual Cluster Summit, the cluster's Annual General Meeting, to keep all up to date on the cluster's activities and to allow open exchanges as input to the cluster's evolving strategy.

Over time, an informal Cluster Advisory Board may be established, linking a large group of senior triple helix stakeholders that includes retirees from the main Board.

Peak Innovation Cluster, Sweden	This tourism/sports/outdoors cluster established a Coaction group, "Samhandlingsgruppen", a reference group of more than 50 people who, for a few years, met 4-6 times a year and was led by the County Governor. It included most of the regional actors relevant to the initiative and became an important element in mobilising commitment, steering towards its vision and coordinating.

At the start of the clustering initiative, supporting cluster management will be the Cluster Ignition Team, the informal coordinating mechanism for support agencies. Over time, this informal group morphs into the cluster's Technical Support Team.

Tips: Cluster Governance

- There are strong benefits in having organisational flexibility during the early stages of a clustering initiative.
- Take time in formalising the legal structure, it may need 12-24 months.
- The clustering initiative should view itself as self-help organisation.
- The Board will increasingly rely on task-force members who tackle specific projects. Give them scope and independence.
- Make way for the talented (and often young) individuals who 'do their own thing'.
- Think ahead. Plan for succession.

Danger Signs

- The Board has been formalised with haste.
- Board members firstly look after the interests of their own organisation.
- Board members fail to develop an understanding of the cluster's development issues, and/or lack a passion to engage; their time for engagement with the cluster is limited to Board meetings.
- The initiative moves at the speed of a bureaucracy with paralysis-by-analysis, rather than a (more chaotic) approach of learning-by-doing.
- Substitutes/alternatives are permitted at Board meetings.
- The Board is dominated by:
  - The cluster's largest organisations, the loudest, or representatives from a (conservative?) 'Old Boy's Club';
  - Second level managers, not CEOs/Heads of Departments;
  - Public agency representatives and industry association officials;
  - Those seeking public funding to maintain the status quo;
  - One gender.

CHAPTER 4 STEP 5

PREFERRED FUTURE

With the initial analysis completed and the cluster's Board under establishment, broad agreement is now needed on the cluster's direction, the preferred future. This is shaped in a workshop setting.

"When you dream alone it remains just a dream.
When you dream together it is the beginning of a new reality."
Quoted by Paul Born in 'Community Conversations'

Brazilian proverb

Where are we Heading?

The Clustering Initiatives Greenbook[29] identified that the most common reason for the failure of clustering initiatives was a lack of consensus on the cluster's direction. Without agreement on direction there is a real danger of future disappointment amongst the diverse stakeholders. A shared sense of purpose is needed that becomes the starting point for the shared strategy. First comes, Where are we heading? Then comes, How will we get there?

The preferred future[30] needs to be grounded in the reality of today, as identified through the analysis undertaken in Step 3, the 'NOW'. However, it is not creating a future in an image of the past, it is envisioning a desirable future. It articulates a *s-t-r-e-t-c-h* ambition, setting a challenge. It clarifies the broad direction for the cluster and as such it may contain reference to the markets the cluster serves, its products and services. It describes what the successful cluster will look like, what it will be recognised for.

The preferred future needs to capture both hearts and minds. A bold but realistic direction is required. If the preferred future's bar is set too high it will fail to attract attention, especially from business. If set too low, it will fail to inspire. It needs to be action orientated and to resonate across the cluster.

The key question to be addressed is **'What does success look like?'** Related questions are: What do we offer? What do we stand for? How do others see us? How are we different from our competitors? What are we doing that others cannot easily replicate? As a 'preferred future', it is assuming that all goes well for the cluster.

Preferred Future Examples	
Sweden	*"To position the Mälar Valley as the world leader in research, development and manufacturing in robots. Specialising in industrial robots, field robotics and robotics for medical and health care."* Robotdahlen Robotics cluster
South Africa	*"The Valley of the Olifants is renowned as the premier tourist destination in Southern Africa offering a vibrant, unique and quality African experience focusing on eco, adventure and cultural tourism. It is built on the cooperation and empowerment of all stakeholders creating sustainable benefits for all."* Tourism cluster
Sweden	*"The region of Jämtland is a world-leading environment for research, innovation and business development in tourism, sports and the outdoors."* Peak Innovation, Tourism & Sports cluster
USA	*"To expand from our current position as Number One in manufacturing of light planes in the USA to be the preferred location for the design, manufacture, maintenance, marketing and distribution of light planes."* Wichita aviation cluster, Kansas
New Zealand	*"To be the centre of light aircraft manufacture, maintenance and pilot training in Australasia."* Waikato aviation cluster

Establishing a Preferred Future

Following a common understanding on the diagnostics, the cluster's 'NOW' (Step3), a view of how the cluster might be in the future is collaboratively developed. The preferred future needs to be jointly shaped so the cluster's stakeholders own it; it is not imposed. It needs to be created with the cluster's stakeholders, not for them.

It can be developed from scratch in a workshop setting. Alternatively, the cluster manager drafts a suggestion to propose at a cluster workshop and then invites comments. This suggestion should firstly be tested and debated with senior cluster stakeholders, including the developing Board (Step 4), prior to the workshop. As with all cluster workshops, a key to success is ensuring that the right people are in the room for this discussion.

Occasionally alternative scenarios using a foresight process are developed that consider a range of development possibilities and then the preferred future identified. More frequently the focus is on shaping one scenario … the preferred one, the desirable one. The Preferred Future can be thought of as a *Dream with a Deadline*.

A starting point in developing a Preferred Future is to imagine a doubling and to open this for discussion at a workshop. Such futures can be refined later. Alternatively, an opening Preferred Future could be along the lines of: *"By 20__, our region will be an internationally leading location for research and business development within 'Y' strategic areas"*

[29]The Cluster Initiative Greenbook (Sölvell et al, 2003)

[30]Thanks to Peter Ellyard for the term 'Preferred Future'

Broad, high-level agreement is being sought, not a detailed picture of the future. In order to avoid lengthy debate early on in the clustering process that may offer only marginal benefits, it can be prudent to describe the preferred future as 'initial' or 'draft'.

Preferred Futures Should Evolve Over Time

The preferred future should be revisited and refined as the competitiveness and area of influence of the cluster evolves and possibly the specialisation narrows. It may well be s-t-r-e-t-c-h-e-d further. It should not be cast in stone.

Supporting Quotations, Preferred Future	
Muhammad Ali	*"What you're thinking is what you're becoming."*
Peter Ellyard	*"In many years of undertaking scenario planning, I have never felt totally involved in the process. The process has always seemed to me to be too analytical, academic and remote. What traditional scenario planning lacks is heart. It ignores the fact that humans yearn, have aspirations, that emotions are involved in futurism. As a result, in my own work I set out to develop a scenario and strategic development process which recognises that heart and hope both play a critical role in determining one's destiny, and in developing effective strategies for achieving success in the future.* *Therefore many when they consider future possibilities ask the question: 'What should happen? What is my (our) dream? What is my (our) preferred-future? This recognises that, in real life, people have aspirations and commitment. All us have dreams about the future. The important issue is whether we take these dreams seriously or whether we regard them only as blue-sky reveries to be ignored in the interests of pragmatism and reality. This is the form of vision which is most natural to the leader.* *The respective ways of the manager and the leader are encapsulated by George Bernard Shaw: 'Some people see things as they are and ask why. Others see things as they could be and ask why not.' We cannot work to create a future we cannot imagine."* Futurist, Melbourne, Australia
Hamel & Prahalad	*"Strategic intent: the realization of a dream that provides a sense of direction, a sense of discovery, and a sense of destiny.* *Strategic intent is a term that goes beyond the basic vision and mission statement to introduce an element of flexibility in setting objectives and strategies in circumstances of continuous change. The strategic intent describes future strategic directions. It conveys a sense of destiny about the long-term markets and eventual competitive position.* *It also offers possibilities by providing a sense of opening up opportunities for discovery to explore new competitive territories. Opportunities to make different choices along the selected economic pathways are made available as well."* Competing for the Future
Ahmed & Olander	*"The most powerful force in the universe isn't technology. It's imagination."* Velocity
Charles Handy	*"It must stretch people's imaginations, but still be within the bounds of possibility."* The Age of Unreason
Charles Landry	*"Broad enough to inspire, but narrow enough to enable practical tasks to happen."* Cities of Ambition, 2015
Oliver Wendell Holmes	*"A mind, once stretched by a new idea, never regains its original dimensions."*

"If you don't know where you're going, you might end up some place else."

Yogi Berra

Step 5 Check List: Preferred Future

Be systematic Don't skip over this step. The results may initially be vague but the discussion is key to getting alignment on future direction from the cluster's diverse stakeholders.

Be practical Open a workshop discussion with a suggestion that been pretested on senior members.

Be bold What's the BHAG, the Big, Hairy, Audacious Goal?

Be ambitious As the cluster develops, s-t-r-e-t-c-h the preferred future further.

It should not be cast in stone.

But be realistic Aiming too high reduces credibility

- Has the preferred future been discussed, shaped and accepted in a cluster-wide workshop?
- Is it describing a compelling vision that captures wide attention?
- Does it capture both hearts and minds? Set a challenge goal?
- Is it intended to further s-t-r-e-t-c-h the preferred future over time?

Danger Signs

- The Preferred Future is owned by only a select few within the cluster.
- The preferred future is:
  - Not meaningful, not relevant;
  - Not achievable … unrealistically ambitious and fails to attract attention, especially from business;
  - Too cautious, failing to inspire.

CHAPTER 4 STEP 6

INITIAL STRATEGY

The initial strategy for the cluster's development is established through an open workshop process.

The Approach

The workshop is focussing on the preferred future, on how the cluster moves forwards, developing the initial 'Strategic Plan' for the cluster. Insights for the initial strategic plan come in part through an open dialogue in a workshop setting, drawing on the *'wisdom of the crowd'.* As execution of the plan will be dependant on the work of volunteers who engage in the aspects that align with their passion and interests, these volunteers need to be part of the strategy setting. The results are not being imposed on them, the process is very much bottom-up, influenced by market needs.

The workshop is focussing on the preferred future, on how we in the cluster together move from good to better. The focus is not on the problems facing the cluster and attributing blame. The plan that flows from this approach will have flexibility, accepting that the external and the internal environments facing the cluster are continually shifting. The plan will evolve further through learn-by-doing. Execution of the plan will be dependant on volunteers, and these volunteers need to be part of the strategy setting.

A Workshop Process

With the Preferred Future established, the cluster's stakeholders identify what broad steps are necessary to deliver on the vision. Identifying these issues through a bottom-up workshop process is more powerful than having a top-down 'independent review' with the strategy being presented by an outsider. *Involving the cluster's insiders through a workshop process, rather than delivering to them an outsider's report, invites their active engagement.* The strategy is not being imposed.

The process centres on **back casting** rather than forecasting from the present situation. The cluster stakeholders, in a live workshop setting, are invited to imagine that the preferred future has been achieved and then to back cast from this to identify the main steps that were taken. Typically five to ten key steps will emerge as the clear priorities. Some practical considerations when running this critical workshop:

A Cluster Workshop Format	
1	The lead determinant for a successful workshop is that the key people actually show up. The *'usual suspects'* are needed for this workshop along with the *'unusual strangers',* the more remote cluster stakeholders. t this stage of the cluster's development, the cluster manager should have established a personal connection with the main cluster stakeholders so the invitation to the workshop does not come from a stranger. The invitation could be jointly signed by respected business, academic and possibly political leaders to signify that this is a collaborative effort and a major event. Personal invitations should be sent to all the people who have been interviewed during the analysis step. The local newspaper and radio should be used to broadcast the workshop. It is open to anyone with an interest in the cluster; this is not a closed-door session.
2	Seating of participants needs to be carefully considered. It should not be random. To ensure interactive discussions there needs to be a mix of participants seated at each table. Ideally no more than 5 or 6 to a round table to ensure that all are engaged in the discussions. Participants coming from the same organisation, or from government agencies and academia and from the Board, should be spread amongst the tables. At a table there could therefore be representatives from a core firm, a supplier of packaging materials, a bank, a government agency and possibly a local training institute. This mix of stakeholders will each have their separate perspectives. The workshop provides the opportunity for each participant to test their perspective against the other viewpoints at their table and then integrate.
3	Seated in the small groups, participants are firstly asked to look back and to individually identify what in their opinion were the key activities that delivered the preferred future, what was done to make it happen.
4	Following a few minutes of quiet during which each participant privately lists the priority activities as they visualise them, the group at each table are then invited to test on each other their individual lists and to synthesise these into one list for the table. The tables are not asked to prioritise the activities, just to identify them. The cluster manager should circulate around the tables to hear what is coming through prior to feedback. If a table has e.g. 'Strategic Plan' on their list, they should be asked to consider what are the headings of that Plan.

5	The synthesised lists from each table are then itemised on a large board, with similar items written next to each other. Separate tables in the room may have identified 'Market Research', 'Market Development', 'Trade Fair Participation', 'Export Development', 'Trade Missions to Priority Markets', 'Inward Visits by Buyers & Trade Journalists' and 'Developing a Cluster Brand'. These related items could be summarised as one key activity: 'Market Research & Market Development'.
6	The cluster manager should go into this workshop having thought through what might be the key activities and prompt if these do not come forward from the workshop's floor, to explore if there is support.
7	Once the activities from each table have been accumulated on the large board and similar items grouped together, there may be 5-10 key activities emerging. The activities will vary from cluster to cluster and could be as broad as: • Market research & market development; • Training, skills development; • R&D/technology transfer; • New product development; • Culture change, more networking, tighter links • Bank finance/venture capital/seed funding
8	These broad activities now need to be prioritised. This can be achieved by giving each participant at the workshop an equal number of votes. If eight steps have been identified, then each participant could be given six votes; or if it is a small workshop then ten/twelve votes each. Participants are then invited to mark their votes on the Board. If a participant considers an activity is particularly important then more than one of their votes is allocated to that activity. All are equal for this voting process, reflecting transparency and openness in the strategy setting.

The cluster manager may understandably be nervous about running a workshop with possibly 100+ vocal participants. A specialist workshop facilitator, or a colleague who is familiar with the process, could assist by taking the lead in this key workshop.

Legitimacy of the Workshop's Conclusions

The process being introduced is firstly open and transparent. It is not a few deciding in isolation on the cluster's priorities for development. The cluster's Board should be participating in the workshop, along with the funder's of the clustering initiative, but their voices will be among many. It is particularly important that a major funder of the clustering initiative is not able to unduly influence the emerging agenda, as this needs to be owned by all.

Most of the workshop participants should already have participated in the analysis process and been involved in the feedback workshop (Step 2), so they are familiar with the discussion on the current situation and the current issues that will have already taken place.

At their table during this workshop, sitting with a mix of the cluster's other stakeholders, they will have had the opportunity to test their own views against the others at their table. Each participant will then have the opportunity to hear the views emerging from the other tables before individually voting for the priorities.

The workshop participants own the strategy that emerges from this workshop. An outside consultant, the cluster manager, the Board or the clustering initiative funders will not have imposed the strategy.

Following the Workshop

The workshop's conclusions should be public, again reflecting the importance of transparency and openness in the cluster process. A summary of the emerging strategy should quickly go to each of the workshop's participants, along with all who where invited but unable to come. A press release should also be prepared for wider circulation.

The outcomes of this key workshop are in effect the headings for the cluster's first Strategic Plan. This document is not cast on stone as identifying a cluster's issues and support activities will be on going activity, not a once off at the initiation of the process.

Step 6 Tips: Initial Strategy

- The strategy is not being set by a few senior people deciding for the many, nor an outside consultant, nor a funder deciding remotely what the cluster's strategy should be.
- Those who will be implementing the strategy are involved in developing it.
- The process centres on back casting from the Preferred Future through a facilitated workshop.
- An important question: 'Have we got the right people in the workshop?'
- Expect 5-10 key activities to emerge from this process and be prioritised.
- These activities become the headings for the cluster's initial Strategic Plan.
- In addition to cluster-wide activities, are more specific agendas developing for sub-groups (SMEs? Large firms?) and possibly commercial networks/consortia?

Danger Signs

- Failure to get the right people into the strategy workshop.
- The cluster's forward strategy is determined without a workshop process, such as:
  - A few senior people decide for the many;
  - An outside consultant presents recommendations, and then disappears;
  - A funder predetermines the strategy as a condition for the cluster receiving support; or
  - The strategy workshop is held prior to the initial appraisal being undertaken and discussed.

CHAPTER 4 STEP 7

SHORT TERM, TACTICAL AGENDA

The emphasis is on quick wins through initiatives that have early support and energy.

These are the projects that don't require substantial resources and start mobilising the cluster towards the preferred future.

Task forces are established for the priority projects.

Start Doing Small Stuff

Firms will walk away if there are not early benefits. They are not interested in talkfests. They look for benefits. So start where there is general consensus … look for the small wins that are supported with passion and energy; listen for areas where firms don't need to open up too much. Small acts of cooperation are needed in low-risk, low-sharing areas These will open the path for subsequent more strategic engagement. What are needed at this step are tactical first generation initiatives, the 'low hanging fruit', not the long-term major impact initiatives addressing fundamental issues. We will work our way up to bigger projects later. Early projects could include:

- Cost reduction, e.g. joint purchasing, negotiating joint transport.
- Developing new business opportunities, e.g. joint advertising, an export trade mission.
- Addressing immediate training needs.
- Commercial collaboration between firms: sub-contracting, out sourcing, export consortia.
- Regular mix-and-mingle meetings; developing a 'Who's Who' for the cluster; establishing the cluster's website … removing the isolation of the cluster's stakeholders.

The early priorities need to offer **tangible benefits to the participating firms**, accepting that not every project will benefit every firm. The initiatives should tightly focus on what can be achieved within the energy and resourcing that is at hand and not be distracted by broader agendas. A cluster that drifts into addressing generic issues (such developing a regional brand or upgrading airport facilities) can be heading for difficulty.

Establishing CATs, Cluster Action Teams

I have seen too many clustering initiatives that generate long 'wish lists' in the hope that others move on the prioritised activities. Responsibility for action needs to be equitably shared amongst the cluster stakeholders. A way of working collaboratively is through short-term temporary task forces ... CATs … Cluster Action Teams. The cluster manager encourages those with passion for an issue to step forward and participate in relevant CATs, ideally people who bring different perspectives from different corners of the cluster. A task force working on a training initiative needs both private sector participants and education providers.

CATs provide an opportunity for the cluster's participants, even competitors, to **work together on common projects** and for the all-important side conversations as trust is developed. CATs spread the workload, minimising the danger of volunteer burnout. For the cluster manager, these working groups provide an opportunity to identify emerging leaders.

It is not unusual to have 10-15 small projects emerging from the cluster workshop. CATs become the cluster's main engine for development. The cluster organisation has an important role in working with these task forces, supporting them but preferably not acting by default as the 'project manager' for everything. With small clusters and clusters comprised mainly of small businesses, the cluster organisation may need to act as the project manager, with the implication that there will be engagement on fewer fronts.

CAT Success Principles

The scoping of a project for a short listed initiative should include:

- An outline of the activity;
- Defining the expected results;
- Identifying the resources that are needed; the timeline and key milestones; and
- Identifying whom from within the cluster has the necessary skills, contacts, knowledge and passion to participate in driving the particular project. Who might lead a small team to drive the project?

The initiatives should demonstrate the value of early collaborative action, showing that together there is forward movement that would not be possible with the cluster's stakeholders travelling solo. The focus is on activities that are given a priority by the cluster's stakeholders, the insiders. Outsiders such as a consultant or a funding provider do not determine priorities. If there is no passion and energy from business to participate in implementation, the issue should be put to one side. Complex, long haul projects should be introduced once momentum is in place, or broken down into doable components. Establishing a spread of projects broadens the pay-offs and minimises dependency on any one. Analysis and report writing is not (as seen by some public agencies) an end in itself. Emerging initiative can be speeded into action by the cluster organisation having the resources to quickly engage on the priorities.

Members of the Cluster Ignition Team should be participating in relevant CATs.

CATs have specific objectives to achieve and then ***self-destruct*** on task completion. They are not committees in perpetuity.

Early Flagship Projects

Flagship projects are small, low cost, quick fix projects and activities that have a butterfly effect that spirals into dramatic outcomes, and demonstrates in a very practical way that by working together, the cluster can make new things happen.

These are the activities that attract attention, the modest efforts that lead to significant change, e.g. a first visit to a trade fair, a joint visit to a related cluster that offers both B2B and learning opportunities, an inward visit by a high profile potential customer … with a public welcome by the Mayor.

Regular Cluster Forums

Clustering initiatives need to include regular meetings to provide opportunities for people from across the cluster to meet face-to-face, to mix and mingle. Innovative clusters are an inter-connected system with many networks. Yet all too often businesses and support organisations are remote from each other, with little active engagement, the *clumps* and *clutter* syndromes. These forums could include:

- Regular breakfast or evening gatherings, such as 'First Tuesday' meetings once a month with guest speakers as draw cards;
- Speed meeting/dating sessions as a means of increasing who-knows-who;
- Awareness briefings at the premises of cluster members;
- Celebration activities centred on individual firms and organisations, e.g. acknowledging an award, the launch of a new product range or training course, a first major export contract.

Some clustering initiatives fail to move beyond these social meetings and are vulnerable, as they are not addressing key impediments and opportunities. Core firms tend to be the first to loose interest and not show up, leaving support firms (hungry for customers?) and soft infrastructure participants (looking for a break from their offices?).

Value Chains, Hot Spots & Business Networks

Other forms of association develop within a cluster community as businesses get to know and respect each other. These engagements all benefits from a neutral broker such as a cluster organisation.

Value/supply chain development integrates activities that bring a product or service from conception through the different phases of production and trade (design, logistics, purchasing, production, marketing, distribution and export) until the final consumer. A cluster may have more than one value chain project, which maybe competing with each other.

As knowledge of the cluster's stakeholders develops, the cluster organisation is likely to see scope to engage in a very targeted way within the cluster. **Hot spots** are the high growth areas within the cluster where a more focussed development approach offers benefits, e.g. around a specific technical competence, a market niche or an emerging opportunity. A large cluster could offer a number of hot spots with some firms participating in more than one. Engagement within these special interest groups can be open to all within the cluster that have an interest, such as with all core firms or all transport operators. Or collaboration could be more private, amongst a small group of core and support firms.

With trust and the knowledge of who-is-who within the cluster developing, opportunities for more private collaborations amongst small groups of firms develop.

These alliances may start with informal (**soft network**) cooperation, such as in joint purchasing or joint participation in a trade fair and then move on to the sharing of machinery and key staff. Later, a joint venture company (a **hard network**) might be established for co-investment in a major new plant or to set up a common international office/warehouse. This migration from informal 'soft networks' to formalised 'hard networks' develops as firms test each other and trust is built. A vibrant cluster may have several such networks. The networks may be competing with each other … co-opetition in practice. The development of these networks is one of the quickest routes to

building social capital, but often a neutral corner, the cluster manager, is required to break the ice and initiate such arrangements.

Differentiation elements	Soft business networks	Hard business networks
Focus	Informal collaboration on generic issues, e.g. training, co-purchasing of commodities. Reducing costs, sharing non-critical resources.	Formal cooperation with a commercial objective. Enabling participating firms to focus on core competencies.
Membership	Open. E.g.: Industry or cluster association. A special interest group. A hot spot within a cluster. A private group, informally sharing resources, co-purchasing.	By invitation only. A closed network. E.g.: consortium for large orders; joint investment; common export brand. *12 Ethiopian leather producers developing a branded range for export.*
Legal arrangement	Informal, possibly a MOU. If formalised, a not-for-profit structure. IP property of each business.	Contractual arrangement, e.g. a joint venture, a consortium. IP may be owned by the entity.
Fundamentals	Common agendas, majority determination. Not necessarily geographically close.	High trust, so socially close and often businesses within a cluster. More substantive bottom-line impact.

Supply chains, hot spots and business networking arrangements are important in enabling firms to co-specialise, a key to lifting firm productivity. In this way firm strategies evolve through an effective clustering process.

The cluster's regular meetings provide opportunities for firms and support organisations to explore collaborative opportunities in an informal setting. The cluster's manager has on-going role as a broker in bringing potential parties together.

UNIDO	*"Networks are alliances of firms that work together towards an economic goal. They can be established between firms within clusters but also exist outside clusters. Networks can be horizontal and vertical."*
USA	*"Established corporations often seek out collaborations with smaller, nimble organizations with fresh ideas to spur innovation within their own ranks. Conversely, start-ups and entrepreneurs look to larger companies to jumpstart their growth and provide hard-won insights."* Arizona Technology Council, 2016
Ireland	*"There has been a notable policy shift in Northern Ireland (NI). This has been away from the 'top-down' cluster based approach promoted in the 1990's towards the creation of business-led collaborations to assist high technology SME's in exploiting new business opportunities. In a recent evaluation of the Invest NI Collaborative Network Programme it was found that collaborative networking activities:* • *Offer the potential to build the capacity and capability of NI businesses;* • *Offer the potential to make a valuable contribution to the regional economy by, for example, enhancing NI's skills-base;* • *Are an important 'building block' in the construction and development of NI's 'Innovation Ecosystem', as they offer the opportunity to build a level of trust amongst NI businesses in which the benefits of collaboration can be clearly identified."* Linda Jamison, Invest Northern Ireland, Belfast

Step 7 Check List: Immediate Development Agenda

- Is there quick mobilisation into action? Is the cluster's modus operandi one of learning-by-doing?
- Is there a portfolio of at least five short-term projects underway? Early projects should offer cost savings or address the immediate problems. These projects should not touch what firms view as their core activity.
- Are the projects being energised with task forces, CATs …. Cluster Action Teams? These CATs are the cluster's operational engines. Do volunteers drive each CAT with a passion for the issue?
- Are the projects providing further insights into the cluster's situation … learning-by-doing?
- Are hot spots within the cluster being identified that merit specific attention?
- And more private arrangements between firms engaging in informal collaboration (soft networks) alongside more formal alliances, joint ventures (hard networks)?
- Are regular mix-and-mingle meetings being arranged?

Danger Signs

- A very narrow development agenda, just 2-3 projects.
- The initiative is bogged down with yet more information gathering, research and paralysis-by-analysis, rather than learning-by-doing.
- Report writing is viewed as an action.
- Many of the cluster's stakeholders are not benefiting from the cluster's projects.
- The cluster's development programme does not move beyond regular meetings, failing to add substantive value to the agendas of individual firms.
- The cluster organisation is leading every Cluster Action Team, is not empowering others and is left with little time to explore new initiatives.
- The participants at mix-and-mingle cluster meetings are reducing to public sector representatives and the cluster's support firms, with core firms not turning up or sending junior substitutes.

CHAPTER 4 STEP 8

FORMALISING

Clustering initiatives are usually kick-started by a public agency, or a private sector organisation.

Over time, the initiative needs to create its own home, often a new organisation.

Formalising the Clustering Initiative

A clustering initiative is frequently sponsored and incubated by a regional economic development agency, with this agency providing the office space and other facilities needed during the cluster's early stages. Alternative sponsors include a Chamber of Commerce, a University / Community College, or a multilateral agency / NGO. The services provided by the initial host organisation usually extend to managing the cluster's financial affairs so that a separate bank account for the clustering initiative (with implications regarding who has the authority to make payments) is rarely needed during the initial steps.

Over time, most clustering initiatives establish their own legal identity and structure. Having a legal structure for a clustering initiative can be necessary for attracting funds from public sector organisations and donors, for handling the ownership of basic assets such as motor vehicles and laptops, for entering into service contracts and for managing risks including any personal liability exposure. With its own structure comes a degree of insulation from short-term political changes. The establishment of a neutral cluster 'home' also brings longer-term stakeholder ownership and commitment, and a neutral implementation mechanism. A purpose -designed organisation will have the flexibility to hire staff from the public and private sectors.

Don't Rush the Formalising

I encourage you to take time in formalising the clustering initiative. SMEs in particular will be seeking pay-offs from the clustering initiative, not lengthy discussion on legal options. Working through the legal details can take valuable energy out of the early stage of a cluster programme, delaying the start of the action agenda. I have seen clustering initiatives stutter and fail when excessive early emphasis was placed on the legal structure

There are strong benefits in having organisational flexibility during the first 6-9 months of a clustering initiative. A practical difficulty with early formalisation is that the Board may need to be finalised prior to fully understanding the nuances of the cluster and its personalities. The boundaries of the cluster (in terms of products/markets served and the geographic scope of the cluster) may evolve as the cluster moves through the earlier steps with implications for Board membership. What could have started as a broad 'engineering cluster' might have narrowed over time to a 'subsea engineering cluster'. Such a clustering initiative will be more focussed if the Board predominantly reflects the narrower definition.

Structural & Legal Options

Each cluster needs to identify the structure that suits its culture, the direction of the cluster at that point in time and the availability of resources. Elements to consider in shaping the institutional home include: the organisation's key strategies; the resources available, both cash and kind (the donation of office space, the secondment of key people, etc.); and the opportunity to co-locate with similar or related organisations, such as complementary institutions for collaboration. The structure that evolves will often be a meso one, between the private and public sectors. It will have a distinct regional focus.

There are broadly two ways of organising: as a membership service model, with the cluster organisation responsible for project delivery, or externally with the cluster organisation acting as the project facilitator. Most cluster organisations are to some extent a hybrid.

Cluster Organisation Models	
Membership Model	**Partnership Model**
Members only	Open, many partners
Focus: The organisation	Focus: The cluster's development projects
Cluster organisation **manages** the projects	Cluster organisation **facilitates**, with external delivery. Considerable opportunities to lever the resources of others.
Strategic Plan, activities limited to the organisation's finite resources.	**Strategic Agenda**, with opportunities to significantly lever a broad forward agenda through partnerships.

Options range between a stand alone, membership based organisation (with annual membership fees contributing to the costs of the organisation) to an economic development agency offering office space and seconding a staff member to act in the long term as the 'Cluster Manager'. Legal structures vary considerably from country to country, determined in part by how the clustering initiative has emerged.

Cluster Organisation, Structural Options	
New, not-for-profit organisation	Establishing a purpose designed, non-governmental, apex organisation. This is the most common structure around the world, often established as a not-for-profit organisation. Legal structures include an incorporated society, a partnership, a trust or an industrial society, according to the laws and practices in the country. Back office functions usefully could be shared with other cluster organisations.
Within a business organisation, university	Establishing under the umbrella of an existing business organisation, an industry association, a chamber of commerce, a local economic development agency, a university or a community college. This may be the initial sponsor of the clustering initiative.
Within a public agency	Establishing within a Ministry (such as Trade, Industry, Regional Development, Economic Development, Science & Technology) or within a regional government / local municipality. With such a public agency structure, care needs to be taken that the initiative is not bureaucratically cramped and confined to the host organisation.
Public-Private Partnership	Establishing as a public/private partnership, such as under a high level National Competitiveness Council. Such structures work well when there is full triple helix participation.
Informal	Continue but in an informal manner, without e.g. a formal cluster organisation.

The legal entity should not engage in trading, or in any way compete with the services provided by the private sector or an industry association. A clustering organisation is in place to fill gaps, not to duplicate existing structures, entities and services. Cluster management should be the sole activity of the organisation.

In order to reduce legal costs, some national organisations have made available generic 'cluster association' legal templates that are then tailored to suit the requirements of individual clusters.

In France each 'pôles de compétitivité' has a permanent support organisation, a cluster secretariat. Larger clusters have up to 20 staff with annual budgets of Euros 3 million. Many of the French clusters have:

- An R&D selection committee, selecting projects according to the strategy of the cluster and the quality of the projects;
- A scientific committee, preparing projects, helping their development;
- A financial committee, ensuring financial support from local and national authorities.

In **Sweden**, each of the nationally supported clusters has their 'process leadership team', typically a team of 2-3 people full time and other staff part-time with an annual budget of around Euros 2-3 million. In contrast, many clustering initiatives in Spain and other countries have annual budgets of Euros 250,000 to 500,000.

Clusterland, **Austria** provides a lead example of a public-private partnership structure for a dedicated cluster development organisation. Clusterland is based in Linz, Upper Austria and supports eight well-established clustering initiatives. Clusterland has an annual budget of Euros 5.5 million with a staffing 38. The organisation is 61% owned by Upper Austria's location and innovation agency, with the balance equally held by the Upper Austria Chamber of Commerce and the Federation of Austrian Industry.

In Austria and other countries, the back office functions for the cluster's organisation, including accounting and web site management, are being cost-effectively handled through a common infrastructure that services a number of clustering initiatives. Back office support includes reception and telephone support, managing invitations for cluster workshops, venues and logistics. This also covers the handling of the cluster's relational database system (see Step 3).

The Cluster Organisation's Physical Location

The cluster organisation's office must be within the cluster's functional region to maintain daily contact with the cluster's stakeholders. There are advantages in being co-located with other cluster organisations and with teams working on specialist aspects of economic development, such as investment attraction, SME development, business and education links. For this reason the cluster association frequently remains housed long term within the region's development agency and, importantly, co-located with other cluster organisations.

Some cluster associations are based at a community college or university (e.g., the Latvian IT cluster is based at Riga University) or a public R&D institute as that organisation's contribution to the clustering initiative. Large businesses within the cluster may offer office space; carefully consider such offers as they can impact on the perceived neutrality of the initiative.

Sweden's Uppsala Bio cluster is located on Uppsala's Science Park, close to the university and main hospital and co-located with the Uppsala Innovation Centre, Connect Uppsala, the Centre for Entrepreneurship and a number of professional services firms, providing a one-stop-shop.

A Public Launch … a Public Celebration

Formalising the clustering initiative provides an opportunity for a public launch. This launch is a celebration of successes (accomplished projects); a public announcement on where the cluster is heading (the preferred future); and the action agenda that has been developed to start moving the cluster towards that goal.

The launch should be a Town Hall type event, open to all with an interest including banks, tertiary institutions, schools, potential investors, political and community leaders, government agencies. Inclusivity, not exclusivity, continues to be the approach. The Board should now be on the front line and presenting, not the cluster manager. A successful launch should:

- Increase public awareness about the regional specialisation, and the clustering initiative;
- Provide the funders of the clustering initiative, in particular politicians, with acknowledgement of their support.

Step 8 Check List: Formalising & Launching

- Take time. Maintain organisational flexibility during the early stages of a clustering initiative, strategy comes before structure.
- Ensure that the organisation is business driven, with a business culture and business timeframe.
- On launching, blow the cluster's trumpet, turn up the volume, raise the cluster's profile and celebrate!

Danger Signs

- The initiative is inward, not outward, looking.
- Senior stakeholders are reducing their personal involvement in the initiative.
- The legal structure is finalised too early in the process, before goals are clear and strategies identified, limiting options.
- The cluster organisation:
  - Is competing with the services provided by other organisations? Or by the private sector?
  - Views itself as an advisory group, not a self-help team;
  - Is beholden to, or over dependant on, one funder.

CHAPTER 4 STEP 9

IN-DEPTH ANALYSIS

A rigorous and externally oriented analysis of the cluster's competitive position is now undertaken, drawing on information from beyond the cluster's stakeholders.

Benchmarking against relevant clusters provides an opportunity for systematic comparisons and often provides data shocks to galvanise action.

In-Depth Analysis, and External Perspective

The focus at Step 3 for the initial appraisal was **inward** looking. Now a more rigorous **external** perspective is prepared, a fact-based appraisal of the cluster's competitive position that in draws on information from beyond the cluster and the cluster's participants. At times there can be a collective myopia with the participants having a limited, or even incorrect, view on their competitive situation, on emerging technologies and on evolving markets. Evidence from beyond the cluster may be needed to break a lock-in effect.

This more comprehensive review draws on the learning accumulated from the Initial Appraisal (Step 3) and through the projects undertaken to date … e.g. projects relating to export development or training needs will have given insights on longer-term agendas. As trust has developed with more teamwork and open dialogue, the more fundamental issues facing the cluster should be surfacing.

Cluster Benchmarking … Opening Eyes

There is useful learning and team mobilisation when a group visit is made to a related cluster and the participants return home with a ***data shock*** that galvanises local action. A team of forty from Norway's Mountain Tourism cluster visited the Banff, Canada ski resort. A year later, seventy Norwegians visited Queenstown, New Zealand's 'Adventure Capital'. Businesses return home from such visits with new ideas, new customers, new suppliers, new technology and new opportunities to collaborate in third markets. Importantly, travellers also return home with a greater understanding of each other and more trust.

Benchmarking, or less formally, bench learning, a cluster against higher performing clusters is a key approach in improving the understanding of the cluster's competitive position. Benchmarking also provides a valuable means of galvanising activity towards a higher-level agenda when it provides data shocks to the cluster's stakeholders.

A group visit to another cluster provides a key learning opportunity and helps build the home team. If possible, a series of visits are undertaken as benchmarking is an on-going learning process, comparing activities and performance. The benchmark location needs to be carefully chosen; comparing an embryonic film cluster against Hollywood may offer only limited learning. The smaller Wellington, New Zealand or Vancouver, Canada film clusters could offer more relevant experience.

Benchmarking can also be considered as a mechanism to develop a deep two way understanding with a related cluster, with two-way benchmarking visits being undertaken by teams to understand the underlying processes that deliver different performances. Such two to three day visits, with a combination of data exchanges and storytelling, support B2B links and A2A, academic links. Benchmarking with clusters located in neighbouring countries with similar cultures is more productive than with a cluster in a totally different environment.

Cluster benchmarking can be broad or specific, evaluating the cluster as a system against other clusters or examining specific aspects within the cluster. The initial appraisal and the subsequent cluster workshops and the CAT/task force engagements are likely to have pinpointed some aspects of the cluster's activity that merit a closer inspection. Benchmarking can also be usefully undertaken with clusters in a different value chain where that cluster has developed superior performance.

Identifying Benchmark Candidates

Information to start identifying benchmarking candidates may be held by individuals within the cluster with international experience:

- Are some of the core and support firms already selling to, or sourcing from, related clusters?
- Have multinational suppliers within the cluster (such as machinery, packaging, raw material suppliers) a good understanding of similar locations around the world? These insights may be held in their head offices.
- Do academics have awareness of knowledge centres around the world? Are they in touch with their peers at other universities and research centres?
- Have migrants to the community come from similar clusters?

A number of online sources can also help in identifying benchmark candidates, covering Europe, the USA, Canada, India and other countries. These were introduced in Step 2 (Cluster Identification).

A Benchmarking Check List

A benchmarking approach is for the visiting group to divide into small teams with each team having a specific focus. Most of the benchmarking topics that are identified below are by their nature qualitative rather than quantitative:

A Benchmarking Checklist
Tertiary education competencies and specialisations; university / publicly funded research; technology transfer mechanisms.
Education, workforce training in place; secondary school involvement.
Availability of mentors, angels, seed funding, venture capital.
Export performance, internationalisation, investment and migrant attraction.
Entrepreneurship, spin-offs, SME development, mentors.
Cluster's culture: the balance between business rivalry and collaboration, 'co-opetition'; the approach to improving connections within the cluster; the development of business networks, firm-to-firm links, export consortia.
Collaborative market research, market development; development of the cluster's identity, brand.
Benchmarking the hard statistics; identifying past and current performance: number of firms, their concentration, ownership, employees, wages, exports, R&D, value added per employee … changes over time.
Transport, logistics infrastructure.
Science parks, incubation facilities; in some countries the establishment of export processing and special economic zones, free trade zones.
Tax and regulatory environment.
Responsiveness and support from public agencies for the cluster's infrastructure and cluster projects; national, regional and local government
Organisational and governance structure for the cluster; clustering process activity; sources of finance for the clustering initiative; attendance at meetings over time; number of collaborative projects.
How did the cluster succeed in developing collaborative projects? And what are they doing together?
Links with related clusters in other countries; the development and value of sister city type relationships as a framework to support cluster-to-cluster links.
Quality of life: region's ability to attract and retain professional talent; quality of local schooling.
What is smart about the cluster, and the clustering initiative?

Benchmarking examples:

- The Humber, **UK** fresh seafood cluster has benchmarked its special logistics against Holland's cut flower cluster.
- **South Africa's** Sunshine Coast tourism cluster made a bench-learning visit to Australia's more developed Sunshine Coast.
- Teams of 40+ people from **Norway's** Mountain Tourism cluster have visited similar tourism clusters in Banff, Canada and Queenstown, New Zealand.

Porter's Analytic Frameworks

Prof. Michael E. Porter[31] provides three valuable frameworks that support and give structure to the cluster analysis process.

1. **The Diamond:** Porter identifies four broad factors that are key aspects in understanding a cluster's competitive situation: the context for firm strategy and the nature of rivalry (does this create pressures to innovate?); the sophistication of local demand; the availability within the region of related and supporting industries; and specialised factor (input) conditions. Two other aspects are the role of government in influencing supply/ demand conditions & firm competition, and discontinuities due to chance.
2. **The Five Forces:** a framework to identify the competitive intensity of a cluster, offering more rigour than a conventional SWOT analysis, covering: the threat of new market entrants (including buyer switching costs); the bargaining power of buyers; the bargaining power of suppliers; the threat of substitute products/services including technology changes; and the nature of rivalry amongst existing competitors.
3. **Value Chain analysis:** understanding how value and competitive advantage is created. The primary activities linked in a firm's value chain are likely to include inbound logistics, production, outbound logistics, marketing & sales and services. Support activities can include administrative systems, management, human resource management, technology / R&D and purchasing.

Comparison, Diamond and Five Forces Models		
COMPLEMENTARITIES	**Five Forces**	**Diamond**
Time frame	Medium (Business cycle)	Long term (10 + years)
Level of analysis	Industry	Nation and cluster
Primary use	Develop business policy / strategy; Industry attractiveness	Develop public policy National attractiveness
Implication for use	Profit potential	Competitiveness & Innovativeness
Geographical scope	Industry boundaries range from local to global	Local/regional focus
Location of firms	Plays no role	Proximity to other cluster actors critical
Main drivers	Static competition	Dynamic competition and collaboration
Type of model	Largely deterministic but room for voluntarism … change industry structure	Largely deterministic but room for voluntarism … change cluster dynamics
CONTRADICTIONS		
Rivalry	Weak is advantageous	Strong is advantageous
Value chain actors	Weak buyers and suppliers are advantageous	Strong and sophisticated buyers and suppliers are advantageous
Value chain dynamics	Compete for largest share of the pie	Collaborate to enlarge the pie

Source: Professor Örjan Sölvell, On Strategy & Competitiveness, 2016

Foresight Process

A valuable technique at this stage is using a foresight process. This process has several distinct phases, leading from the initial gathering of information through to the production of outputs intended as input into the more familiar activities of strategy development and strategic planning[32]. Foresight methods include Delphi interactive discussion panels; expert panels; brainstorming; technology mapping and scenario analysis workshops. All serve to boost interaction amongst the cluster's stakeholders and to generate mobilisation momentum.

[31]For Prof. Porter's comprehensive writings at the Institute for Strategy and Competitiveness, Harvard, see http://www.isc.hbs.edu/

[32]For a practical introduction to forsight processes, see 'A generic foresight process framework', Joseph Voros, Australian Foresight Institute, www.swin.edu.au

One of the first Norwegian clusters to initiate a foresight process was the Offshore and Drilling Engineering cluster (NCE NODE www.ncenode.no). This cluster has 50 companies with a combined turnover of Euros 5 billion. *'NODE Foresight is the single most important project that has had the greatest significance for the cluster's development.'* The foresight process started in 2006. Companies, the university, the regional development agency and regional government engage annually. *'No one is an expert on the future; there is a need for a flexible strategy; strategy and planning must be a collective dynamic effort with input from a variety of actors with different perspectives'*

PEST Analysis

PEST analysis stands for '**P**olitical, **E**conomic, **S**ocial and **T**echnological analysis' and describes a framework of macro-environmental factors used in environmental scanning. The concept can be extended to include **E**nvironmental factors and **L**egal. PEST provides a framework for the cluster's external analysis, understanding the cluster's growth/decline; it's position, potential and direction. The significance the following factors will differ from cluster to cluster:

- **Political** factors include tax policy, labour law, environmental law, trade restrictions, tariffs and political stability. It may be appropriate to also consider government influence on health, education and physical infrastructure.
- **Economic** factors include economic growth, interest rates, exchange rates and the inflation rate.
- **Social** factors include cultural aspects, health consciousness, population growth rate, age distribution, career attitudes and emphasis on safety.
- **Technological** factors include R&D activity, automation, technology incentives and the rate of technological change. They can influence outsourcing decisions.
- **Environmental** factors include ecological and environmental aspects: weather, and climate change, which may especially affect tourism and agricultural clusters.
- **Legal** factors include discrimination law, consumer law, antitrust law and health and safety law.

GAP Analysis

Gap analysis is a tool that helps a cluster to compare its actual performance with its potential performance. At the core of a gap analysis approach are two questions:

- **'Where are we?'** What is the cluster's current situation, the 'NOW'
- **'Where do we want to be?'** 'What's the Preferred Future?'

A gap analysis provides insights into aspects that could be improved in upgrading the cluster's performance, in moving from the 'NOW' to the Preferred Future. Benchmarking specific aspects of a cluster's performance against relevant clusters can provide valuable input to this analysis.

Social Network Analysis

SNA is a relatively new tool for looking at complex systems. It has been used mainly within academic studies but increasingly it is being used as a way of understanding the structures of communities and governance networks. SNA maps and measures relationships and flows amongst a cluster's stakeholders. The software can provide a valuable visual on these relationships, highlighting the well connected within a cluster along with the outsiders on the periphery, identifying the hot spots as well as possible weak spots within the cluster. As SNA is resource intensive it is more appropriate for use at this Step than Step 3.

Integrating the Strategic Insights

By this Step in the cluster development process, possibly 12 -18 months into the journey, three routes will have been taken to strategically understand the cluster:

1. The initial appraisal, the inward looking analysis in Step 3, that identified immediate pressure points and opportunities for engagement.
2. The learning-by-doing, the on-going learning through engaging on specific projects through the Cluster Action Teams. Many of the activities should by now have moved on from 'low hanging fruit' initiatives (the quick and easy) into more substantive and longer-term agendas.
3. The externally focussed analysis in this Step, through the benchmarking, Porter's frameworks and other analytic tools.

This is now an opportune time for the cluster manager to integrate these insights into a presentation to a cluster-wide workshop, reviewing the learning and the activities to date. In the next Step, 'A Cluster's Development Agenda', many of the development activities that I have come across around the world are identified. The Step concludes with the cluster's first comprehensive strategic document, the Strategic Agenda.

Step 9 Check List, In-depth Analysis

- Is the cluster's competence clear, relative to competitors? Is there evidence that the cluster, over time, has become more specialised? Evidence that the cluster's firms are profitably serving even more distant customers?
- Has the cluster undertaken benchmarking/bench learning against related clusters? Have data shocks help galvanise the home team into action?

Danger Signs

- Further analysis is primarily viewed as report writing 'for others', not as an input into setting the cluster's forward agenda.
- Analysis is led by outside consultants, not the cluster management team.

CHAPTER 4 STEP 10

LONG TERM, STRATEGIC AGENDA

Early success with short-term initiatives creates the momentum for the more substantive issues in lifting the cluster's competitiveness.

By this Step, there should be well-informed insights into the cluster's competitive position, a more open culture and an appetite to address the critical issues. The full Board should now be in place.

There is no single silver bullet in developing any cluster, but high amongst the initiatives should be internationalisation.

Cluster Organisation's Activities

What does a clustering organisation actually do?[33] Within 18-24 months of the start of a clustering initiative, activity on a broad range of fronts should be underway that address the substantive and pressing competitiveness issues facing the cluster. Success with 'low handing fruit' initiatives should have built the momentum to now address key strategic issues. Wherever practical, project teams (the Cluster Action Teams) are built around these activities.

The main tasks can be divided into three areas:

Cluster Organisation in Action	
1. Cluster Attractiveness	Connecting the cluster's stakeholders, removing isolation, providing multiple opportunities for informal discussions, side conversations. Networking events. Building a collaborative culture. Facilitating links, acting as a bridge builder, enriching interaction. Community engagement. Promoting the cluster within the region and globally. Information and communications, web site. Media contact, visiting journalists. Communications with organisation's funders, support agencies and politicians. Cluster's brand. Talent attraction. Investment attraction. Linking to other clusters. Cluster strategy. Annual general meeting.
2. Capability Development	Innovation, R&D New products, new processes, new technologies SME development. Physical infrastructure, incubators, Training, skills. School links Logistics. Venture capital, seed funding.
3. Business Development	Internationalisation: export development, trade fairs, trade missions, symposiums. Business networks - hard & soft cooperation. Consortia. Co-opetition culture: co-purchasing, co-production, co-development.

Agendas across clusters differ. R&D intensive clusters, such as biotech and new materials, are more research intensive; tourism clusters place more emphasis on promotion. The examples on cluster development agendas that follow are drawn from many different clusters on six continents, covering both developed and developing economies, covering embryonic and mature clusters and a wide range of sectors. Some examples are included under more than one heading.

Building Social Capital, Trust, Connections

A key to the development of innovative clusters is building the personal connections and relationships, opening up communications. Building the social capital, the trust and tacit information flows amongst the cluster's stakeholders is no east task. It takes time to increase the interactions and to develop the formal as well as the (even more important) informal conversations. People need to relate to each other as individuals, and as representatives of their organisations. Removing the *clumps* and the *clutter* that impede the development of many clusters is no easy feat.

Examples: Building the Social Connections	
One-on-one contact building	Frequent meetings by the cluster organisation with the cluster's stakeholders. With this detailed knowledge, identifying common agendas, collaborative opportunities and projects. Identifying leaders for Cluster Action Teams.

[33] Drawing on (1) 'Building the Cluster Commons', Prof. Örjan Sölvell & Mats Williams; (2) the experience of Nigel Gwynne-Evans, Cape Town; and (3) 'Management of clustering initiatives, five areas of activities' prepared by CLOE - Clusters Linked over Europe, an alliance of clusters led by Karlsruhe (Germany) with Linz (Austria), Lyon (France), Tartu (Estonia), Värmland (Sweden), Timisoara (Romania), Kaliningrad (Russia) and Nottingham (UK).

Regular meeting events	Networking mix-and-mingle meetings to facilitate informal conversations, e.g. regular 1st Tuesday meetings. Exchanges at different locations. Market and technical seminars. Speed collaboration workshops - a variation on speed dating.
Regular communications	Regular updates to the cluster's stakeholders. Monthly newsletters. Active social media: Facebook, YouTube, Twitter and LinkedIn. Linking social media to the cluster's web site and blogs. Regular contact, regional, national & international trade media.
Easier connections	Online cluster database, making it easier to find '*Who is who?*' Database with public and private (members only) sections. An annual directory. Standardised contracts to reduce transaction costs.
More focussed connections	Development of hot-spots, sub-groups, special interest groups especially within a large cluster, e.g. with a production, an IT, a technology, a training or a target export market focus. CEO Roundtable. Women's network. Exporter's network.
Physical infrastructure	Cluster-focussed incubator, common user facilities. A cluster club (a cluster hub) as the regular social and learning meeting place for the cluster.
Building firm collaboration	Private collaboration amongst firms in non-threatening areas. Linking anchor firms to local SMEs, supply chain development. Participation in the Cluster Action Teams.
Joint learning activities	Team study visits to trade fairs. Missions to priority markets, related clusters; cluster benchmarking visits. Cluster specific training courses, e.g. on lean manufacturing, export development, finance.
Business – university networking	Building bridges between universities and research organisations and business. University open days.
Wider community engagement	Award evenings that celebrate firm successes and the local stars. Involvement of local politicians in cluster events. Cluster fairs. An annual 'Cluster Day' with community wide participation … Denmark's Robotics cluster attracts 15,000 people over three days to their annual Robotics Festival.
Regular Celebrations!	Successes within the cluster are identified and celebrated. Success stories are actively sought out and in these stories the cluster's members are placed on a pedestal, including politicians and the cluster's funders, rather than the cluster organisation itself. Hosting of an annual cluster summit, looking back at successes and forward to the next phase in lifting the cluster's competitiveness.

Internationalisation

Internationalisation should be at the centre of the cluster development approach, not a *'we will get to it later'* strategy. Does the cluster go global … or choose to die local?

While the mantra for clustering initiatives is '*Be Local – Go Global',* in reality internationalisation fails to have urgency for many clusters. A lack of resources, a lack of awareness and a lack of confidence all hinder action. For many clustering initiatives this is a serious impediment as SMEs operating independently have difficulty in meeting the up-front costs in reaching international markets. Relative to larger firms, SMEs find it more difficult to attract internationally experienced staff, to acquire information on international markets and to persevere in developing

new markets. Collaborative engagement helps in addressing these deficits.

Most clusters have underutilised capacity. Market development, usually with an export focus, is therefore an early priority. But 'Internationalisation' and 'Going Global' imply a wide range of activity, more than simply exporting. An integrated agenda needs to be developed encompassing inward and outward investment, migrant, talent and student attraction; outward investment; accessing knowledge and developing academic links with other centres globally; building on diaspora connections and levering sister city relationships. Raising the cluster's international profile and developing the cluster's brand, strengthening awareness of the cluster as a commercial and academic magnet, underpins this range of activities.

From a public agency perspective, support for internationalisation can be effectively (and efficiently) focused through cluster organisations. Internationalisation is a key motivator for many businesses to engage with a clustering initiative.

Some clustering initiatives unwisely exclude participation by foreign owned firms with activities within the cluster's functional region. Clustering initiatives strongly benefit by being open to all local firms, whatever their ownership or size. There should not be any form of apartheid.

Europe's TACTICS Taskforce has developed a 10-step framework for cluster internationalisation, supporting clusters in their journey from being *'inward looking and local'* to being *'outward facing and global'* clusters[34].

Examples: Building Global Bridges	
Export market development	Research into international markets; diligently identifying priority markets so firms can tightly focus their international activities; gathering intelligence on markets, distribution channels. Supporting SMEs with access to new, sophisticated markets. Training in export marketing, export finance, export documentation. Mechanisms to check on rejected enquiries and to black list non-payer buyers. Sharing marketing consultants to explore new opportunities.
Integrated strategies for priority markets	Building demand for a cluster's products/services. Carefully identifying priority markets and developing integrated strategies to engage; trade fair study visits followed by participation at the trade fairs, exhibitions; identifying new customers, new distribution channels; inward and outward trade missions; inward 'Meet the Buyer' events, providing an opportunity for one-on-one meetings with overseas buyers; visits by international technical experts; inward journalist visits; visits to related clusters; marketing materials and web sites in appropriate languages; advertising; supplier catalogues; portals for joint marketing; e-commerce web site. PR activities, e.g. preparing articles for the trade/professional press; inward visits by journalists. Facilitating academic exchanges, school exchanges, visits by local political leaders to the market. Sister city relationships centred on linking clusters. Providing regular market updates.
Foreign Direct Investment	Inward investor visits; attracting quality investment that add to the cluster's competencies, much more than branch plants; infilling the cluster's weak points; targeted business recruitment to fill gaps in the local supply chain. Attracting a major competitor to an existing anchor firm may well cause short-term consternation - but in the longer term is beneficial to both the cluster and the incumbent firms, providing further encouragement to support firms and organisations such as training institutions to extend their offerings. Providing a 'welcome service' for newcomers to the region.
International talent attraction	Skilled migrant attraction. International students. Recruiting talent globally that bring connections to key markets.

[34] http://www.eca-tactics.eu/page/tactics-final-reports

Cluster-to-Cluster Links	At the core of many cluster programmes, including France's pôles de compétitivité programme; Exchanges with relevant international clusters. Proactively developing cluster-to-cluster links, B2B connections Linking value chains. Benchmarking visits, generating data shocks to galvanise mobilisation. Sister cities, twinning. (see Chapter next chapter, Linking Cluster)
Beyond exporting	Assisting firms with licencing foreign companies, forming joint ventures, establishing off shore production facilities and joint R&D activities.
Development of internal alliances	Facilitating critical mass for firms to develop distant markets; export consortia; business networks; SMEs piggybacking on larger firms for export business; cross selling. Development of marketing packages that combine products from a number of firms.
Hosting conferences, technical symposiums	Positioning the cluster as a Go-To knowledge centre; increasing international visibility. Providing firms and academic institutions with the opportunity to demonstrate their capabilities to international audiences.
Establishing academic links	Developing academic and research links with international knowledge centres that are relevant to the cluster; proactively identifying the key universities, R&D centres globally; attracting new technologies and processes that extend the local knowledge
Diaspora links	Clusters benefit through linking with diaspora communities and these can be on a global scale, ethnic networks are very effective for the transmission of tacit knowledge across distances. Building on family, ethnic, cultural and linguistic ties around the world. • Bangalore, India - well established IT connections with Silicon Valley. • The extensive Taiwanese diaspora in Silicon Valley have leveraged alumni networks to develop the Taipei-Hsinchu semi-conductor cluster. • US venture capital has played a significant role in the development of IT firms around Tel Aviv, Israel building in part on diaspora links.
Local awareness raising	Highlighting local firms with export success stories. Export business plan competitions. Seminars around senior visiting buyers and profiling them in the local media. Outward visits by journalists.

Europe	*"Strong cluster organisations can help reduce the uncertainty in a distant and unfamiliar market"* Handbook of Recommendations for Internationalisation and Best Practices, 2013. BioXcluster Partners: Biocat, Catalonia (Spain), BioM, Bavaria (Germany), bioPmed, Piemonte region (Italy), Lyonbiopole & Rhône-Alpes region (France).
Central Europe	*"Clusters can play an important role in supporting internationalization activities of SME. They are well connected to all regional/national experts for starting internationalization efforts, can identify possible partners, provide contacts to other foreign cluster initiatives and can therefore provide the required target market information."* CluStrat
UK	*"Competitive and successful clusters are absolutely embedded within – and committed to – particular places. Simultaneously, however, their 'DNA' is defined around networks and relationships that are anything but local or parochial."* SQW, Accelerating Local Economic Growth – Clusters and Deals, 2014

Training, Skills Development

Skills shortage is the main growth impediment for many clusters. The provision of vocational and technical training can be the key element in lifting a cluster's productivity. Most clusters have a range of training programmes underway, some very short term, others at the post-graduate level.

Germany's World Class Cluster review identifies that leading clusters have a good track record in seeking the knowledge providers that meet the direct demands of business, i.e. the ones with the most appropriate potentials for relevant knowledge delivery. These providers are not necessarily the region's most prestigious institutions.

Cluster organisations primarily act as intermediaries, linking the cluster's needs with specific providers rather than organising and conducting the actual educational programmes themselves. Cluster organisations should not be competing with education and skills providers. The primary role is coordination - not delivery. Cluster managers are frequently working with a range of providers … high schools, technical training institutes, higher education establishments and R&D institutes, facilitating collaboration between businesses (the customers) and the providers.

Examples: Bridging the Skills Deficit	
Working with local schools	Developing close business-school partnerships. Proactive in reaching out to the local high school students. Establishing practical projects to engage students with the cluster's firms. Organising open days with local firms that introduce school leavers to the core and support firms. Promoting the cluster's technology to young people. Creatively marketing the cluster as a premium career option for school leavers. Dynamic web sites that attract attention. Arranging school competitions, such as design competitions, with high profile judges.
Joint learning opportunities	Training workshops and seminars bringing companies together around specific issues and opportunities. Employee study trips. Technical workshops at different business premises. CEO & Management learning circles. Cross-company learning circles. Expert round tables on markets, technology, finance. Speed dating meetings (five minutes per table to identify like-minded people for more detailed discussions later). Internships. Developing young leaders. Meaningful volunteering.
Linking training providers and students	Flexible sandwich courses so students gain practical experience with local firms whilst studying and giving participating firms the opportunity to identify possible recruits. Supporting graduates in finding local employment. Alerting the cluster's stakeholders to new training opportunities. Development of specific training programmes by existing providers. Input to technical training programmes, co-designing. Matching students with the cluster's businesses for specific projects. Vacation projects, especially for international students.
Student Attraction	Attracting the next generation of talent for technical training courses in the region, undergraduate and post graduate courses; attracting specialised students from across the country and across the world; assisting those students with vacation projects & employment opportunities; and finally assisting them with permanent relocation, immigration formalities and new business start-ups. Supporting internship programmes, vocational training, summer schools; promoting career opportunities with the cluster's stakeholders. Development of specialized (long term) university and (shorter term) vocational training. Short-term courses designed in partnership with the core and support firms; offered at times to suit the trainees; provided in the home language of immigrants.

Talent Attraction	Migrant attraction Participation at international Employment Expos and offering multiple career options to preferred candidates. Targeted immigration and helping immigrants reach their potential (after care); partner resettlement support.
Broadening the recruitment base	Gender and diversity initiatives; encouraging school leavers to widen their options. Broadening the recruitment base; participation in recruitment fairs, talent attraction to the region; attracting international students. Job vacancy alerts; Supporting the redistribution of staff from companies loosing contracts.
Short courses	Flexible, intensive training, e.g. efficiency improvements; lean manufacturing; emerging technologies and processes; business innovation; export marketing; creating a web site; selling a business; raising external capital.
Audits	Analysis of current and future skill needs.
Specialised cluster-training centre	A centre attached to an incubator, a technology park, or a university … and ideally co-located with all three.
Supporting entrepreneurship	A mentor team offering one-on-one business advice. Angel support for high growth businesses.
General education	A quality educational infrastructure in the community that attract professionals and their families, from kindergarten through to high schools.

Cape Town, South Africa Fashion Cluster

The cluster has offered skills development and information sharing workshops on:

- Learning how to cost garments accurately;
- Establishing the building blocks for business branding;
- How to put presentations together when selling a range to a large retailer;
- Establishing the correct use of interlining on various garments; and
- How to correctly select the right fabric for end-use suitability.

Technology

Technology provides the base for changes in products, processes and markets. Any innovative cluster with a global reach will be 'high tech' relative to its competitors in its field. A cluster's technology needs are likely to require inputs from a number of providers, not all of whom are necessarily within the cluster's functional region.

Examples: Lifting Technology Capabilities	
Building innovation teamwork	Needs-driven signals from business to technology providers; technology mapping, forecasting technology trends and relating to market needs. Pre-competitive technology platforms supporting a number of firms; setting technology standards; product and process development, projects between firms and universities; commercialisation of university research. Exploring new technologies by undertaking joint visits to other clusters and/or fairs; arranging a technology exhibition for technology sellers.
Technology scouting, attraction	Seeking relevant technology for the cluster's firms from wherever it may be in the world; the development of research networks that reach beyond the region Developing university-to-university links; attracting to the cluster a world-class academic and team; attracting major R & D corporate facilities.

Technology transfer	Establishing technology transfer centres (hubs) to develop and test new technologies; technology observatory; diffusion of technology through seminars, workshops. Developing shared physical facilities such as test and prototype development centres that firms cannot justify on their own. Identifying within universities/public R&D facilities the individuals with a passion to engage with local firms.
SME technology focus	Technology aid schemes; subsidised product development. Enabling access by SMEs to new technology. Technology demonstrations. Linking local firms to local knowledge centres. Joint projects between SMEs and technology transfer centres. Promotion of new technology areas.
Specialised physical infrastructure	Dedicated Science / Technology Parks that are cluster specific and support FDI attraction. Specialised business incubators in close proximity to a technology transfer centre. Establishment of common user facilities, e.g. joint testing facilities, test beds.
Regional government as a demanding buyer	Local procurement, regional government as a demanding customer; becoming the local early adaptors for new products and processes.
Acquiring resources	Funding for applied (needs driven) research; technology transfer; specialised research facilities; linking firms, research institutes, and collaborative R&D projects to support commercialisation.

SME Growth

New firm formation is a vital sign of a healthy cluster. A vibrant cluster provides an enabling environment for new business start-ups. SMEs thrive alongside large companies, with many SME's accessing international markets through the larger firms. I have yet to visit a cluster that is not proactive in engaging with SMEs.

Examples: Accelerating SME Growth	
Removing SME isolation	Facilitating integration through supply chain links with the region's larger firms. Facilitating export partnerships between SMEs & established exporters. Involvement of SMEs in Cluster Action Teams so they can informally mix and mingle with others. Development of soft (informal) and hard (formal) business networks between SMEs, with the cluster manager acting as a bridge builder. Cluster focused (i.e. specialised) incubators. Learning circles for start-up CEOs to share experiences.
Building an entrepreneurial culture	Supporting young pre-revenue companies (and even earlier, projects) that are moving from the 'idea' stage to a growth stage. Establishment of 'New Business Associations' for young entrepreneurs. Encouraging start-ups and spin-offs from anchor firms and academic institutions. Annual awards and business competitions for young companies that celebrate success. Increasing the media profile of SMEs.
Facilitating specialised services	Encouraging the development of specialised support firms, e.g. payroll management; accounting; recruitment; legal services; IP; export development; design consultants.
Business mentoring	Virtual incubator support. Tailored technical advice, mentoring and expert research. Connections to support such as IP lawyers, angel finance and to related SMEs. Bespoke training courses and mentoring for start-ups. Business start-up support to graduates.

Developing the Cluster's Brand

A strong brand supports a location as the 'place-to-be' and the 'place-to-go' for a particular activity. Silicon Valley and Hollywood are globally recognised place names and brands. Strong regional identities support whiskey distilleries in Scotland and Tennessee, the champagne producers in France. The 'La Glass Vallée' brand, from Bresle, France, reinforces the cluster that produces 70% of the world's perfume bottles. Seed Valley, North Holland is one of the preeminent seed clusters globally. As with consumer brands, often only one or two premium brands (or premium locations) fully capture mind share. Impressions once formed are not that easy to change.

Branding is positioning the cluster in a specialised, unique and differentiated way, not as yet another 'Silicon Somewhere'. Developing brands that aspire to global visibility requires professional input … it is much more than selecting a logo through a public competition. Establishing the brand is simply the first phase. Structures and funding are required to develop and maintain the tools and means for effective communication of the brand. Firms should be licensed to have the right to use a cluster brand for their own promotion; if necessary this licence can subsequently be withdrawn.

Brand development for a cluster has two dimensions:

1. External: Positioning the cluster as the **go-to place** for its particular activity, lifting market recognition to attract customers, investors, talent, students and interest from other knowledge centres and from national agencies.
2. Internal: Positioning the cluster as the **place-to-be** provides the social glue that rallies firms and support organisations around the cluster's activities and strategy. A strong brand enhances the cluster's image, attracting local actors to the initiative, broadening community interest from school leavers to political leaders and local bankers. It builds local pride.

Examples: Promoting the Cluster's Brand
Establishing message consistency. A cluster web site; pages in the languages of key markets. Actively using the social media: Twitter, Facebook and LinkedIn. Advertising in trade journals. Participating at trade fairs with a cluster stand. Hosting prestigious international events that are the global meeting place. Trade fairs, technical symposiums, conferences and congresses that promote the cluster as a centre of excellence and a must-visit location. Inward visits from and outward visits to related clusters and to customers. Regular release of media articles and success stories directed at the international media. Cluster presentations to international VIPs; inward media tours; itinerary management for VIP visitors. Appointing 'Cluster Ambassadors' to represent the cluster internationally. Building local awareness of the cluster through holding open days at local firms, universities and incubators; sponsoring local competitions.

Europe	*"Clusters will stick out and be recognized for their uniqueness, they will be able to attract external interest and resources such as skilled people and capital, and to mobilise local actors and potential members around a common vision and strategy."* Cluster Marketing & Branding Handbook, TACTICS, Transnational Alliance of Clusters Towards Improved Cooperation Support, 2013
New Zealand	*"Business is about ethics, aesthetics and functionality. Brands which capture these points of difference, should deliver a special experience through unique design, supportive cultures and an infectious and honest story you have never heard before."* Brian Richards, brand strategist

Cost Reduction

An early focus for many clustering initiatives is cost reduction. Efficiencies can be gained e.g. through collaborative purchasing that is open to the whole cluster, or to sub-groups collaborating more privately.

Examples: Reducing Costs	
Joint purchasing	Bulk purchasing of commodity items e.g. raw materials, packaging, insurance, utilities, transport logistics. Firms sharing consultancy costs: plant layouts, energy audits … Firms drawing on each other's emergency supplies, enabling inventory reductions.
Co-specialisation	Facilitating co-specialisation, out-sourcing, sub-contracting within the cluster, enabling firms to focus on their core competencies. Establishing a network of 'preferred' professional support firms such as for tax and IP advice.
Standardised contracts	Reducing negotiation time and costs.
Common facilities	Establishment of common facilities: effluent treatment & disposal; R&D & testing laboratory; common design facility, common storage facilities. Common provision of high cost equipment.
Staff sharing	Drawing on each other's staff when needed, giving participating businesses staffing flexibility.

Business Finance

The availability and cost of debt & equity finance is a common growth constraint facing many clusters.

Examples: Addressing Business Finance	
Improving availability, debt & equity funds	Development of micro finance. Development of seed capital, venture capital. Developing the regional business angel network, the informal venture capital market. Connecting with distant venture capital suppliers.
Developing financial engineering skills	Up skilling company owners so they are better informed when dealing with finance providers; familiarisation with different forms of financing. Developing financial advisory specialists within the community. Preparing high growth firms for external equity and linking them to local sources, including high net worth individuals.
Improving cash flow	Information clearing house on slow/non paying customers. Customers providing order security to banks. Establishing specialised warehouses offering bankable deposit receipts for high value products in storage, e.g. bonded warehouse for Parmesan cheese in Parma (Italy); alcoholic beverages in bond; imported steel supplies in the Sialkot (Pakistan) surgical instrument cluster.
Reducing cost of finance	Sensitisation of bankers. Reducing the risk premium. Informing finance providers on the cluster's development issues, so the market/ technology risks are better understood. Especially for knowledge intensive firms with limited physical assets.
Developing specialised financial instruments	Specialised investment funds providing co-financing on market terms. Setting up mutual credit guarantee (MCG) schemes. Exploring financial products through experts/ experiences from other countries.

Physical Infrastructure

Upgrading a cluster's physical infrastructure often attracts early political attention and can be one of the easiest aspect to address. Physical proximity is a major factor in the movement of tacit information.

Examples: Upgrading Physical Infrastructure	
Dedicated industry/ technology parks & incubators	Specialised real estate developments with common user facilities. Specialised incubator attached to a local university/public R&D facility/service centre. Flexible accommodation options for start-ups.
One-stop-shop cluster service centre	Hub providing e.g. technical and management training; technology transfer; export information; testing and prototype facilities; a focal point for cluster meetings. Locating such a hub on a specialised industry park, with an incubator.
Technical infrastructure	Specialised transport logistics, road, rail, air; inter modal facilities; airport access and connections. Bandwidth 24/7; water supply; waste disposal.
Land use policies	Move-on sites and premises for growth firms and potential investors.
Attracting, retaining talent	Developing a physical environment that enables the community to attract and retain talent and their families. Quality of urban design; vibrant public spaces, sports facilities, public transport facilities.

South Africa	An early issue for Cape Town's IT cluster was SME access to bandwidth 24/7. Response: the Bandwidth Barn incubator.
Italy	Many of the northern Italy clusters have a substantial one-stop-shops in place, offering a range of support including market trends, export information, new machinery and technology support.
Canada	Newfoundland's ocean engineering cluster is home to the world's largest water testing tanks, a common user facility.
Sweden	Sweden's Packaging Arena cluster acquired a pulp mill that has become 'The Packaging Green House'. This common user facility is extensively used for prototyping and the development of new fibre-based packaging materials.
China	Regional governments in China have been proactive in developing specialised facilities to support high growth clusters. Wenzhou, the 'Chinese Shoe Capital' that manufactures one-eighth of the world's footwear with 300,000 employees: the municipal government has developed an integrated industrial complex that brings together technical training, testing, information services and shoe-related cultural exhibitions. Puyuan's cashmere sweater cluster: the township government has built a 'cashmere sweater marketplace' and a logistics centre with loading docks, warehouses and parking space in partnership with 27 private logistics and transport firms[35].

Policy Influence, Institutional Reforms

A key element in cluster development is moving from a *clutter* of support organisations to alignment centred on the cluster's development priorities. Each agency may well have their own (and as they come from different perspectives, probably differing) understandings of the cluster's development priorities. In many countries the *clutter* of public support includes agencies from three levels of government: local, regional (state/provincial) and national. Building the necessary teamwork amongst this range of agencies may not be easy and is a key role for the cluster organisation. Early formation of the Cluster Ignition Team, bringing together relevant agencies, in part addresses this difficulty.

[35] As quoted in: Zeng, *'Building Engines for Growth and Competitiveness in China',* The World Bank

The cluster's priorities for public investment need to be clearly articulated, with frequent formal and informal interaction between cluster members and public agencies, politicians. The Chairperson and other members of the Board will be needed to use their contacts and influence to cut through the local *clutter*.

Examples: Addressing Policy & Institutional Reforms	
Agency alignment	Integrating separate agencies around the cluster's forward agenda: Economic ministries; Technology support and transfer agencies; Investment attraction agencies; Export/trade development agencies; Agriculture; Rural development; Educational providers, especially tertiary and community colleges; workforce and skills development agencies; Transport agencies; Regulatory agencies. Local, regional, state/provincial governments, city councils.
Donor & NGO alignment	Less developed countries have a bigger challenge: aligning (possibly 100 +) well-meaning multilateral agencies, donors, non-government organisations and charities, each with their own agendas.
Innovative public procurement	Through public purchasing and regulation. Singapore has relied on local software suppliers to develop leading edge e-government solutions. Sweden's regional municipality in Norrköping had the opportunity to be an early lead customer for high tech moisture measurers produced by the local Printed Electronics cluster.
Institutional reforms	The cluster directly influencing the development of relevant public policy and government regulations. E.g. eliminating red tape, regulations and import tariffs that are no longer applicable; standards setting; tax and regulatory reform; financial market reform; competition policy; legal infrastructure, intellectual property laws; negotiating access to export markets; land use planning.

From Strategic Plan to Strategic Agenda

The ingredients should now be in place to prepare the cluster's first comprehensive strategic document. Two levels of analysis will have been completed, the inward looking Initial Analysis (in Step 3) and the more externally focussed In-depth Analysis (as Step 9). The 'low hanging fruit' projects that emerged as the Short-term Tactical Agenda (Step 7) will have provided opportunities to learn-by-doing. These projects could have related to export development, addressing immediate training needs, targeted investment attraction to fill capability gaps, or mentoring small businesses … each will have provided opportunities to better understand the cluster's development issues.

As previously, the priorities should emerge through transparent workshop processes rather than being determined by a small group, the Board or an external consultant. The cluster should at this stage of its development be able to clearly define needs to public agencies so each can more narrowly target their support for the cluster. An increase in funding is not necessarily the required response; the quality of their funding may well be more important than the quantity. The cluster's strategic priorities are likely to influence the priorities of a number of public agencies, for example:

- **R&D Ministry:** Funding the cluster's priority pre-competitive technology needs.
- **Education Ministry:** Better equipping school leavers for careers that relate to the region's wealth creating clusters. This is where the growth in employment will be and where the higher paying jobs will be.
- **Investment Attraction Agency:** Bridging capability gaps in the cluster through targeted investment attraction.
- **Transport Ministry:** Developing a dedicated inter modal transport hub; or within a forestry cluster responding to input on road upgrading priorities.
- **Export Development Agency:** Linking the cluster's firms into global value chains; addressing export market information needs; trade fair support; inwards and outwards missions; developing cluster-to-cluster links.

What emerges from these deliberations can be the cluster's **'Strategic Plan',** neatly identifying the priority activities that can be undertaken within the available resources to the clustering initiative. It is a comfortable and well-organised representation of the cluster's forward agenda, based on committed resources. It is usually a top-down document that is prepared annually. Activities are trimmed and prioritised by the cluster's Board to match the available resources. It is a control device.

Alternatively, what emerges is a loftier **'Strategic Agenda'** that is not constrained by the current availability of resources. A Strategic Agenda focuses more on 'strategic thinking'. This is a continuous and often messy process. It is iterative, with constant dialogue and experimentation. It is informal, more learning-by-doing. As such, the Strategic Agenda provides guidance on priorities. It boldly highlights the priorities for action, the key activities that need to be addressed in moving the cluster towards its preferred future, and then seeks to find the resources for implementation.

This Strategic Agenda should have severe stretch ambitions. With the Agenda, the role of the Board shifts from allocating priorities to garnering the external resources to deliver on the Agenda. The Strategic Agenda then becomes the key document moving from a *clutter* of support to aligned support by public agencies around the cluster's needs. These resources may come from support organisations giving more priority to the cluster's agenda, from public agencies or NGOs, and from the cluster's firms.

Cluster Action Teams

The modus operandi continues to be centred on the Cluster Action Teams, the CATs, a series of specific project task forces. Ideally, the cluster organisation is not the project manager for all of these initiatives, but is able, through knowledge of the individuals within the cluster, to assemble the CATs. These CATs may well bring competitors who barely speak to each other together to work on specific projects to their mutual benefit. The CATs have two agendas:

1. An overt one, to implement specific projects; and
2. A more covert one, to create an environment that opens up communications amongst the CAT participants, raising the level of informal discussions, building trust and providing opportunities in a neutral environment for side-conversations.

Clusters Sub-dividing and Merging

It is not unusual for clustering initiatives, especially large ones, to sub-divide into a number of tighter, more focussed special interest groups, or sub-clusters. Clusters are organic systems and it may be at a more specific and narrow level that the collaborative agenda is particularly vibrant for the participating firms. An engineering cluster may have a 'hot spot' on agricultural engineering, or even more specifically, 'dairy machinery'. As clusters mature, it becomes more critical to identify the emerging hot spots, perhaps embryonic new clusters.

Other cluster initiatives find over time benefits in merging with neighbouring clusters. The Rhône-Alpes aeronautics clusters AEROSPACE CLUSTERS and Auvergne AVIA merged in 2016 to become Cluster A4R - Alliance for Air, with 350 aeronautics firms, 30,000 employees and a combined annual turnover of 3.3 billion Euros.

Norway	*"Breaking Waves symbolises what the Norwegian maritime cluster is best at: Being a pioneer in creating advanced marine operations for the future.* *Breaking Waves is about taking the offensive, getting results and being in the lead. It has its roots in the industry's history and in the country's geography.* *Breaking Waves is about strength, courage, teamwork, experience and knowledge.* *Breaking Waves is also a daily reminder of the industry's goals – and how to achieve them."* Maritime Cluster, Ålesund
Sweden	*"To write the right business plans is like writing a best selling book. You have to catch the reader and keep them engaged until the final page, get them involved in trying to solve the mystery, feel passionate about the cluster and to feel a part of the fulfilment of the story, get them to want to be a part of the story itself.* *That's how it has to be with the business plan for the cluster initiative as well. Our business plan tells its story with logic and makes our aims transparent and has a focus on matters of human behaviour, motivation, and social change as well as on financial figures and economic analyses. This is done in a way so that even readers who don't know anything about FPX can understand and evaluate what we intend to fulfil and to get them to realize why they need to contribute or join the FPX cluster."* Johan P Bång, European Cluster Manager of the Year, 2011, Former CEO, Future Position X cluster, Gävle

Step 10 Check List: Longer Term, Strategic Agenda

- The development agenda for any cluster is broad. There is no easy, single, silver bullet.
- Has success with early initiatives created the momentum that enables the more substantive issues to be tackled?
- Does a portfolio of CATs, the Cluster Action Teams, continues to provide the operational engine for the initiative?
- Is the internationalisation agenda broad? Does it include (along with export development) investment attraction, the development of cluster-to-cluster links and links with international knowledge centres?
- Do many of the substantive projects require collaboration with and implementation through others, including public agencies and academia? Is this happening?

Danger Signs

- The cluster is engaged on a limited number of fronts with just one or two major initiatives.
- The benefits from the clustering initiative are limited to a small number of the cluster's stakeholders.
- No activities are in place to remove the isolation of the cluster's stakeholders, to build the cluster's social glue.
- The initiative is not succeeding in influencing and levering the agendas and resources of others, including public agencies, high schools, donors and NGOs.

CHAPTER 4 STEP 11

LINKING THE CLUSTER

Opening to collaboration with other clusters is a win-win. No cluster is a self-contained system.

A cluster can beneficially link at four levels:

1. Regionally,
2. Nationally,
3. Pan-regionally, and
4. Globally.

INVITED FOREWORDS

MIKE CROWE

Former Director, Desert Knowledge Australia, Alice Springs, Australia

Building local clusters and creating critical mass by linking the clusters across the Australian desert has been a successful strategy for outback businesses. A key to doing this successfully has been finding the right mix of face-to-face contact and the use of communications technology. A key learning is that people want to know each other first and develop trust before engaging on business collaboration over distance.

PROFESSOR PHIL COOKE

Bergen University, Norway

We must all now face Grand Challenges like Climate Change and Elderly Healthcare. Already in some regions, Grand Challenges have been translated into integrated innovation platforms linking specialised elements across different regional clusters. This has proven a flexible but focused management methodology for searching out innovation 'white spaces' within and between regional cluster hubs.

SIMONE HAGENAUER

Project Manager Clusters, Ecoplus, The Business Agency of Lower Austria

A cluster without links to the outside is just fish in a fish tank. Links are necessary not only to buy and sell, but also to find complementary skills and technologies to develop. There are many ways to identify these links and potential partners: Regular meetings ("jour fixes") of cluster managers representing different sectors (green building, plastics, mechatronics, food, logistics) to discuss common issues and exchange ideas for cross sector projects, workshops with companies to identify and describe their competences that could be used also in other applications, events to inform companies about cross-cutting environmental technologies – these are some of the tools we use to link the different clusters within our region.

We manage cross-regional cluster initiatives with our neighbouring regions to create critical mass. But if the necessary know-how is not available nearby, how do you find the right people somewhere else? "Talk about your skills and needs and they will find you", could be a successful strategy. Or taking your companies to study trips abroad and listening carefully. By the way these trips might also strengthen the trust and team spirit within your cluster. We probably all agree that linking clusters is absolutely important, but still, thinking outside the fish tank and finding links to a colourful ecosystem remains one of the hardest tasks.

LUCIA SEEL

Communications & Content Manager, European Cluster Collaboration Platform

The European Cluster Collaboration Platform (ECCP) supports international cluster cooperation, building cluster bridges within Europe and beyond; hosting bilateral cluster events e.g. EU-US, EU-Japan, EU-Mexico, EU-Brazil and in other strategic countries; and providing support for international cooperation. To be part of this growing community and to gain global visibility: visit www.clustercollaboration.eu, profile your organization or contact directly by email at contact@clustercollaboration.eu

I am deliberately placing 'Cluster Linking' at Step 11, arguing that firstly there is a need to fully understand the cluster's issues and opportunities. What exactly are the cluster's competencies? What are the points of difference with other clusters? What gaps in the local competencies might be bridged through cluster partnerships … or markets developed? And then answer: Partnerships with whom?

Cluster Linking Logic	
Avoiding lock-in	Rigid, isolated clusters are vulnerable to lock-in. Knowledge and contacts needed for growth will not be only within the 'home' cluster.
Disaggregation & Specialisation	Disaggregation of global value chains; production processes fragmented between clusters with increasing specialisation. With specialisation, a mutual dependency developing between clusters leading to inter-cluster cooperation. Dynamic clusters are not closed systems.
Innovation at cluster interfaces **Enabling firms to access knowledge, make new connections**	Breakthroughs occur where disciplines intersect. Diversity. Cross-fertilisation. Absorption of extra-cluster knowledge. Emerging industries tend to require multidisciplinary skills. Access to key enabling technologies (KETs): micro- and nanoelectronics, advanced materials, industrial biotechnology, photonics, nanotechnology and advanced manufacturing systems. Access to other cross cutting technologies/capabilities: design, creative and green technologies. Access to new connections, new information sources as business emphasis shifts from R&D to C&D … Connect & Development.
Regional Innovation Systems, **National agendas**	Regional clusters provide the bottom-up building blocks: 1 For the Regional Innovation System, addressing systemic, cross-cluster issues, and 2 For national sector strategies.
Addressing Grand Challenges	Challenge driven innovation, addressing critical society needs where co-creation and cross-sector collaboration is needed, e.g. healthcare, mobility, sustainable cities. Wicked problems demand collaboration.
C2C links as a framework	Cluster-to-Cluster (C2C) links support the development of B2B links and A2A links, Academia-to-Academia, linking knowledge hubs. As clusters become less and less self-contained systems, accessing additional knowledge becomes more critical.

Clusters lever through selectively linking with other clusters, facilitating cooperation amongst those who would not normally talk with each other. Activities include:

- Facilitation of B2B links, distribution arrangements, outsourcing.
- Two-way investments and technology transfer.
- Knowledge exchange, academic links; student and teacher exchanges.
- Migrant and diaspora links.
- Sister city and political links.
- Transport, airline connections.
- Benchmarking/study tours.
- Exchange of staff between cluster organisations, internships.
- Business roaming agreements, offering temporary office space to firms from partner clusters.

European Union	*"Firms in traditional sectors are far more likely to find innovative growth by forming new linkages and applying new technology to their existing products and services. This can be facilitated by opening the clusters to cooperation with and learning from other clusters in the same or other sectors."* Aho Report, 2006
Prof. Ellen Enkel	*"We borrow with pride."* Emphasising the importance of innovation partners from beyond the cluster. Vienna Cluster Manager's Conference, 2012

1. Linking within the Region

Prior to exploring links further afield, a first priority for a cluster is usually linking within the region. In Step 2, early engagement with more than one cluster within a region was recommended, developing **a portfolio of clustering initiatives**, in part to reduce risks associated with over-specialisation within the region but also to stimulate rivalry between clustering initiatives. More substantially, developing a number of clusters within the region provides the opportunity to identify from the bottom-up the common, **the more systemic issues** that are facing the region. Many infrastructure constraints will not be cluster specific and may well be inhibiting growth on both the traded and domestic side of the regional economy. Linking regional clusters provides the critical mass to engage in addressing such issues, e.g.:

- Developing effective business-school connections; establishing a more entrepreneurial culture with an angel support network; addressing transport and communication constraints.
- Identifying cross-cutting technology, common technology platforms.
- Building alignment across regional clusters to address Grand Challenges.
- Promoting the region, possibly developing a regional brand.

Action teams with participation from the relevant clusters should be formed to address such cross-cluster issues.

A central reason for linking clusters within a region is to **facilitate innovation where clusters meet**, at the interfaces. Innovation is multidisciplinary, with breakthroughs often coming with the combination of knowledge from more than one discipline, more than one cluster. Firms that are active on the periphery of their cluster, pursuing opportunities adjacent to their strengths and seeking external sources for innovation, tend to have improved performance. Novel solutions come from multi-disciplinary collaborations. The intersection of two or more clusters enables firms to integrate into their offerings specialised knowledge and capabilities, e.g. linking tourism and food clusters in the development of the local cuisine; linking health care and IT in the development of e-health systems; linking mining and IT for remote mining applications; linking (as in Catalonia) the Railgrup Cluster and Kids Cluster to explore new approaches for entertaining kids on long train journeys. Where clusters meet is also where new clusters emerge, drawing on a range of technologies and market knowledge.

Sweden's VINNOVA is promoting cross-sector collaborations to find solutions to society's needs, solutions that are rarely found in one traditional sector or a single research field. New collaboration patterns are emerging such as 'green urban transportation' at the interface between energy, automotive engineering and ICT. Many regions are in engaging across the 'white spaces' between regional clusters, including Rhône-Alpes (France), the Basque Country and Catalonia (Spain).

Cross-cluster innovation is helped in many regions by cluster umbrella organisations that provide common back-office services to the clusters.

Examples, Clusters Linking within a Region	
UK	Collaboration amongst regional clusters in Sunderland accelerated by four clustering initiatives co-locating: the North East Process Industry Cluster (NEPIC), Health Network North, the North East Automotive Alliance (NEAA) and Design Network North.
Austria	Clusterland Upper Austria is home for nine clustering initiatives, with increased emphasis being placed on collaboration between the clusters, e.g. plastics & electronics. Clusterland provides common back office services for the clusters.
Sweden	Skåne Region is addressing Grand Challenges in Personal Health (at the interface of Skåne's 'Food Academy', 'Life Sciences', 'Mobile Heights' and 'Media Evolution' clusters) and Sustainable Cities (drawing together three clusters: 'New Materials', 'Logistics' and 'Training Regions').
Spain	22@Barcelona supports the Media, ICT, Med Tech, Energy and Design clusters.
USA	*"The most promising conversations can be designed at the intersection of the edges of clusters." Ed Morrison,* www.economicdevelopment.org

UK	*"Cities thrive when their clusters overlap and are in constant connection."* Clark & Clark, Nations and the Wealth of Cities, 2014, www.centreforlondon.co.uk
Australia	*"Focus at the intersection of disparate technologies."* John Dean, Bremer & Co, Canberra, TCI Auckland conference, 2011
Professor Michael E. Porter	*"Cluster development is often particularly vibrant at the intersection of clusters, where insights, skills, and technologies from various fields merge, sparkling innovation and new businesses."* Clusters and the New Economics of Competition, HBR, 1998
Professor Örjan Sölvell	*"Regional variety of skills and competencies, where the – often unplanned – interaction among different actors leads to new and unexpected ideas and new creative designs, products, services and business concepts."*
Australia	*"Just as important to work between clusters as within the cluster itself."* Rodin Genoff, Clusterpreneur, Sydney

2. Linking Nationally

Many countries prepare national development agendas for priority sectors. Biotech, creative and ICT are common, with high level reports that draw on senior advisory groups and provide valuable descriptions of international market conditions and technology changes. While strong on exhortation, these reports can be light on implementation. A more pragmatic route is to build the high-level, national, agendas through **bottom-up input** from the regional clusters as this is where most of the action needs to be. Top-down national strategies, even when well resourced by national agencies, can be remote from the issues affecting individual clusters and lack implementation feet. As such, they often fail to capture long-term private sector involvement.

However, engagement at both the regional and national levels is required. Some issues, such as schools links, incubators, freight logistics, are local. An oil & gas engineering cluster will have different training needs and market development priorities to a defence engineering cluster.

Other issues, such as tariffs, product and training standards may be most effectively handled at the national level. Some issues, possibly export development, investment attraction and venture capital, merit addressing at both the regional and national levels. A key is having effective linkages between these levels, with issues being handled wherever possible at the lower level and establishing a bottom-up approach, rather than the more traditional top-down … the subsidiarity principle.

3. Linking Pan-Regionally

A first step for many clusters in moving from an inward looking 'local' cluster to an outward facing 'global' cluster is establishing links pan-regionally, with clusters in neighbouring countries that are also socially close.

The European Commission, through a number of programmes, is encouraging clusters to link across Europe to stimulate the emergence of strong pan-European clusters. The Commission has supported the development of an online-tool for international cluster collaboration, the European Cluster Collaboration Platform (ECCP), www.clustercollaboration.eu. Users can register at no charge and introduce their cluster to the worldwide cluster community.

Also in Brussels is ERRIN, the European Regions Research and Innovation Network, a network of 120 European regions. ERRIN facilitates knowledge exchange, joint action and project partnerships between its members to strengthen their region's research and innovation capacities.

An organisation active in the development of cross-border links within macro regions is BSR Stars, Innovation in the Baltic Sea Region. The 4th Cluster Matchmaking Conference, in Warsaw in 2016, involved 250 participants, representing 150 clusters from 30 European countries. There are initiatives linking clusters across the Danube Region, again with EU support.

European Commission	*"The internationalisation of excellent cluster organisations can help businesses, especially SMEs, to improve their competitiveness and maximise their presence in global value chains.* • *Access to Knowledge, to use in new products & services* • *Access to new Markets* • *Access to key Infrastructure* • *Access to new Partners for collaboration* • *To raise Profile* • *To attract mobile Foreign Direct Investment"* The Handbook takes ten steps in the Internationalisation Journey, from an inward looking 'local' cluster to an outward facing 'global' cluster. TACTICS, Cluster Internationalization Handbook, 2012
Germany	*"There is ample empirical evidence that companies in networks and clusters find it easier to engage in international cooperation."* European Clusters go International, Gerd Meier zu Köcker, Lysann Müller, Zita Zombori, Institute for Innovation & Technology, Berlin, 2011

Examples, Clusters Linking within Europe	
Aerospace	Forty clusters are part of the European Aerospace Cluster Partnership. Three of these clusters have a specific MOU: Izmir (Turkey), Hanse Aerospace (Hamburg) and Bavaria Aerospace (Munich).
Agro Food	Agro food clusters in Pazardjik (Bulgaria), Macedonia (Greece) and Central Puglia (Italy) are collaborating through RAF-REGIONS to support their SMEs.
Atlantic	Benchmarking regional clusters and policies and facilitating cluster cooperation, the Atlantic clusters project is led by Spain's Galicia Regional Development Agency. Partners: IDEPA, Asturias (Spain); SODERCAN, Cantabria (Spain); South West Regional Authority (Ireland); Bretagne Innovation (France) and ADRAVE (Portugal).
Automotive	Bench Learning in Cluster management for the automotive sector (BeLCAR) with 12 partners from Germany, United Kingdom, Austria, Spain, Hungary, Greece, and Italy
Bio economy	3BI (Brokering Bio-Based Innovation), launched in 2015, brings together four bioeconomy clusters: BioVale (UK), Biobased Delta (Netherlands), BioEconomy (Germany) and IAR (France), all use biorefining to convert biological resources, working together on R&D, renewable raw materials and international markets.
Biotech	NETworking activity for BIOtechnology CLUsters in Europe (NetBioClue) with 14 partners from Italy, United Kingdom, France, Germany, Denmark, Czech Republic, and Hungary.
Biotech Food, ICT and wood/furniture	The EU's BSR InnoNet pilot project between Finland, Iceland, Latvia, Lithuania, Norway, Poland and Sweden, linking clusters across the Baltic. Learning points: importance of early projects offering quick wins and the cluster's themselves, not national agencies, driving the process.
BioValley	BioValley life sciences cluster initiative links Alsace (France), South Baden (Germany) and Northwest Switzerland.
Books	Hay-on-Wye (Wales, UK), the world's largest second hand book centre, twinned with Redu, Belgium's 'Book Town'.
CLOE	Clusters Linked Over Europe, 15 European regions, sharing experience, establishing close co-operation and learning from each other in cluster management.
Creative	CReATE links 7 creative clusters from Germany, Italy, France & UK, focus on ICT and advertising, digital media, games.
Denmark & Germany	Southern Denmark active in developing collaboration for their clusters with related clusters in northern Germany.

Denmark & Sweden	IT Øresund Cluster 55°, Food Øresund and Øresund Biotech clusters extend across the Copenhagen – Malmo bridge.
Food	www.foodclusterinitiative.eu facilitates cooperation & learning amongst food clusters, provides an umbrella for organisations such as FINE (Food Innovation Network Europe) linking 9 regional food clusters, and BaltFood.
Footwear	Montebelluna, Italy's sports footwear cluster, has extensive ties with Timişoara, Romania.
ICT/New media	Regional Economic Development by ICT/ New media clusters (REDICT) spans 6 regions and clusters with 17 partners
Life science	ScanBalt BioRegion, a network of clusters, universities, companies and public authorities promoting the Baltic Sea Region as a green valley and health region, involving Denmark, Estonia, Iceland, Latvia, Lithuania, Norway, Poland, Sweden, northern Germany and northwest Russia.
Plastics	ALPlastics, seven plastics clusters in five Alpine regions, focus on SME links, technology transfer and exchange of cluster management experiences. Proplast (Italy); Clusterland Oberösterreich Kunststoff-Cluster (Austria); Plastipolis (France); Chemie-Cluster Bayern (Germany); CARMA (France); Réseau plasturgie (Switzerland); Regione Piemonte (Italy).
Plastics	Twente plastics cluster straddles the Dutch-German border.
Tissue Engineering and Regenerative Medicine	TERM links clusters in Pay de la Loire, Nantes (France); Stockholm/Uppsala (Sweden); Madrid (Spain); Milan (Italy); Berlin (Germany); Göteborg/Oslo (Sweden – Norway); Wallonia (Belgium) and Tartu (Estonia).
Value Added Wood	8 wood clusters with common challenges joined through EU's INTERREG programme to stimulate new solutions: Upper Austrian Technology and Marketing Company; Wood Network in Southern Sweden; Laapenranta University (Finland); Bolzano-South Tyrol Office for Industrial Innovation (Italy); Forest and Timber Cluster South Westphalia (Germany); Zala Furniture Cluster (Hungary); Woodcluster Styria (Austria) and Kurzeme Wood Processing (Latvia).
Water Management	SWAM links water management clusters from Western Greece, Eastern Galilee (Israel) and Murcia (Spain).

A small number of examples are developing of links between regional clusters within North America, and within other parts of the world.

Examples, Linking Clusters Pan-Regionally	
Canada & USA	Cascadia Innovation Corridor: linking British Colombia & Washington State life sciences, clean tech and analytics sectors. Great Lakes: Linking clusters in Canadian provinces and US States.
USA & Mexico	Chicago, Los Angeles, San Antonio and Phoenix: agreements with Mexico City for two-way trade and investment through linking common clusters. Also: Cali-Baja Mega region, BorderPlex Alliance (El Paso/Ciudad Juárez/New Mexico) and the BiNED (Binational Economic Development) project in the Rio Grande Valley
South Pacific	Across a number of South Pacific countries, explorations are underway to link (1) cruise tourism clusters and (2) value adding virgin coconut clusters.
Mekong Delta	Cambodia, Laos, Myanmar and Vietnam are building intra cluster linkages around Silk, Organic rice, Mango, Sea Food, Coffee, Furniture, Silver, Gems and Jewellery clusters … market access, technology, raw materials, R&D.

4. Linking Globally

Whilst there is nothing new about clusters linking globally, what is new is the emphasis now being placed by the European Commission and others on linking clusters globally and creating through C2C links an environment that supports B2B links. Cluster twinning also enables clusters to sourcing knowledge from the most specialised clusters/ knowledge hubs globally, spanning both developed and emerging countries such as Brazil, China and India.

Sweden	*"To maintain dynamism, clustering initiatives increasingly seek knowledge inputs and collaboration partners outside of their region/country."* Cecilia Johansson and Emily Wise, VINNOVA; TACTICS, Where the Cluster Winds are Blowing in Europe, 2012
European Commission	*"Collaboration between clusters can yield many benefits including expanded international linkages and global value chains and strengthened cross-fertilisation and dynamism. European clusters are generally considered to lack the critical mass necessary to compete in markets that reach beyond the region in which they are located.* *To build critical mass, these clusters have to reach out and link up to other clusters in order to get access to new markets, research experts and knowledge infrastructure.* *By linking companies, centres of research and universities across borders, clusters will be able to make better use of existing infrastructure and take advantage of economies of scale. This in turn can lead to the creation of some of the world's leading innovation hubs in European macro regions or zones with a rich ecosystem of actors from various clusters"* Final Recommendations, European Cluster Policy Group, 2010

Examples, Clusters Linking Globally	
European Cluster Collaboration Platform	Supporting the development of cluster-to-cluster links: Japan – through EU-Japan Centre for Industrial Cooperation; India – through European Business Technology Centre; Brazil – through the Ministry for Development, Industry and Trade; Korea – through Kicox, Korean Industrial Complex Corp.
North Atlantic Ocean Cluster	Linking marine clusters in Iceland, Faroe Islands, Norway, Greenland and Newfoundland, Canada.
Clean Tech	Global Cleantech Cluster Association, founded in 2010, links 50 clusters and 10,000 firms globally.
Optics	Tucson, Arizona's optics cluster has developed commercial links with 15 optics clusters globally.
USA & UK	Portland, Oregon & Bristol: leveraging their 'green city' reputations, connecting firms in their sustainability clusters. San Diego & London: promoting synergies among companies, academic centres and investors in their life sciences clusters.
WIINTECH	Worldwide Intercluster Initiative for New materials and processes focused on clean TECHnologies, linking European clusters to address opportunities in third markets with EU support. Plastipolis (France), Clusterland (Austria), Proplast and Veneto nanotech (Italy), Plastival (Spain), Bayern Chemie Cluster (Germany), NEPIC (UK) and Poolnet (Portugal) Target: clusters in North America, South America and Asia. *"We consider Project WIINTECH as a breakthrough action at European level contributing to the creation of more globally competitive clusters and cluster firms in Europe. It has generated considerable interest from French clusters."* French Ministry of Economy, Industry & Finance
BioXclusters	'The European Strategic Cluster Partnership on Personalised Healthcare': Linking Biocat (Catalonia, Spain), BioM (Bavaria, Germany), bioPmed (Piemonte, Italy) and Lyonbiopole (France) with global life science hot spots. Initial targets: US, Brazil and China; extended to Kansai bio cluster, Osaka, Japan.
Silicon Valley	Many high-tech clusters have developed links with Silicon Valley. Three stand-outs: Bangalore (India), Hsinchu (Taiwan) and Silicon Wadi (Israel).

Italy & Vietnam	UNIDO's cluster programme in Vietnam had the support of the Italian government and twinned related clusters between the countries to facilitate business partnerships. *"The Cluster Twinning Project was aimed at developing an optimal process for linking two clusters across different countries – one developed and the other not so developed, but producing near similar products."* Cluster Twinning, UNIDO, 2013
Korea, Balkans & Black Sea	Cluster Bridge Korea - Balkan & Black Sea (Hungary, Bulgaria, BiH, Croatia, Serbia, Czech, Romania, Macedonia, Albania, Slovenia) MoU signed at cluster conference, Ohrid, Macedonia, 2016

Check List: Cluster Linking

- Firstly, clarify what can the cluster offer a partner? What is the differentiation? What is being sought in a partner? What capability gaps need to bridged? Where can the cluster's assets best be levered?
- As no cluster is a self-contained system, links are needed to open commercial doors, to build critical mass and to enhance the cluster's knowledge base.
- C2C (Cluster-to-Cluster) linking facilitates B2B connections and A2A (Academia-to-Academia) for connecting knowledge centres.
- Are current diaspora connections being fully utilised? … close community networks are effective long-haul transmitters of tacit knowledge.
- Are C2C links providing a framework for FDI? … multinationals are attracted by similarly specialised clusters.
- An early emphasis on building the cluster links within the region maybe more fundamental to on-going innovation than international links.
- C2C connections provide opportunities for benchmarking clustering initiatives.
- Is the cluster:
  a. Linking within its region to develop the region's innovation system; to addressing systemic issues restricting competitiveness; to explore the fertile ground for business growth and new cluster development where local clusters connect?
  b. Linking beyond the immediate region, engaging with similar clusters on business development, e.g. internationalisation?
  c. Linking globally, using the establishment of C2C links to facilitate SME internationalisation, to facilitate links to global value chains, to support two-way international investments, to link diaspora and to establish connections with global knowledge centres?

Danger Signs

- The cluster has not fully understood its own strengths and its development priorities prior to developing links.
- The cluster is reactively responding to other clusters reaching out, rather than predetermining which clusters support it's growth agenda.
- Linking with other clusters is limited to developing B2B links.
- C2C links are driven by political, not business, needs.
- Political and administrative boundaries inhibit the linking of regional clusters.
- Insufficient trust between the clusters; business leaders on both sides not fully engaged.
- Starting by linking with clusters in culturally unfamiliar countries.

CHAPTER 4 STEP 12

MEASUREMENT & EVALUATION

This final step reviews progress in upgrading the competitiveness of the cluster's firms and evaluates the impact of the clustering intervention. This step also identifies what is needed to take the cluster to the next level.

Is the initiative doing the right thing? And is it doing things right?

> *Everything that can be counted does not necessarily count; Everything that counts cannot necessarily be counted.*
>
> **Albert Einstein**

INVITED FOREWORDS

MADELINE SMITH

Head of Strategy, Institute of Design Innovation, Glasgow School of Art, Scotland, TCI Network, Director

As interest in clusters has grown, from companies, practitioners and policy makers, the need for effective evaluation has also risen, not least to be able to show the return on investment from such initiatives.

Cluster measurement and evaluation has long been a source of frustration for policy makers – how to properly capture the impact of the investment in cluster interventions.

In this context it is important to understand that evaluation is a learning process, the outputs of which should feed back into future approaches. It is not just audit. As evaluation approaches have become more sophisticated they have moved from merely looking at activity (numbers involved and engaged with the cluster), to capturing the difference that this activity is making, both to the companies and to the region. In addition understanding the processes that help build a successful cluster, and how the social capital and trust generated in clusters can be maximised is an important aspect often overlooked.

Evaluation of clusters is a thus complex area, involving different levels and diverse audiences. This could involve evaluating the success of single projects within a cluster, the success of a cluster initiative, and the systemic improvement of investment in a sector by public authorities – a more systemic view.

It is worth bearing in mind the audience for the evaluation when designing a suitable approach. Overall this should consider capturing:

***The Why:** Ultimately the impact must be measured in sector growth and the change in the regional economic structure. This is the core reason for cluster investment – the "Why".*

***The What:** Many cluster interventions focus on a range of projects aimed at building a strong Business Environment and improving the competitiveness of the companies (the "What" of a cluster programme). Areas of focus will often include projects involving money and access to finance, skills and talent, infrastructure, knowledge and innovation, and market access and global positioning.*

***The How:** Social capital is the core of the cluster approach and the tool used to build competitiveness by bringing partners and companies together (the "How" of a cluster approach). Capturing the level of partnership and collaboration as a cluster develops can help show the how these relationships have matured and deepened to give greater returns.*

Evaluating clusters is a developing field, and because of their wide-ranging nature the evaluation of clusters can be challenging. However, clusters continue to be used widely to stimulate innovation and maximise economic strengths within a region. In order to better show their impact, and indeed to know which interventions will be most effective, analysing all aspects of cluster development, especially the changes in behaviour and trust is an important aspect. Understanding how clusters grow, from just a collection of organisations in the same sector, towards cooperative and collaborative behaviours helps develop better policy and more targeted practice.

THOMAS LÄMMER-GAMP

Director, European Secretariat for Cluster Analysis, Berlin

The European Secretariat for Cluster Analysis (ESCA) is an offspring of the European Cluster Excellence Initiative, launched by the European Commission in 2009 to promote professional cluster management. Representing a huge network of nearly one hundred cluster experts and professionals ESCA offers management audits for cluster organisations. The scheme consists of three steps, Bronze, Silver and Gold, ranging from a benchmarking of cluster structures to fully-fledged quality assessments of the cluster management organisation. Many governments have incorporated the scheme into their regional or national cluster programmes to support management excellency of cluster organisations.

Both benchmarking and quality assessments provide cluster managers not only with an assessment of the management quality of their organisations, but also with a number of learning possibilities as the audits are conducted by experienced assessors who have a sound knowledge of cluster management and can introduce best practice from other cluster organisations. Thus, the scheme is much more than 'just a certification'. It is a down-to-earth non-theoretical management review that creates results in an instant.

FRANK WAELTRING

Partner of Mesopartner, North Rhine-Westphalia, Germany

Every practitioner knows of the difficulties of demonstrating concrete results with cluster development. Ifor mentions them also: the promotion of trust and cooperation as a means to an end; the promotion of innovative ideas, initiatives, projects and products. In that respect clusters are complex networks, not manageable in a linear planning manner, rather acting on a dancing landscape (using Scott Page's term) in respect to changing market conditions and human, as well as, organisational network challenges.

Ifor points out in this chapter that under these conditions "evaluations will rarely deliver answers at the level of detail expected by the sponsors of a clustering initiative" and that the learning and development aspects are much more relevant than the delivery of concrete numbers. In relation to this I mention two aspects that often do not get enough attention in clusters as well as in their monitoring and evaluation procedures:

1) Creative experimentation and tinkering in the cluster to test its boundaries and creative opportunities.

2) Promotion of learnings from failed experiments that show us what is still possible or not at a given time.

***Experimentation:** What is needed in many clusters is still more experimentation with different kinds of cooperation networks, bringing together different stakeholders from within and outside the cluster and promoting joint experiments. Testing the "adjacent possible" in a cluster means to encourage a search process for creative and innovative possibilities that only grow as they are further explored. I suggest experimentation is a relevant indicator on the agenda of M&E.*

***Safe to fail initiatives:** It is necessary to encourage learning from failure in clusters and this should be valued more strongly. Save to fail experiments or safe to fail initiatives are organized with the clear awareness that a certain experiment might not work out but provides deep insights of learning.*

Both aspects are not yet strongly considered in M&E procedures and should be seen as important indicators to test the opportunities of a cluster and to understand better its complexity and patterns of behaviour.

Why Measure Cluster Performance?[1]

Prior to engaging on the measurement and evaluation, the rationale for that activity needs to be determined. The purpose shapes the approach.

Motivations for Measuring Cluster Performance[36]	
Intervention Effectiveness	Success of the policy interventions. Impact in lifting the performance of core and support firms. Contribution to broad policy goals … and any unintended consequences.
Accountability	Data for funders and other triple helix stakeholders on how resources have been used, with evidence of achievements. Evaluating progress relative to set objectives and performance indicators that legitimise investments to date.
Securing resources, commitment	Securing on-going resources, finance and commitment for the cluster organisation and for cluster projects.
Learning & development	Feedback, identifying what is working and what is not working regarding the cluster organisation and the cluster's performance. Adjusting future actions, identifying improvements & changes. What has been learnt from failures? What further interventions might be appropriate? Are we on this clustering journey together?
Planning	Identifying the next steps in moving towards the cluster's preferred future, designing and allocating future resources, developing a roadmap for future activities.
Inspiring	Celebrating successes and motivating the current and potential cluster members. Building the sense of belonging to the cluster.
Promoting	Promotion of the cluster internally and externally. Gathering data for presentations at key events, lobbying for support.

Drawing on (1) PwC, The Hague and (2) *'SMART INNOVATION: A Practical Guide to Evaluating Innovation Programmes',* DG Enterprise, Brussels, 2006

Measurement & Evaluation Complications

Cluster evaluation needs to accommodate different and at time conflicting objectives. The focus of the public sector (and donors) may be employment creation, investment attraction, poverty alleviation and/or gender equity. For the private sector the focus is much more specific: profitable growth. For academia the criteria may be the number of collaborative projects underway, or number of student placements.

[36] I acknowledge the many who have enhanced my knowledge in this area including Olav Bardalen, Philip Cooke, Kristina Dervojeda, Alexander Eickelpasch, Peter Kempinski, Lisa De Propris, Chris Ritchie, Madeline Smith, Örjan Sölvell and Brian Webber.

Cluster Measurement & Evaluation Difficulties

New issues and new agendas develop during the clustering journey, including changes in the cluster's functional region and the products/technologies/served markets.

Changes emerge slowly and can be subtle … it can take years after a clustering initiative is launched to observe changes in firms' performance.

Measuring impact of a relatively small investment in a changing environment on the incremental growth of a cluster.

Attributing impacts to just the clustering intervention; separating results from external influences, e.g. currency fluctuations and effects of other public policies.

Results come unevenly.

Employment growth within a region, as a result of the clustering intervention, may be more significant within the local rather than the traded economy.

With these difficulties, it is unrealistic to directly attribute any change to the clustering intervention and to expect to see a clear ROI on investment in a clustering initiative. The reality is that success of a cluster and of a clustering initiative cannot be measured through blunt instruments such as employment growth and levels of value added. As economic effects are indirect, measurement of results is qualitative rather than quantitative. Unfortunately, evaluations will rarely deliver answers at the level of detail expected by the sponsors of a clustering initiative.

What should emerge from an evaluation process are clear indications as to whether the clustering initiative is moving in a positive direction. What has changed as result of the process from the perspectives of the different cluster stakeholders? And what should now change to further lift the cluster's performance?

Measurement & Evaluation Perspectives	
OECD	*"It is not uncommon for policy makers to be vague and unrealistic about a cluster policy, with expectations far exceeding resources and potential."* *"Evaluations of cluster policies are rare and often not very robust. This is due in part to complications of identifying the cluster and isolating the impact of the policy intervention, limiting comparisons across studies."* OECD Innovation Policy Platform, 2010
Inter-American Development Bank	*"The main question that an impact evaluation aims to answer is whether the Cluster Development Program delivered the expected results.* *The initial expectations were that, with a detailed diagnostic of the cluster's strategic needs and missing public and semi-public goods, multilevel coordination would develop easily. However, the differences among public actors in mandates, bureaucratic processes, strategic views, and short-term political considerations trumped the collaboration opportunities the programs generated."* Impact Evaluation of Cluster Development Programmes, 2016
Mesopartner	*"It sometimes would appear that cluster practitioners are not too keen on monitoring and evaluation since this would highlight the fact that their cluster initiative makes only slow progress.* *This is usually due to the fact that a cluster initiative often involves protracted periods of building trust and overcoming resistance to cooperation among local actors, and trust-building activities are inherently difficult to monitor and to evaluate, especially when it comes to quantifiable indicators."* J. Meyer-Stamer and U. Harmes-Liedtke, How to Promote Clusters
Inno Germany	*"In reality, it proves enormously difficult to even guesstimate the net effect of cluster policies due to time lags, multi-causal relationships, unclear and / or conflicting policy goals and the unspecific nature of cluster policies. Also, unintended effects of cluster policy, such as windfall gains, crowding out and substitution effects are hard to detect and even harder to quantify."* Clusters and Clustering Policy

Professor Örjan Sölvell	*"The first question to ask is what is evaluated and how. One approach is to evaluate the initiative as such. These evaluations tend to measure things such as number of meetings, extension of personal networks, and reports that have been carried out and presented. Other areas include member growth, press coverage and outreach. A more constructive evaluation approach targets the cluster itself. Do firms actually perform better? Have there been spin-offs from the new incubator? Has the region increased its attractiveness?"* Clusters: Balancing Evolutionary and Constructive Forces
Purdue Center for Regional Development	*"Moving toward measurable outcomes sustains the collaboration. Assessments lead to agility, the capacity to change direction quickly, to move toward opportunity as we learn by doing. It's running to daylight. Integrated assessment accelerates collective learning."* Ed Morrison, Newsletter, 2016 economicdevelopment.org
Milton Friedman	*"One of the great mistakes is to judge policies and programs by their intentions rather than their results."*

Cluster Performance Framework

The underlying health of the cluster needs to be separated from the impact of the clustering initiative. Too often cluster reviews just focus on the effectiveness of the intervention.

A General Framework, Cluster Performance Measurement		
1. Processes	**Activities**	E.g. number of meetings, workshops, training courses; website traffic; trade fair participation …
2. Outputs	**Operational objectives**	E.g. number of new products; number of trained specialists; improved communications with cluster stakeholders; website contacts; media coverage …
3. Results	**Specific objectives**	E.g. recognised globally as a 'Centre-of-Excellence'; attractive environment for new business start-ups …
4. Impacts	**Strategic objectives**	E.g. higher productivity; increased competitiveness; business growth; employment growth …

Drawing on the experience of PwC, The Hague

Performance measurement needs to be tailored to the interests of different stakeholder groups within the cluster, to the specifics of each cluster and to the cluster's life cycle stage.

Tailoring Performance Measurement to Cluster Life Cycle	
Emerging cluster	Quality of internal linkages, especially between firms and knowledge centres. Success in attracting early public sector support. Success in attracting early public sector support. Success in attracting private investment … merger and acquisition activity provides early confirmation of business interest. Success in attracting talent that reinforces the cluster's specialisations.
Growing cluster	International awareness of the cluster. Breadth of the cluster's strategic agenda. Bridging of competency gaps. Development of sub-contracting, co-specialisation. Cross-fertilisation with neighbouring clusters. Private sector commitment to the cluster's projects.
Mature cluster	Links with neighbouring and international clusters. Maintenance of the cluster's reputation. Exploration and development of activities at the cluster's periphery … where new clusters emerge.

For Spain's Basque Country clusters, the 'king of indicators' is the number and quality of strategic collaborative projects that have been launched.

Who Undertakes the Review?

Elements of the review should be undertaken by an independent external resource, a third party. This could be a consultant, an academic, a market research company or another cluster organisation, rather than the cluster organisation itself in order to hold credibility with funders and stakeholders. An independent assessor, free of any conflict of interest, can with more authority establish from the cluster's stakeholders the extent to which the clustering initiative has benefited them and any negatives. While cluster organisations are a key source of 'results' information, they naturally have a vested interest in talking up the results.

However, while external inputs are certainly needed, I place emphasis on a participative evaluation process. The logic is as follows:

Conventional v. Participative Evaluation		
	Conventional	**Participative**
Who?	External experts, funders	Shared responsibility amongst the cluster's stakeholders
What?	Success criteria and information necessities are pre-determined. Evaluation by objectives.	Participants identify their own information necessities; determine their own success criteria. Evaluation criteria are relevant to the cluster.
How?	Distance from the cluster's stakeholders.	Shared methods and results from the involvement of participants.
When?	Typically, when the policy or programme is finished	Frequently, throughout the duration of the policy. Continuous evaluation.
Why?	Emphasis on results. Summative evaluation. Should the policy or programme be continued?	Emphasis on process. Formative evaluation to generate actions of improvement. Continual learning. Stakeholder ownership of the results.
Value?	Can be useful when performance indicators are standardised.	Danger of bias, lack of objectivity. Builds new knowledge and understanding of the cluster. Builds stakeholder relationships.

Cluster Review Timeframes

Clusters take time to develop. The review process needs to reflect this extensive time horizon. Differences between clusters need to be considered: a creative or IT cluster will evolve more rapidly than a forestry or tourism cluster.

Some projects such as trade missions and trade fair participation should show results within a relatively short time frame. An education/training initiative that is imparting new knowledge may have a two-year time frame. Establishing a business incubator is likely to require a time frame of five or more years to deliver substantive results. Developing a new technology platform or new crop varieties may require a ten-year or longer time horizon.

Annual Firm Surveys

Measurement and evaluation should not be an occasional activity. All clustering initiatives need continual feedback against predetermined indicators, identifying challenges, new directions and providing if necessary early warning signs. A short annual survey covering the activities of the cluster's firms is common practice. These surveys provide both quantitative and qualitative data, building on the Baseline Data obtained when undertaking the initial cluster analysis at Step 3.

The survey should be kept simple. Data gathering can be by mail or email, and is often independent of the cluster management. Catalonia has developed an online, user friendly, data capturing process for annual firm surveys. In a Swedish cluster, a local accounting firm manages the annual survey as its pro bono contribution to the clustering initiative and ensures confidentiality with the data that is imputed by each stakeholder. When a number of cluster surveys are being undertaken simultaneously within a region, there should be common data points for comparison.

Annual firm surveys	
Quantitative data Examples	Hard data can include total revenues (domestic and export); Employment numbers; Average salary /employee; Number of firm start-ups; International investment within the cluster; Establishment by cluster firms of overseas offices; Number of joint ventures, alliances, export consortia; Number of students attending relevant training courses; Level of funding and other resources levered to support the clustering initiative. Specific performance indicators within a high tech cluster may include the number of companies with innovation cooperation with local universities; R&D expenditure related to turnover; patents registered; share of workforce with tertiary education; annual venture capital investments; number of IPO's.
Qualitative data Examples	Soft data can include satisfaction by the cluster's stakeholders with the cluster management's services; Identifying in what ways the cluster has supported individual firms; Which specific cluster initiatives have benefited the organisation; Extent to which new relationships have developed through the cluster programme and the development of new export opportunities. A key qualitative feedback: the extent to which the clustering initiative has had impact on each stakeholder's organisation, with examples.

Project Reviews: When reviewing the clustering process, there is a need to examine the individual initiatives that have been undertaken by the cluster. Project management techniques should be used to measure progress against the pre-established milestones, budget performance and expected outcomes.

Annual 'Show and Tell': Annual surveys provide an input into an annual 'Town Hall' public meeting. This gathering is publicly highlighting the cluster programme, renewing enthusiasm and commitment, and broadening awareness. Such a meeting is the equivalent of a business Annual General Meeting with its shareholders. As with the cluster launch (Step 8) such meetings should feature the business leaders and the other Board members rather than the cluster manager. An appropriate time for first annual meeting is 12 months after the cluster launch.

Second Year Reviews

Public agencies expect results within the short time frame of election cycles. While cluster development is long haul, qualitative feedback can be provided within this time frame. By the time a second round of annual data gathering has been completed, 24 months after launching a clustering initiative, there should be evidence of:

Behaviour changes: A change in behaviour amongst the firms with more open collaboration and more trust. This could be evidenced through the development of supply chain links, increased out sourcing, co-specialisation amongst the core and support firms and collaboration through export consortia. Also evidence of collaboration with other regional, national and international clusters … B2B and addressing cross-cluster issues.

More targeted support: By public agencies and academia, such as evidence of needs-driven training programmes and investment/talent attraction to fill specific capability gaps.

Increased cluster awareness: Greater awareness of the cluster within the region (including politicians, school leavers and amongst bankers) and internationally (attracting customers, new investment and talent).

Third Year Reviews

The first comprehensive review of a clustering initiative could be usefully undertaken three years after the launch, not earlier. The review is examining successes and failures with the clustering initiative together with the impact and learnings. It is also more fundamentally reviewing the development of the cluster's competitiveness. Multiple lines of evidence need to be gathered which will primarily come from interviewing the cluster's stakeholders.

Indicative Measurement & Evaluation Timetable	
End Year 1	Comparison with baseline data, e.g. total sales & % export; number of firms; employment. Review projects against milestones. Satisfaction by the cluster's stakeholders with the cluster organisation's services.
End Year 2	Again baseline data comparison, project reviews and cluster stakeholder's satisfaction. Evidence of: • Change in behaviour amongst the cluster's firms, more open collaboration and trust; • More targeted needs-driven support by public agencies & academia; • Increased cluster awareness within the region & internationally.
End Year 3	Again baseline data comparison, project reviews and cluster stakeholder's satisfaction.| A 360° review through an external panel, exploring firm level change; soft infrastructure alignment; public funder benefits & additionality; effectiveness of cluster governance and management. This review could include benchmarking v. similar initiatives.

Case studies at the end of this chapter introduce other elements in an evaluation process.

"The most serious mistakes are not being made as a result of wrong answers.

The truly dangerous thing is asking the wrong question."

Peter Drucker

Cluster Measurement & Evaluation	
Checklists, Eight Topics	
1. Firm Level Changes	Are the growth, profitability, productivity and innovativeness of the core and support firms increasing? Is there an increase in new product development? Is the cluster's market share increasing? Are the cluster's firms now able to profitably service even more distant customers? Is the value chain being consolidated? **Evidence** of growth over time in: Broadening of the cluster's SME base? The number of new firms, spin-offs and their survival rate? Number of local firms? **Evidence** of better cooperation amongst core and support firms? Have connections between the firms improved? (Evidence could be gathered using social network analysis) Are local firms linking with local suppliers? Co-specialisation amongst the firms? Firms collaborating e.g. for joint investments, pre-competitive technologies, joint purchasing, international development? **Evidence** of increased internationalisation? Exports as a % of total turnover? Opening new export markets? Number of international markets with a permanent presence by a local firm? Growth in offshore investments by local firms? Increased FDI in the cluster? **Evidence** of an increase in R&D spending? Number of R&D employees? World-class scientists? Is this evidence augmented by **stories** and testimonials to encourage others? Stories of firms engaging together, enhancing their capabilities? Joint projects, sharing problems, resources? With more in-depth collaboration over time?
2. Soft Infrastructure Changes	**Evidence** of universities, vocational colleges and schools now better aligned with the cluster's firms? Is the knowledge base within academia and the cluster's firms being stretched? Closer integration between firms and non-firms for R&D, innovation? Is the new knowledge that is being developed, of relevance to and being absorbed by local firms? Are publically funded support organisations (such as training and R&D) responding more closely to the needs of firms? **Evidence** of joint projects, more porous boundaries? An increase in the number of students in relevant studies at local institutions? Two-way movement of key staff between academia and business? Increased research activity, such as more patents, more publications; increase in needs-driven research? Have new curricula been developed? Increase in % of workforce with special competencies?
3. Benefits to Public Funders	What additionality has the initiative influenced? What are the appropriateness, effectiveness, efficiency and sustainability of the clustering intervention? What are the most important benefits of the initiative, where has there been impact? Is the cluster becoming a more demanding customer of public resources, enabling more targeted support? Are the *clumps* and the *clutter* being removed? Are public funds being used to encourage new agendas or to subsidise on-going activities? Have the most appropriate decisions been made regarding the clustering initiative? Has the cluster's functional region evolved over time? **Evidence** of change over time? Is there evidence of structural change within the cluster's system? Does the cluster have increasing economic impact within its region? Has the significance of the cluster to the local economy and as a % of national activity increased? Improvements of knowledge, skills? Increased employment? Have revenues/employee increased relative to the regional and national averages? Are the effects of the clustering initiative sufficiently large to justify the invested resources? Should changes be made to the level of funding? Is this still a priority initiative?

4. Cluster Development Process	How satisfied are the cluster's stakeholders with the initiative? What so far has been learnt on this cluster development journey? What is being done differently today to when the clustering initiative started? Are the objectives being achieved? Is each of the cluster's development projects meeting their milestones? Has there been an ability to adjust as difficulties have arisen? Have the objectives of the clustering intervention and the progress to date been well communicated? Is there room for improvement in the design and execution of the approach? What is the next step in the development of the clustering initiative? How might mobilisation around the clustering initiative be increased? What changes should now be made to the cluster development approach? Is the strategy still valid? Is it time for changes be made to the cluster's governance and management? **Evidence** that the process introduced to speed up the development of the cluster is actually making a difference?
5. Cluster Governance	Is there full triple helix commitment and engagement? Are the Board members active and staying with the initiative, or absent, delegating? Has the role of the cluster's Board evolved over time? **Evidence** that the board members are actively engaging to support the cluster? Beyond the Board meetings? Is the cluster's governance team still appropriate? How are the priority activities selected? Does the Board set the cluster's strategy? Or manage the process that establishes the strategy?
6. Cluster Organisation and Management	What are the main applications of the available time? Do the cluster's stakeholders view the management team as a resource? Does the management team have sufficient competency, time and legitimacy? What have been the changes in staffing over time and why? Is the cluster's management team still appropriate? Number of company visits within the cluster initiative? Number of involved actors/ institutions in the cluster initiative? Does the management team run all the cluster's projects? Are the results of the clustering initiatives being well communicated to the firms, the public sector and to politicians? Are new members joining? Is there a broad spread of members? Is the cluster's profile being systematically raised? Improved access to key firms, key support organisations? Are the stakeholders fully mobilised to engage in developing their cluster? Have hot spots/sub-groups been developed within the cluster with firms with specialised capabilities, interests? Is the strategic agenda for the clustering initiative clear? Including internationalisation? Are there synergies with complementary competitiveness initiatives? **Evidence** that an increasing number of organisations are committed to the clustering initiative? Is the private sector firmly owning and driving the clustering initiative? Increased 'sweat equity' by firms in the cluster? Is there an increase in the proportion of relevant firms that are active in the cluster initiative? How satisfied are the cluster's stakeholders with the intervention?

7. Financing of the Clustering Initiative	What have been the main sources and applications of funds? Changes over time? % Contribution from firms (1) for the cluster organisation and (2) for projects? What additional resources have been won beyond the initial support for the cluster's development agenda? Both direct financial support and indirect … others committing their resources to support the cluster's development agenda. **Evidence** of clear catalytic leverage on the funds being invested in the clustering initiative?
8. Cluster engagement, additionality	Have the cluster's dynamics been strengthened? Are there improved connections and flow of tacit information between the cluster's stakeholders? Is there a greater focus on customers and the market? More sophisticated and higher value-added products and services? Signs of innovation rather than imitation? Stronger linkages between firms and support organisations? Enhanced innovation; new/improved products, processes? Number of R&D personnel; level of private sector R&D expenditures. **Evidence** of new resources being attracted to the cluster? Volume of risk capital? Increase in public and private investments? Inward foreign direct investment, new migrants, additional public agency commitments, support from donors/NGOs? **Evidence** of success in attracting to the region high quality FDI, talent, skilled migrants…scientific, managerial, commercial? **Evidence** of increased trust? More open dialogue amongst all the cluster's stakeholders? Is the cluster becoming a more connected, networked innovation system? **Evidence** that the clustering initiative adds value for the firms and other stakeholders? **Evidence** of an increase in local political support for the cluster? How has this manifest itself? **Evidence** that the cluster's international reputation and profile has developed? Web sites in other languages? **Evidence** of increasing innovation? What progress has been made on innovation projects? How many, what successes, any failures, any measurable results e.g. IPR, successful commercialisation? How and with what success is innovation at the interfaces with other clusters evolving…interactions with clusters that are different as well as similar, clusters in the region as well as outside and globally. **Evidence** of progress being made towards the cluster's Preferred Future? **Future orientated questions:** How is the cluster's future viewed? Which are the most promising growth areas? Market trends? Technologies? Internationalisation? Focusing? What are the key gaps remaining unfilled? What are the main obstacles to the development of the clustering initiative? **What needs to be put in place to achieve further success?**

Cluster Organisation, Satisfaction Assessment

Using a five point scale, 1 = To a very great extent, 5 = To a minimal extent

- To what extent are the cluster's stakeholders taking part in the initiative?
- Has the cluster organisation sufficient capacity, experience and legitimacy?
- Does the cluster organisation function as an active and strategic resource?
- Has better cooperation and coordination:
  - Been established between the cluster's firms?
  - Between public agencies and firms?
  - Between academia and firms?
- Has the initiative contributed to increased dialogue with:
  - International knowledge centres?
  - International business partners?
  - Other clusters within the country?
- Has the initiative established well functioning arenas for cluster dialogue?
- Does the initiative's web site provide good and active communications?
- To what extent is the regional media used for communications?
- To what extent are seminars, conferences, etc. used by the initiative?
- Has the initiative given a clearer insight into the cluster's development potential and barriers?
- Have projects been initiated that give clear, positive results for the cluster's development?

Based on Oxford Research, Norwegian Centers of Expertise,
Monitoring and Evaluation System and Model for Baseline Analysis, 2006

Clustering Initiatives at Risk

A cluster development initiative traverses many mine fields during its journey. The following quotes come from cluster managers I have worked with around the world, illustrating ways in which a clustering initiative can go off-track. Responses follow each quote.

"We need to understand everything about our cluster before we can engage"

- Absolutely not!
- Paralysis-by-analysis is crippling. A clustering initiative that is removed from the culture of the private sector, with an over emphasis on analysis and an under emphasis on action will inevitably result in businesses walking away.
- At the extreme, I have seen cluster programmes where available public funds have been fully used by prolonged analysis and report writing, leaving no resources to engage on the identified projects. The end result is exhausted firms and negative value for them. (However, sceptics on cluster development can be satisfied that cluster development is proving to be an ineffective development approach.)
- Strategy development needs to be viewed as on going. It should not be an irregular activity driven by outside consultants. Take confidence in learning-by-doing. Engage early on projects with feed back loops. Adopt a private sector 'let's-do-it' culture.
- Open the conversations; open the dialogue.
- No one person has all the answers. The wisdom of the crowd needs to be accessed.

"We have no hard numbers on our cluster's performance"

- Then, as the cluster manager, you are vulnerable.
- Changes over time must be measured.

- Start gathering your cluster's baseline data from Day One. Hard evidence is needed on changes to the size and health of the cluster.
- Keep the data gathering simple and consistent.

"We are doing stuff we were told to do by our funder"

- Whose cluster is it? It's not 'theirs'!
- Funders should participate in setting the cluster's direction … alongside the cluster's other stakeholders.
- A strong clustering initiative has multiple sources of funding, so no one funder can over dominate the cluster's development agenda.
- Depoliticise decision-making; carefully gather the facts.

"It (the clustering initiative) has became a fluffy talk shop"
"Clustering is looking at generic problems"

- Is the cluster so broad that the collaborative agendas that emerge are generic?
- If so, disaggregate … reorganise into smaller units; find the cluster's hot spots.
- Move early into action, find the low hanging fruit, and quickly generate benefits.

"Our cluster's strategic plan was set three years ago"

- Clusters operate in dynamic environments.
- Move on from 'one best strategy' developed through top-down analyses.
- Facilitate local experimentation and the development of bottom-up initiatives.
- Don't debate new cluster agendas that are backed by passion, just test them and learn. Strategy development then becomes an emerging process.

"Just a very few are engaged with our cluster's projects"

- There is a real danger with limited inclusiveness in the development and implementation of the cluster's strategy … a few deciding and then acting on behalf of the many.
- Active participation comes with inclusion. The strategy needs to be developed and owned by the cluster's stakeholders, not imposed on them.
- Don't restrict the strategy setting to the Board, or an 'old boy's club'.
- Don't limit participation in the clustering initiative to SMEs or to an ethnic group
- Don't exclude foreign owned companies
- Don't block the entry of new actors who could revitalise a cluster
- Don't artificially confine a clustering initiative within political borders.
- Don't over rely on a few key firms and a few senior people and then expect too much from them. Avoid volunteer burn out.
- Ensure that the cluster manager is not the only 'Project Manager'. Identify the talent within the cluster and empower.

"I have no time to go out and visit firms."

- This is a **BIG** warning sign
- The cluster manager's starting point is the knowledge and trust accumulated through frequent personal contacts with the cluster's key stakeholders.
- Equipped with this knowledge, the cluster manager is in a position to act as a boundary crosser between the cluster's stakeholders and able to identify needs-driven collaborative projects.

"We are only about businesses. Large businesses"

- Then you are choosing to do only the easy stuff.

- Small firms are essential elements in a cluster's ecosystem.
- As are Public Agencies and Academia.
- Garnering alignment amongst public agencies is one of the most difficult tasks.
- Political support (with or without agency funding) is mandatory.

"We have succeeded! Our firms no longer compete with each other"

- Hold it! We can go too far in hand holding.
- A healthy and dynamic system feeds on competition.
- A co-opetition culture is needed, a combination of rivalry and collaboration.

"Our cluster's Board has not changed for many years"

- Is it time to refresh and to spread the workload?
- Is it time to invite new leaders who are able to energetically address current priorities? The players are needed, not the spectators.
- Is it time to invite some current board members to join an 'Advisory Board' for the cluster?

'Value chains? Regional Innovation Systems?
No way … WE JUST DO CLUSTERS"

- Cluster development is just one framework in upgrading competitiveness.
- The starting point is the cluster manager having an in-depth knowledge of the cluster's key stakeholders.
- Two fertile arenas are (1) at the cluster's boundaries and (2) private collaboration between firms.

Post Review Check List	
Close Projects?	As part of the review, it may be appropriate to close down slower moving projects that are not delivering expected results and reallocate energy and resources elsewhere. Not every initiative will deliver value: the initial champions may have moved out of the community, the passion for the initiative may have gone or a changing competitive situation may have altered the relative importance of an initiative.
Re-energise?	There are many examples of clusters that ceased to invest in product development, new technologies and new market development and where new businesses and spin-offs have ceased to come through. As a result a window has been left open for a competitive cluster to draw ahead. There is no time at which a clustering initiative can rest and claim 'We have made it'. It is important that confidence does not lead to inertia. Clusters, like firms, have life cycles. Do aspects of the clustering initiative require re-energising?
Preferred Future?	Time to revisit? Is it still setting a challenge? Perhaps now too broad, as the cluster's specific specialities are better understood?
Broaden the Cluster's Agenda?	With growing confidence in the clustering approach, the opportunity could be taken to extend the portfolio of activities and the number of people directly involved with the task forces.
Review Board Membership?	Are there on the Board spectators rather than active players? Can the current Board members energetically address the cluster's priorities? Is the workload being shared? Is there a danger of burnout by the Chairman or others? The time may be right to review and reinvigorate the membership of the cluster's Board.

Establish a Cluster Advisory Board?	As part of reviewing the cluster's governance structure, this could be the time to establish a Cluster Advisory Board with the role of providing high-level support to the cluster. This informal organisation could over time build up to 20 - 30 senior people, meeting annually. Members could include people retiring from the Board to ensure their continuing involvement. Addition members, using triple helix principles, could be senior politicians and academics and representatives from national organisations who are involved in areas that support the cluster's development. Seniors who bring credibility, influence and resources to the clustering initiative are particularly valuable.
Over communicate!	Provide feedback to the cluster's stakeholders for learning, for re-energising, for mobilising around new agendas, for new projects. Use the review to demonstrate progress, to promote success stories. Use as input into the cluster's annual 'Show & Tell' meeting.

When to Walk Away

When should a clustering initiative be terminated? This will be driven by failure rather than success.

It is important to differentiate whether it is the cluster that is failing (such as loosing market share, anchor firms exiting) or the clustering intervention. A mature cluster can be in decline due to market, technology and competition pressures that are beyond its ability to adapt. At times a clustering initiative simply fails to fire.

When to Walk Away
The benefits of the clustering initiative are perceived as too marginal to maintain the interest of business. This can particularly occur during times of strong business growth. There is a collective myopia amongst the cluster's stakeholders, an inability to comprehend how the future is unfolding and to respond. Lack of urgency. Inertia with the assumption that everything will turn out well without the need for deliberate action. Distrust is too intensive. A historic lack of dialogue and trust across the cluster that is too much to overcome within the funding time frame. Previous negative experiences with public agency sponsored initiatives; a lack of passion and faith that change will be created through this initiative. A lack of business leadership. The senior stakeholders remain sitting on the fence waiting for each other to take the lead … and no one does. Or, quite simply, it is an inappropriate time to engage with the cluster.

With a struggling intervention and difficult forward movement, it can be better for a public agency to exit gracefully, leaving the door open for a future re-start, or to scale-down the level of resources committed. Consider carefully as a total walk-away can severely damage even the embryonic trust that may have started to develop amongst cluster's participants. Exiting from a failing clustering initiative is never easy but may be the key to reinvigorating the group. When it is obvious that the initiative is not providing value, it is better to stop. Don't push to complete a pre-defined process for the sake of the project.

However, there may be seeds in place for a new cluster(s) to emerge at the periphery of the mature cluster. If so, then there can be logic in public funding being narrowly targeted at the emerging capability.

A retreat should not significantly harm the cluster. The cluster was in place before the intervention commenced and its existence should be acknowledged and respected. Personal contact should therefore be maintained with

the cluster's senior stakeholders. Bridges should not be burnt. The provision of information on successful clustering initiatives elsewhere may be sufficient to pull the group back together later on, in their time. Alternatively, as has happened with underperforming initiatives in **Sweden**, short term funding is offered on the condition that substantial changes are made.

Case Study 1: Benchmarking a Cluster Organisation

Benchmarking should be viewed as a continuous learning tool to improving processes and the performance of the clustering initiative. **Bench learning** is a less formal approach, and can be used by two or more cluster organisations who share their experiences and learning across key dimensions.

Whilst each cluster is unique in terms of its development path, its culture and its opportunities, it is now becoming easier to benchmark thanks to the development of German benchmarking tool. This benchmarking can be sector specific. The European Secretariat for Cluster Analysis (ESCA) with the support of VDI/VDE Innovation + Technik GmbH, Berlin have introduced a cluster initiative benchmarking process that centres on an extensive interview with the cluster manager by an ESCA benchmarking expert. Thirty-six indicators are used to capture information on the cluster and the cluster organisation.

European Secretariat for Cluster Analysis	
Benchmarking Indicators	
Cluster Structure	Age of the cluster organisation Legal form of the cluster organisation Nature of the cluster: driving forces Nature of the cluster: degree of specialisation Composition of the committed participants Geographical concentration of the committed participants Utilisation of regional growth potential International participants of the cluster Nature of cooperation between cluster participants
Cluster management & governance **Cluster organisation's strategy**	Clear definition of the roles of the cluster manager / Implementation of a governing body / Degree of involvement of the participants of the cluster in the decision making process Number of cluster participants per employee of the cluster organisation Human resource competences and development in the cluster organisation Strategic planning and implementation processes Thematic and geographical priorities of the cluster strategy
Financing of the cluster organisation	Share of public funding, chargeable services, membership fees and other private sources in the total budget of the cluster organisation in relation to the age of the cluster Financial sustainability of the cluster organisation
Services provided by the cluster organisation **Spectrum and intensity**	Acquisition of third party funding Collaborative technology development, technology transfer or R&D without third party funding Information, matchmaking and exchange of experience among participants Development of human resources Development of entrepreneurship Matchmaking and networking with external partners / promotion of cluster location Internationalisation of cluster participants

Contacts and interaction with relevant players	Regular contacts with cluster participants Integration of the cluster management organisation in the local and national system of innovation Customer and membership satisfaction
Achievements, recognition of the cluster organisation	Number of external cooperation requests received by the cluster organisation Institutional origin of external cooperation requests Geographical origin of external cooperation requests Characteristics of cooperation with other international clusters Visibility in the press Impact of the work of the cluster organisation on R&D activities of the cluster participants Impact of the business-oriented services of the cluster organisation on SME participants Degree of internationalisation of cluster participants Impact of the work of the cluster organisation on international activities of the cluster participants

See www.cluster-analysis.org for additional information

At the Bronze level, the benchmarking compares a cluster to a portfolio of 870 clusters from 40 countries (as at September 2016). At the senior Gold level, benchmarking is against 79 well-established clustering initiatives from 16 countries. A number of countries now make ESCA accreditation a condition for receiving public funding.

ECSA's final report provides comparison of the cluster with clusters from the same technological area and the most excellent ones in Europe, along with recommendations for improvement. This benchmarking provides a cluster manager with immediate feedback on the status of the cluster compared to peer clusters. The results document strengths and indicate areas for improvements.

The approach has been used to evaluate IKT Grenland, a **Norwegian** ICT cluster[37]. The evaluation was undertaken through a half-day interview with the cluster's manager and compares the Norwegian cluster with (1) a sample of other ICT clusters and (2) a broader group of other 'Quality Clusters'. For each of these indicators, judgements are made as to how the particular cluster compares with the clusters it is being benchmarked against, identifying if the selected cluster is in the upper quartile, the lower quartile or between these two, the median (accounting for 50% of the distribution).

The results from such a benchmarking process help the cluster manager in identifying areas that require attention. The final report should be used as the basis for a Board discussion. While benchmarking provides a comparison with the 'best', the result should be much more than a ranking.

[37]The 'Cluster Benchmarking Report' on IKT Grenland, Norway prepared by Gerd Meier zu Köcker, Institute for Innovation and Technology, Berlin, 2009

Case Study 2: Reviewing Sweden's Cluster Initiatives

One of the lead cluster programmes globally has been developed by **Sweden's** national innovation agency, VINNOVA. Funding of Euros 1 million is locked in for each of ten years to the winning Vinnväxt initiatives, subject to a three-year review. This review takes a 360° look at each of the clustering initiatives. Broad input for the independent review comes from the cluster management team, the cluster's Board, local businesses, academic and political leaders and the Vinnova programme management. The evaluation focuses on the following issues:

- The quality of implemented research, innovation/commercialisation strategies and results from an international comparison perspective;
- The achievement of the initiatives in setting up the organisation, the processes and mobilising key actors;
- The conditions established for the sustainability of the initiative after financing through the Vinnväxt programme has ended.

The evaluation is also provides input to the strategic development of the initiatives and the action plan for the following three years.

The evaluations are undertaken by an international panel comprising 3-4 cluster/innovation experts (selected by VINNOVA)[38] and two international technical experts (selected by the cluster being reviewed). The framework that has been developed to summarise the observations builds on the programme's objectives as well as experiences on cluster development from Sweden and globally, with two themes:

1. The innovation stretch of the initiative

- Knowledge base: academia
- Knowledge base: firms, absorptive capacity
- Commercialisation & Entrepreneurship
- Equity finance: venture capital, angel funding
- Cluster scale: potential regional impact

2. The quality of the clustering intervention

- Governance
- Strategic focus, including internationalisation
- Process leadership
- Connecting & catalysing; Leveraging the regional innovation actors
- Raising the cluster's profile

Sweden's Cluster Review Process, 2013	
Timeline	**Activity**
Prior to site visit	Preparation by the clustering initiative of a detailed and comprehensive report covering the last three years of the initiative
On site, **Day One**	A series of 6-7 separate and intensive discussions with a range of the cluster stakeholders. In total 30-50 people may be participating in these meetings: • The cluster manager and team *(the only meeting with a PowerPoint presentation)* • The cluster's Board • Businesses innovators and entrepreneurs in the initiative • SMEs and global companies in the initiative • University management and researchers • Intermediaries in the regional innovation system
On site, **Day Two**	**Morning:** Discussion amongst the international team exploring differences in views and interpretations from the previous day. Preparation of a 60 minute PowerPoint presentation with recommendations for the next phase of the cluster's development. **Afternoon:** Presentation by the international team to the cluster Board, management and local political, business and academic leaders followed by an open discussion. *The afternoon session benefits considerably from having a wide range of cluster's stakeholders present in terms of both the discussion and the internalisation of the conclusions.*
Following site visit	Submission of a concluding report, typically 10 pages, that extends the PowerPoint presentation and takes into account the Day Two afternoon discussions.

[38]My colleagues on the international panel have been Phil Cooke, Alexander Eickelpasch, Peter Kempinsky, Lisa de Propris and Jørn Rangnes. The final reports are available on Vinnova's web site, e.g. www.vinnova.se/upload/epistorepdf/vr-07-11.pdf

Based on the 2011 evaluation of the initiatives, the international panel made the following general recommendations to the initiatives:

- Clarify the importance and potential of the cluster to the region and nationally;
- Systemic thinking and fresh business models are needed for the sustainability of the initiative;
- Internationalisation needs to be at the core of the initiative, supporting the globalisation of the cluster's firms;
- Strengthen the business dimension in governance board and process management;
- Diversity as a driving force for growth and sustainability needs a broader perspective than just Gender;
- Take the accumulated knowledge and experiences on innovation systems and clusters to a wider Swedish audience.

The international panel also made the following recommendations to VINNOVA to lever their investment in the Vinnväxt program:

- Insert more competitive elements in the further implementation of the programme; reward the most competitive;
- Support the initiatives more pro actively by stretching the ambitions;
- Use the Challenge Driven Innovation Concept to build on and link the Vinnväxt initiatives;
- The initiatives are 'Mini-VINNOVAs' and the hands on involvement of other parts of VINNOVA is a win-win;
- Support more active learning and sharing between the initiatives;
- Tighten collaboration with supporting national actors, especially for the internationalisation of the initiatives;
- Establish a standardised web presence for all Swedish cluster initiatives (for example www.kompetenznetze.de);
- Support the learning of regional authorities in the development of integrated regional innovation systems, drawing on VINNOVA's comprehensive learning from different programmes, including Vinnväxt.

Case study 3: Reviewing an African Cluster Programme

A multilateral agency was the prime funder of this 36-month East African cluster development programme. It was managed by a private sector organisation based in the country with support from US consultants. At the time of the review the programme had been running for 24 months with some activities still ramping up. A formative evaluation was conducted that focused on the effectiveness of the design and delivery of the program, the progress to date and lessons learned[39].

Multiple lines of data that triangulated evidence formed the basis for the findings and recommendations. Documents and files were reviewed along with monitoring and evaluation data. Interviews were held with representatives from 30 organisations including donors, partners, a university, government departments, the industry associations from the three priority sectors and businesses. Discussions focused on the appropriateness of the program design, the effectiveness of its delivery, its progress toward achieving objectives, lessons learned to date and the adjustments needed to maximize the programme impact in the time remaining.

At the conclusion of the visit a presentation was held with the sponsoring organisation and the main stakeholders. The presentation identified that a well-qualified and energetic team had been engaged to manage the initiative. However, certain aspects of the program design had detracted from its effectiveness, arising in part from the program's terms of reference and the lengthy contractor procurement process; the attempt to manage regional clusters from the capital city; the exclusion of key partners from the project and a lack of integration with other cluster development activity in the country.

The program had a baseline of economic indicators that could not be attributed to the programme's activities. The evaluation found that it was unrealistic to expect to see evidence of outcomes being achieved after just two years. It was also unrealistic to expect that such a programme could be sustainable after 36 months without external funding.

[39]My colleagues in undertaking this review were two Canadians, Brian Webber and Chris Ritchie.

Step 12 Check List: Measurement & Evaluation

- Is there evidence that the cluster's core firms are able to profitably service more distant customers? Is the cluster's competitiveness being upgraded?
- Has evidence been sought that the initiative is making a real difference to the profitability and activities of the cluster's firms? Is the clustering initiative adding value to the cluster? Does the review extend to identifying what is working, and what is not?
- Is the review process being used to revisit the cluster's strategy, the governance structure and the management team? Should the cluster's preferred future now be s-t-r-e-t-c-h-e-d further?
- Is there movement from *clumps* of isolated firms to co-opetition amongst networked firms? Evidence of a more collaborative culture? Have different interests been integrated? Has trust been built?
- Movement from public agency *clutter* to achieving multi-agency alignment, driven by the needs of business?
- Movement from paralysis-by-analysis ⟶ learning-by-doing?
- And from public agency supply-push ⟶ demand-driven, needs driven support?
- Does the clustering initiative hold an annual 'Show-and-Tell' public meeting, the equivalent of an AGM?
- Does the initiative require re-energising, possibly re-designing, with a tighter focus on deliverin benefits to the cluster's firms through addressing the more central issues?
- Is the clustering initiative still relevant?

Danger signs

- The review is only concerned with 'hard data', such as the number of new jobs created.
- The review process does not appreciate that cluster development is long term.
- The review process is only being undertaken to satisfy the cluster funders, not to more fundamentally review the cluster's strategy and organisation structure.
- The level-of-effort being applied for the review is out of proportion to the resources applied to the cluster's development.

Everything will turn out all right in the end.
If they do not turn out all right, it is not the end.

Dev Patel, Best Exotic Marigold Hotel

CHAPTER 5

CLUSTER DEVELOPMENT FAST TRACK

In the absence of substantive financial support, can regions with limited resources engage on cluster development?

Absolutely.

I have supported a number of regions with cluster development pilots. There were insufficient resources and time to systematically move through the Twelve Step process that is my strong preference. A fast-track route was needed.

Cluster based economic development is fundamentally about changing behaviour patterns … moving from clumps of solo firms and a clutter of support organisations to more integrated systems. Whilst these changes take time, the fast track route centres on quick engagement, emphasising learning-by-doing, not paralysis-by-analysis.

Cluster Development: A Fast Track		
# 1: Cluster identification	Shortlisting a cluster for pilot development, with consideration to (1) driver clusters already attracting wealth into the region and (2) emerging clusters.	**See Chapter 4.2**
# 2: Cluster Muster	A public meeting, open to all with an interest in the cluster, introducing (1) the initiative, with relevant international examples and (2) the cluster's development person.	**See Chapter 4.3**
# 3: Initial appraisal	Extensive interviews with the cluster's firms and support organisations. A question: *What is holding you back from doubling?*	**See Chapter 4.3**
# 4: Strategy workshop	A cluster-wide workshop, (1) reviewing the appraisal and (2) identifying immediate opportunities, projects for collaborative development.	**See Chapter 4.6**
# 5: Establish project teams	Establishing Cluster Action Teams (CATs) to engage on the immediate agendas, the *'low hanging fruit.'*	**See Chapter 4.7**

Time is needed rather than cash for this fast track process … time in particular for #3, a series of individual interviews with the cluster's core firms, support firms and soft infrastructure and for #5, supporting (but ideally not managing) the project teams.

As cluster development centres on building links and bridging gaps, a local person (as the cluster manager) who establishes a long-term relationship with the cluster's stakeholders should undertake these activities, not an outsider briefly parachuting in.

This cluster manager could be sponsored by e.g. a private sector organisation (as in Austria, Columbia, Iceland and the Pacific Islands), a public agency (as in France, Norway, Sweden), or a university (as in Uganda). A key is effective triple helix teamwork and moving at the speed of business.

'Low hanging fruit' projects could be early participation in a trade fair, addressing an immediate training need or establishing a cluster web site. Opportunities should also be made for the cluster's stakeholders to regularly interact, such as 'First Tuesday' meetings.

Securing early engagement on such *'low hanging fruit'* projects creates the appetite to subsequently engage on more substantial, longer-term activities.

Three important caveats with the Fast Track route:

1. Whist a Fast Track clustering initiative is about rapidly engaging, it still needs **long-term** staffing – one or two senior people who act as the cluster manager (possibly part-time). If this is not in place, then there is the danger of exciting business interest to no avail.
2. If sub-contracting the cluster manager function to a consultant, this **must** be long term. Cluster development is about long-term relationships, not short-term analysis. Analysis is the relatively easy task.
3. While the clustering initiative may be largely public agency funded, it is **private sector** driven and moves at the speed of business.

CHAPTER 6

ACKNOWLEDGEMENTS, FURTHER INFORMATION

This final chapter acknowledges the many who have contributed to this handbook.

It provides openings to further information sources, supplementing the quotations used in the handbook.

1. The TCI Network

TCI (www.tci-network.org) is the global practitioners network for competitiveness, clusters and innovation. TCI has been a leading source of contacts and fresh ideas, in particular the Annual Global Conferences. I acknowledge the four who founded TCI with me in Chihuahua, Mexico in 1997: Emiliano Duch, Mike Enright, Eric Hansen and the late Frederic Richard. I have had the opportunity to serve as TCI President and I acknowledge the others who have contributed in this role: Emiliano Duch, Alec Hansen, Lars Eklund, Juanma Esteban, Alberto Pezzi and currently Christian Ketels.

Most of the Invited Forewords to specific Chapters have been written by TCI Network experts.

> *"The TCI Network is a powerful glue that links hundreds of cluster practitioners from around the globe. People who, working from very different environments and situations, share knowledge and practical experiences for a common end: to improve the competitiveness and the welfare of their regions using an inclusive and sustainable approach."*
>
> **Alberto Pezzi** TCI Past President

2. Authors on Competitiveness, Clusters and Regional Innovation Systems

Most of the Invited Forewords to specific Chapters have been written by TCI Network experts:

- Professor Philip Cooke, Bergen University
- Dr. Joe Cortwright, Impresa Inc., Portland, Oregon
- Professor Michael Enright, University of Hong Kong
- Dr. Christian Ketels, Harvard Business School and TCI President
- Professor Michael E. Porter, Harvard Business School
- Professor Torger Reve, BI Business School, Oslo
- Dr. Stuart Rosenfeld, Regional Technology Strategies Inc., North Carolina
- Professor Örjan Sölvell, Stockholm School of Economics
- Dr. James Wilson, Basque Institute of Competitiveness - Orkestra
- Professor David Wolfe, University of Toronto

3. Published Papers, Cluster Manuals

There is a huge range of research papers and reports available on clusters and cluster development. Those identified above have contributed to many. In addition the references below acknowledge some of sources that I have drawn on:

For an extensive library on cluster related publications, see http://www.clusterobservatory.eu/index.html#!view=documents;mode=all;sort=name;uid=;id

For a wide-ranging review of the academic literature on clusters with a comprehensive reference list: *"Founders and disseminators of cluster research"*, Lazzeretti, Sedita & Caloffi, Journal of Economic Geography, 2013 http://joeg.oxfordjournals.org/content/early/2013/02/17/jeg.lbs053

Brookings Institution, *The New 'Cluster Moment' – How Regional Innovation Clusters Can Foster the Next Economy – Mark Muro & Bruce Katz*, Washington, 2010

European Commission, *Smart Guide to Cluster Policy*, Guidebook Series, 2016

OECD, *Regions and Innovation Policy*, OECD Reviews of Regional Innovation, 2011

World Bank, *Cluster Initiatives for Competitiveness: A Practical Guide and Toolkit*, 2009

UNIDO, *Making Clusters Work* http://www.enterprise-development.org/wp-content/uploads/Making_Clusters_Work.pdf

UNIDO, *Approach to Cluster Development, Key Principles and Project Experiences for Inclusive Growth*, 2013

UNIDO, *Cluster development for pro-poor growth*, 2009

US National Governors Association, *A Governor's Guide to Cluster-Based Economic Development*, 2002

4. Websites

Organisation	Website
TCI Network, Barcelona	www.tci-network.org
Brookings Institution, Washington DC	www.brookings.edu
Canada, Institute for Competitiveness & Prosperity	www.competeprosper.ca
Cluster Green & Red Books, Stockholm	www.cluster-research.org
Cluster Platform Germany	www.clusterplattform.de
Cluster Portal Baden-Wuerttemberg	www.clusterportal-bw.de/en
Denmark, Cluster Excellence	www.clusterexcellencedenmark.dk
EU Cluster Portal	www.ec.europa.eu/growth/smes/cluster
European Secretariat for Cluster Analysis, Berlin	www.cluster-analysis.org
France Clusters	www.franceclusters.fr/en
India, Foundation for MSME Clusters	www.fmc.org.in
Norway Innovation Clusters	www.innovationclusters.no/english
OECD, Paris	www.oecd.org
Sweden, VINNOVA	www.vinnova.se
UNIDO, Vienna	www.unido.org/clusters www.clustersfordevelopment.org
US Cluster Mapping Portal	www.clustermapping.us
US Council on Competitiveness	www.compete.org

5. Videos materials

TCI network, Why Clusters Matter series: www.tci-network.org/news/1097?platform=hootsuite

Cluster library: cluster cases and cluster-related documents (e.g. on cluster management; www.clusterobservatory.eu/index.html#!view=classroom;url=/classroom/OnClusters/ClusterManagement

Cluster Development Handbook

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