

**CAN GOVERNMENT CATALYZE CLUSTERS?
EXAMPLES OF GOVERNMENT ACTIONS**

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Table of Contents

Introduction

Cluster as an Economic Development Model

What are Clusters

What Makes Clusters Successful

Reasons for Its Widespread Appeal

Concerns About the Cluster Approach

Why the Cluster Model is Effective

Government Role and Specific Government Actions

Key Government Functions

Government Actions and Their Impact on Selected Clusters

Areas for Government to Support Clusters

The Ontario Government Mobilizes the Mining Cluster Participants

The Ontario Ministry of Northern Development and Mines

Mining Sector as a traditional engine of Economic Growth

Steps the Ontario Ministry of Northern Development and Mines Took

Quotes from Stakeholders

Conclusion

Appendix - Examples of Government Actions

Acknowledgement

References

Can Government Catalyze Clusters? Examples of Government Actions

“There is room for governments to show greater entrepreneurial acumen and zeal in providing support to clusters....governments should seek out cluster participants and proactively understand their needs at a time when early action can have a transformative impact.”¹

1. Introduction:

There is growing evidence that the shape of economic policy and practice is changing significantly around the world at the dawn of the 21st century. Globalization, rapidly changing technology, intense competition and the rising public expectations for a higher standard of living create significant challenges to conventional economic development approaches. Governments continually search for new tools and policy formulas to improve economic performance and create economic prosperity for all citizens.

In this context a more proactive and strategic role for government in support of the cluster-based economic development model has emerged. There is a growing consensus that if done right, this model can provide a foundation for sustainable economic growth and the way forward to greater prosperity.

Over the last decade, clusters have drawn substantial attention from policy makers, legislatures, business leaders, academics, economic development practitioners and development agencies. Cluster development strategies have been implemented in many parts of the world. Thirty countries, thirty-two American states and all of the Nordic countries have implemented cluster initiatives to position their economies to meet the challenges of the new economy.² Clusters are present in the economies of developed and developing nations, large and small, urban and rural, and across jurisdictions (e.g., nations, states, metropolitan areas, regions and cities).

Governments with widely differing ideologies and philosophies have instituted cluster promotion policies. In the United States and Canada, liberal and

¹ Roger L. Martin and Michael E. Porter, “Canadian Competitiveness: A Decade After The Crossroads Working Paper – 1”, (C.D. Howe Institute, 2001)

²Other organizations that promote and support cluster based economic development include: World Bank, Agency for International Development, United Nations Economic Commission for Latin America and the Caribbean, Organization for Economic Cooperation and Development, International Development Research Centre, Social Sciences and Humanities Research Council of Canada, the US Council on Competitiveness, the Nelson A. Rockefeller Institute of Government, the SNS Economic Policy Group of Sweden and the European Union. www.btimes.co.za/97/0817/survey/survey5.htm

conservative governments have adopted cluster-based strategies.³ They are being employed in Europe by governments across the spectrum - right to left. In the Asia Pacific region, national and local governments from Australia and Malaysia, to New Zealand and Singapore have adopted cluster strategies.

The objective of this paper is three-fold: to discuss *why* clusters are an effective economic development model; to substantiate that government *can* catalyze clusters, and; to discuss a recent experience of how the Ontario government mobilized cluster participants.

While the focus of this paper is on government role and actions, the author recognizes other organizations such as firms, educational and research institutions (colleges and universities), non-profit organizations and trade associations all play important roles in cluster development and have a catalytic effect on clusters.⁴ For example, the private sector is the key to success as private sector-led initiatives are simply more successful. Anchor companies play a disproportionately large role in seeding and upgrading clusters, acting as a magnet for other companies and supporting projects that improve the business environment. Educational and research institutions play pivotal roles in cluster development. It is worth noting that the majority of clusters either originated at educational institutes or in close proximity to universities. Community colleges and vocational apprenticeship training centers produce the specialized workforce essential to the cluster's success.

This paper is organized as follows: Section 2 discusses what a cluster is, what makes a cluster successful, some of the concerns about the cluster approach and why cluster-based economic development is effective; section 3 describes the government role in cluster development, identifies specific examples of government actions and their impact on clusters and recommends areas for government action to strengthen clusters; section 4 presents an example of how the government mobilized cluster participants and covers differing viewpoints for why this cluster approach appealed to a broad spectrum audience; and, section 5 provides concluding remarks.

Appendix 1 lists selected examples of actions taken by governments at all levels in support of clusters.

³ Michael J. Enright, "The Globalization of Competition and the Localization of Competitive Advantage: Policies Toward Regional Clustering", *The Globalization of Multinational Enterprise Activity and Economic Development*, (London, MacMillan, 1999)

⁴ Micheal E. Porter, Monitor Company, ontheFRONTIER, Council on Competitiveness, *Clusters of Innovation: Regional Foundation of US Competitiveness*, 2001 refers to these organizations as institutions for collaboration. These include firms, related and supporting industries, universities, research centres, training institutions, trade association, government and so forth."

2. Clusters as an Economic Development Model

Varying definitions of clusters include: "... A geographically proximate group of inter-connected companies and associated institutions in a particular field, linked by commonalities and complementarities"⁵; "...A group of inter-related industries that drive wealth creation in a region primarily through the export of goods and services"⁶; "...A group of industries whose linkages mutually reinforce and enhance their competitive advantage. They can be each other's consumers, competitors, partners, suppliers or research and development sources."⁷

The origins and trajectories of clusters differ. The initial stimuli for a cluster may have been the availability of raw material; suitable climate conditions; proximity to markets; chance events; R&D facilities; an educated workforce; a culture of entrepreneurship; or a culture that values higher education. It may take decades for a cluster to reach maturity. The evolution of the world's largest clusters has occurred over a long period of time. These were not planned per se and went unnoticed until they reached a level of activity that warranted attention. Examples include Hollywood's movie production, Dutch flowers, and Silicon Valley North electronics industries.

A cluster may progress through different stages including birth, potential, emerging, sustainable, mature and declining.⁸ This is not to imply that all clusters experience all of these phases. Clusters also vary in size from as large as Hollywood to small, highly-specialized clusters that pursue global markets and "generate wealth well beyond many other localities in their country."⁹

What makes a cluster successful? A number of important factors include: the availability of venture capital; critical mass; technical infrastructure; presence of higher education and research institutions; entrepreneurial drive; influence of champions; presence of an anchor firm(s); networks and quality of linkages; social capital; and, diversity. An intriguing aspect is that the factors that distinguish 'over achieving' from 'under achieving' clusters are so-called intangible assets. Clusters possessing strong inter-firm relationships, trust and social capital are more competitive and dynamic. According to Enright, 'overachieving' clusters are aware of the interdependence of their players and, in essence, produce more than the sum of their parts. 'Underachieving' clusters

⁵ Michael E. Porter and Scott Stern. "Innovation: Location Matters" *MIT Sloan Management Review*, Vol.42 No. 4, (Summer 2001)

⁶ San Diego Association of Governments, *Understanding Cluster Analysis*, (1999).

⁷ Scottish Forest Industry Cluster, "Roots for Growth – A Strategic Framework for Action for the Scottish Forest Industries", 2000.

⁸ Kenneth White and Peter Gunther. *Review of Knowledge Intensive Clusters in Canada Scoping Study*, (Acton White Associates, 2001)

⁹ Cluster Navigators Ltd., "Cluster Building: A Toolkit", (Cluster Navigators Ltd., 2001)

have opportunities but synergies are not yet realized, while potential clusters have some of the requirements but lack social capital.¹⁰

While these intangible assets promote and cultivate collaboration, a high degree of competition plays a pivotal role in successful clusters. A major study on clusters notes that clusters that rely on competition and rivalry are significantly more competitive than clusters that rely on factor conditions, such as climate, stock of natural resources and geography.¹¹

Some argue that the *reasons* for the widespread popularity of the cluster approach are: a) Due to a fascination with and desire to emulate the Silicon Valley model; and, b) Porter's and others' effective marketing of the cluster approach.¹²

While some cluster initiatives were inspired by the success of Silicon Valley, interest in clusters should have waned with the burst of the technology bubble. Rather, interest continues to grow.¹³ According to Jocelyn Ghent-Mallet,

“Clusters are attractive for many reasons. They catalyze economic transformation. They drive growth and enhance stability. Once they are rooted they are remarkably self-generating. In the recent downturn in information technology, the Ottawa community lost 25,000 jobs and then quickly recovered almost all of them. Clusters look like a good bet for economic success. No wonder everyone wants one.”¹⁴

Furthermore, as noted by the US Department of Commerce, “Clusters can provide a stabilizing force and an engine for growth and positive identity for the region.”¹⁵

It is true that Porter's persona as the celebrated architect and promoter of the cluster concept, have influenced the reception of cluster approach. “Every sentence he utters has to have a point and preferably a practical application,”¹⁶ noted Peter Gaskell. It is true that there has been a proliferation of cluster

¹⁰ Enright, 1999

¹¹ Dr. Claas van der Linde, “The Demography of Clusters First Findings from the Cluster Meta-Study “ (October 2001) The study looked at 719 clusters from 49 countries including 23 developing countries. The preliminary findings shed some light on why some clusters are more competitive than others.

¹² Ron Martin, Peter Sunley, “Deconstructing Clusters: chaotic concept or policy panacea”, *Journal of Economic Geography* (2003)

¹³ In the last six months numerous conferences on clusters have taken place Copenhagen, London, Cambridge, Montreal, and Ottawa to name a few.

¹⁴ Jocelyn Ghent-Mallet, “Silicon Valley North: The Formation of the Ottawa Innovation Cluster” (Information Technology Association of Canada, 2002)

¹⁵ Economic Development Administration of US Department of Commerce, “America's Clusters”, 1997

¹⁶ Peter Gaskell, “Porter's Precious Cure for Bad Location Choices”, *Corporate Location* n.d.

practitioners and international consulting firms who provide expertise and have marketed the cluster model effectively.

On the other hand, one can argue that the main reason for the appeal of the cluster approach is its association with productivity growth and prosperity. Another reason, as Terry Bibbens notes, is the stability of clusters, "Clusters are impossible for other regions to steal. Even if one or two companies are tempted away, they will most likely be replaced by others."¹⁷

Some of the concerns expressed with the cluster approach include:^{18 19 20}

- 1) Cluster definitions are broad and ambiguous;
- 2) It may not be applicable to rural areas as they could lack the necessary scale for a cluster;
- 3) Communication technology is replacing the need for spatial or geographic clustering; and,
- 4) Scarcity of research on the effectiveness of the cluster approach in generating economic benefits.

These concerns are addressed as follows:

1) Cluster definitions are broad and ambiguous - Clusters are defined with variations due to differences in size, structure of industries, origins, performance, etc. Boundaries of clusters evolve.²¹ As new firms and industries emerge and pursue a global strategy, the stage of the cluster evolves from potential through to mature. Each cluster is as unique as the circumstances in which it evolves. Part of the reason why different types of governments can adopt cluster strategies is precisely because the approach is so flexible.

2) It may not be applicable to rural areas as they could lack the necessary scale for a cluster - This argument is not consistent with the successes of small clusters noted i.e. Renfrew, Ontario (population 10,000); Montebelluna, Italy (population 25,000); Timmins, Ontario (population 75,000) and Dalton, Georgia (population 25,000).^{22 23} Cluster theory and principles are by no means exclusive

¹⁷ Terry Bibbens, *High Technology Development: Industry Clustering*
www.sbaer.uca.edu/docs/proceedings/95sbah01.txt

¹⁸ Martin and Sunley, 2003

¹⁹ Wolfe, 2003

²⁰ Jessica LeVeen, "Industry Cluster Literature Review": *Urban and Rural Development*, March, 1998
www.unc.edu/depts/dcrpweb/courses/261/leveen/litre.htm

²¹ White and Gunther, 2001 Based on over 50 interviews, it noted that 'in the opinion of interviewees, markets determine cluster boundaries not those preordained by "political fiat". The report suggested that the relative efficiency of clusters within a geographic entity will be determined by the degree of: inter firm cooperation (networks); agglomeration (external economies); social capital (associated behaviour), and; technology transfer and diffusion (knowledge spill over)

²² Cluster Navigators Ltd., 2001. Overspecialization has allowed smaller communities to create wealth and reach the global market. Such examples include, Renfrew Ontario has a specialization in wood home building with specialized firms collaborating to serve Pacific Rim countries; Timmins, Ontario is using its

to urban areas. Further empirical evidence from developing countries shows that clusters can exist in rural areas.²⁴ As long as the location is able to afford competitive advantage, regardless of size, a cluster can exist and will not be dependent upon the size of the local population.

3) Communication technology is replacing the need for spatial or geographic clustering, - While Information Communications Technology has made e-education, e-business and telecommuting possible and profitable: face-to-face interactions that support an information rich environment are still needed. Both research and empirical evidence support the view that tacit knowledge is critical to innovation. Tacit knowledge is not easily transferable through technology. Clusters gain power through personal collaboration. Clustering is a powerful means to create and share tacit knowledge.

4) Scarcity of research on the effectiveness of the cluster approach in generating economic benefits - Clusters require a decade or more to develop depth and gain competitive advantage. There is a lack of available information that is cluster-focussed and intangible assets, of trust, social capital and inter-firm linkages, are difficult to measure and require unique and sometimes costly approaches such as surveys. Notwithstanding its wide spread appeal and interest, not many jurisdictions have made fundamental changes in their programmes and services to support clusters.

The cluster model is effective for several reasons. First, conventional economic development approaches, such as a sector or industry-specific strategy, are often characterized by compartmentalized and isolated activity. In contrast, the cluster approach is integrative, bringing coherence to disparate activities and projects. Clusters are defined by interdependencies and are inclusive of other economic development approaches.

Secondly, clusters drive innovation and innovation drives productivity. "Innovation and the commercialization of new technology take place disproportionately in clusters."²⁵ The argument follows that to move a concept to a commercialized product, many organizations must cooperate and collaborate. Clusters provide the critical mass for this to occur by facilitating interaction by participants. Few companies have all the necessary skills to develop unique products and services by themselves, therefore clusters, rather than single companies or industries, are the sources for income, jobs and export growth. As noted by Martin, "Clusters

comparative advantage, its climate for cold weather testing facilities and have attracted international firms; Montebelluna, Italy produces 75% of the world's ski boots and specialized footwear, and; Dalton Georgia is home to 174 carpet mills, 85% of the US carpet output and almost half the world's carpet output.

²³ Institute for Competitiveness and Prosperity, 2002

²⁴ Institute for Competitiveness and Prosperity, 2002 and Michael E Porter, et al, 2001 Both noted that traded clusters are more productive and innovative. Traded clusters are made up of traded industries which sell products and services across economic areas. The clusters are concentrated in the regions where they choose to locate production due to the competitive advantages afforded by these locations.

²⁵ Porter and Stern, 2001

produce global competitiveness, enhanced productivity and a rising standard of living wherever they exist.”²⁶

Thirdly, the cluster approach is about inclusion, collaboration and cooperation and there are benefits to all participants. The cluster approach breaks down organizational, geographic and sector silos, promotes social capital and facilitates tacit knowledge, all critical ingredients for a creating a virtuous cycle of sustainable economic growth.

From a public official’s point of view, the cluster approach promotes horizontal collaboration²⁷ and strategic partnerships. It breaks down silos that separate firms, institutions, jurisdictions and people. It focuses on strengthening economic foundations such as infrastructure and workforce development. The cluster strategy brings coherence and coordination to various programmes and funding at various levels of government that usually exist in isolation and lack cumulative impact.

Fourth, clusters provide benefits to all involved. From a major firm’s perspective, firms in a cluster share hard and soft infrastructure, energy, transportation, R&D, and health and safety standards. It provides them with access to all players, attracting brainpower, expertise and local suppliers. In turn, it makes the industry more innovative to adopt technology and enables them to develop and export unique products and services. Major multinational firms can transfer benefits of innovation to their foreign subsidiaries. Working in a cluster brings benefit to firms in terms of their being seen as good corporate citizens. Businesses in a cluster have a stronger voice compared with individual firms in targeting government funding for R&D, infrastructure, skills development, legislation and so forth.

From the educational institutions and research point of view, clusters provide critical mass for brainpower, talent, funding for R&D and access to industry. The Research Triangle Park at the University of Duke, North Carolina State at Raleigh, University of North Carolina at Chapel Hill and Biotechnology Clusters at University of California at San Diego strengthened research capabilities and promoted entrepreneurship. Being part of a cluster allows universities to translate concepts and ideas into commercialized products.

The cluster approach is not a traditional economic entity. It offers a way to better understand how the dynamics of an economy work. Clusters are not isolated, but are rather highly-connected. By recognizing this connectivity, the government and private sector can be more effective in their respective roles.

²⁶ Roger L. Martin, "A Remedy for Canada's Competitiveness Problem," *Toronto Globe and Mail*, December 20, 1999.

²⁷ Paul Crookall, “Tony Dean”, *CIO Government’s Review*, Volume 4, Issue 9, 2003. Secretary of Cabinet Tony Dean, the highest ranking civil servant reporting to the Premier, has made achieving horizontal collaboration and partnering across boundaries key priorities for the Ontario Public Service.

3. Government Role and Specific Actions

Policy makers, practitioners, academics and business leaders agree that in an economy, government plays three basic roles in providing suitable macro economic conditions, improving microeconomic capacity and, establishing a supportive and progressive regulatory environment. Michael Porter argues that these are necessary roles but may not be sufficient in and of themselves. The government role should also include facilitating and upgrading cluster development and creating opportunities for productive dialogue to bring cluster participants together.²⁸

Some of the key government functions are to:

- Play a role as 'broker', 'facilitator', 'initiator', 'participant' and 'listener' to engage partners in a productive dialogue and create a sense of urgency to cause action.
- Conduct ongoing cluster assessments to determine their viability and relative strength to ensure global competitiveness.
- Institutionalize cluster upgrading (e.g. restructuring government programmes and services, diffusing new knowledge, and collecting and disseminating data/information by clusters).
- Directly invest in and provide investment incentives for technical, physical and knowledge infrastructure.
- Sponsor cluster conferences and forums to promote 'social capital'^{29 30} opportunities for participants.

"The intervention of an organization... can influence the development of clusters,"³¹ notes Rosenfeld. "Cluster development can be enhanced by conscious private and public action,"³² adds Porter.

Both deliberate and unintentional government actions have proven to be catalysts for clusters. In the past, government actions may not have been designed to promote clusters per se but did have a catalytic affect on them. More recently, government actions have been intended to accelerate cluster growth.

²⁸ Michael E. Porter, "Clusters and the New Economics of Competition", *Harvard Business Review*, (November-December, 1998).

²⁹ Michael E. Porter. "Location, Competition, and Economic Development: Local Clusters in a Global Economy", *Economic Development Quarterly*, Vol. 14 No.1, (February 2000) views social capital as an essential part of the glue that holds clusters together. The existence of social capital depends on the ability of people to interact and that they demonstrate the willingness to subordinate their individual interests for the larger interests of the community.

³⁰ David Wolfe, "Social Capital and Cluster Development In learning Organisations", in *Knowledge, Clusters and Learning Regions*, (Queen's University, 2000) noted that trust is a rare commodity that can neither be bought nor imported it can only be built through a prolonged process for frequent interactions.

³¹ Stuart A. Rosenfeld, James Jacobs, and Cynthia D. Liston, "Targetting Clusters Achieving Excellence" (Regional Technology Strategies Inc., 2003)

³² Porter, Monitor Group, ontheFRONTIER, 2001

Even in mature clusters like Ottawa's Silicon Valley North, which evolved over decades, government actions, such as R&D spending, tax incentives, and government procurement, proved to be beneficial. These early actions were not identified as cluster support initiatives. Saskatoon's Plant Biotechnology Cluster was catalyzed by the infusion of technology and heavy R&D investments. Similarly, the government of India catalyzed Bangalore's Software Cluster through deliberate public policy, initiating 15 software technology parks. Costa Rica's government investment helped form the Information and Communications Technology cluster by establishing an economic vision and making it a key strategic priority.

The following provide examples of government actions and their impacts on clusters.

1) Government of Quebec's Cluster Agenda

In 1991, the Quebec government was the first Canadian provincial government to adopt cluster development as a government policy.³³ The Quebec government made a \$30M (CAD) cluster development commitment, identified 14 clusters and established committees for each cluster and cluster service centers. Since then, the Quebec economy has reduced its reliance on the export of raw materials to higher value products. As a result, Quebec has a stronger presence of information technology, biotechnology, multimedia and aero-space clusters.

In 2002, the Quebec government's holding company, Societe Generale de Financement du Quebec (SGF) announced that it would "turbocharge" regional economic development through the identification of regional industrial clusters to generate prosperity.³⁴

2) Niagara Ontario's Wine Cluster

Experimentation with new grape varieties and investment in advertising and marketing the Ontario wine brand were two key factors that contributed to its success. Neither could have been accomplished without government funding support.

³³ Stuart A. Rosenfeld, "Quebec in the 90's Going for Clusters", *Industrial Strength Strategies* (BR Publications Washington DC, 1995) Rosenfeld provides a good overview of the actions taken by the Quebec government in support of the cluster approach. Government publications acknowledge that a transformation of Quebec's economy from the export of unfinished raw to higher value-added products is due to the government's proactive role in directing economic and industrial development to an industrial clustering strategy.

³⁴ www.sgfqc.com/en/ Societe Generale de Financement du Quebec (SGF) is helping to identify and structure industrial clusters. It will collaborate on diagnostic analysis, market studies and international benchmarking of the best development conditions. Using its particular expertise it will initiative and set up developing and financing major projects for the clusters. Since 1998, SGF has generated \$10.6B (CAD) in investments and created 56,000 direct and indirect jobs. It has 65 international partners operating in Quebec. SGF has a new 5 year plan to foster \$11.8B (CAD) in investments.

The Ontario Government and industry leaders developed a 12-year competitive strategy from 1988 to 2000. Both the federal and provincial government invested \$150M (CAD) which catalyzed the cluster. The Ontario government provided an additional \$10M (CAD) investment from 2002-05 and, in partnership with the cluster participants, developed a strategic framework, "Poised for Greatness." This framework established goals to have a 50% market share in 5 years; 1,000 additional direct and indirect jobs; and, \$1.5B (CAD) in sales by 2020.

Today, Ontario wines are domestic market leaders with a 42% market share with its world-class wines routinely winning international awards. Ontario wines enjoy superior ratings: 82% rate Ontario wines as the best quality vs. 77% for France; 81% rate Ontario wines as the best taste vs. 73% for France; 83% rate Ontario wines as the best value vs. 59% for France.³⁵ Unique, high-quality ice-wines, developed in Ontario have become globally competitive.

3) Ottawa's Silicon Valley North

Early success at the Silicon Valley North's telecommunication cluster can be attributed to the Government of Canada's unprecedented R&D spending levels,³⁶ tax credits and start-up support for companies. "If Ottawa had not been blessed with government laboratories such as the NRC and the Defense Research Board at the end of WW2 firms like Computing Devices of Canada and Leigh Instruments would not have been created,"³⁷ notes Ghent-Mallet.

The federal government invested billions in research and development. The government was a demanding procurement customer, using its mainframe computer purchasing requirements to encourage multinationals to establish research, development and manufacturing facilities in Canada. In the 1990's, Silicon Valley North actually grew at a faster rate than Silicon Valley, California.³⁸

³⁹

4) Saskatoon's Plant Biotechnology Cluster

Saskatoon, Canada has transformed itself into a world leader and one of only a handful of identifiable agriculture biotechnology clusters in the world. Government post-war investment in research resulted in a new variety of rapeseed, canola. In recent years, international companies have moved to

³⁵ Kevin Nullmeyer, *Business Cluster Strategy Work with Ontario Wineries*, presentation 26 June 2003 at the St Andrew's Cludn and Conference Centre, Toronto, Ontario.

³⁶ Ghent-Mallet, 2002. In the late 1990's, Ottawa's R&D spending was 3x the per capita amount of other Canadian cities.

³⁷ Ibid

³⁸ Ibid

³⁹ In contrast the Federal and Provincial governments in Canada, concerned with high prices, have kept expensive prescription medicines off the drug formulary and as a result the Canadian pharmaceuticals cluster is not as well developed a cluster as it could be.

commercialize the canola plant and other technologies.⁴⁰ Saskatoon's Biotechnology Cluster at Innovation Research Park, anchored by National Research Council's (NRC) Plant Biotechnology Institute, includes over 100 companies, most of whom collaborate in the country's \$1B (CAD) canola industry. The narrow product focus and reputation for introducing world firsts and spin-offs demonstrate the benefits of a cluster's networking capacity. The government was instrumental in providing research funding and creation of a critical mass for the cluster to become self-reinforcing. It has created jobs, attracted a talented workforce and provided the region with a positive identity on the world map.

5) New Brunswick's Information, Communications and Technology Cluster

New Brunswick's Information Communications and Technology Cluster is comprised of 250 firms and 7,800 workers, of which 3900 are ICT workers and 3,300 are technical and administrative workers. The sector is very young; 70% of the firms are 10 years old or less. It generated \$500-\$770M (CAD) in revenue in 2001 and 63% of its market revenues came from outside Atlantic Canada. ICT reported an on average 3-year growth rate of 177% between 1999 and 2001.⁴¹

The provincial government catalyzed the ICT cluster. It's success was a direct result of the provincial government's bid to diversify the economy, identify ICT as a key development priority and create a local ITC market by becoming a customer of ICT products and services. NBTel, the provincial phone utility, modernized the economy and the province's community college, private technical schools and universities produced skilled personnel needed by the cluster.

6) Arizona's Strategic Planning for Economic Development – Cluster Approach

Near the end of 1980's, Arizona, like most of the United States, experienced an economic slowdown. Until the 1980's, employment growth was largely population-driven and mostly concentrated in low-wage and highly cyclical real estate, construction and service sectors. In response, a private sector-led initiative, Arizona's State Government funded an assessment of its economy.⁴² Arizona's Strategic Planning for Economic Development (ASPED) proved to be a powerful tool to revitalize the economy.⁴³ Tucson emerged as an international optics 'silicon valley' with its membership including various countries attracting optics related firms. Between 1994 and 1999, the optics cluster grew by 65%, the

⁴⁰ Camille D. Ryan, "A Proposed Framework for Analyzing Intellectual Property Structures in the Agricultural Biotechnology Cluster", *The Wall Street Journal*, 2002

⁴¹ Charles H. Davis and Norbert V. Schaefer, "Development Dynamics of a Start-up Innovation Cluster: The ICT Sector in New Brunswick", *Clusters Old and New – The Transition to a Knowledge Economy in Canada's Regions*, (McGill-Queen's University Press, 2003)

⁴² Mary Jo Waits, "The Added Value of the Industry Cluster Approach to Economic Analysis, Strategy Development and Service Delivery", *Economic Development Quarterly* Vol 14 No 1 (2000)

⁴³ www.azcommerce.com/gsped/gsped_history.htm Arizona Department of Commerce, *GSPED History*, n.d.

aero-space cluster added 60,000 jobs and the tele-services industry cluster grew from 2000 to 16000 jobs.

7) India's Bangalore Software Cluster

This is an example of a deliberate public policy to support moving from application software to systems design cluster. In 1991, the government initiated 15 Software Technology Parks instrumental in creating a critical mass of 180 companies with 20,000 skilled professional workers. It exported 85% of its software products as merchant exports \$350M (USD) in 96/97, growing at a 64% rate in 2002. While Information Technology Cluster growth worldwide has waned, the Bangalore Cluster continues to grow. Bangalore attracts talented ex-patriots, foreign investment and major corporations. Oracle, Microsoft and GE have opened offices in Bangalore.⁴⁴

It's interesting to note that Bangalore's Software Cluster evolved under a controlled economy. The establishment of the Indian Institute of Science and Hindustan Aircraft Limited were two government actions that provided the initial stimuli for the cluster.

8) Taiwan's Semi-Conductor and Telecommunications Clusters

Taiwan's Hsinchu Science-Based Industrial Park is an example of government intervention. The government has invested \$1B (USD) since 1980, and provided tax exemptions, generous grants and government laboratories (e.g. ITRI) specializing in computer semi-conductors and telecommunications. The Park was established in 1980 and now has over 334 firms with 98,616 employees generating over \$7,054,000 M (USD) in annual sales.⁴⁵ The government reached its break-even point on the project's annual \$40 M (USD) running costs in 1996. The cluster attracts foreign investment and has enticed talented ex-patriot workers back to the region.

Government actions that have led to cluster success

The federal, provincial and local governments provided funding for both the development and implementation for the cities of Ottawa-Carleton and the Greater City of Edmonton. One year after implementation each reported benefits in terms of enhanced networking opportunities and new business start-ups.

The government of South Africa provided funding to assess the capital equipment cluster (minerals and metals) and to develop a cluster strategy. The cluster evolved into a private sector-led initiative. As a result of cluster

⁴⁴ Rustam Lalkaka, "Industrial Clustering to Support Competitiveness", Competita Inc, presentation at the Competita Public Service Symposium, 2002

⁴⁵ <http://www.sipa.gov.tw/en/report-3.html> Figures noted are as of 2002

strategy implementation, revenues tripled and exports doubled in the first year afterwards.⁴⁶

The Scandinavian government's early action to support experimentation with mobile telephony helped create a strong, globally competitive cluster, having a transformative impact on the economy. The Nordic mobile telephone program was a cooperative effort of the Scandinavian nations to establish mobile telephone systems in each nation well before they were common elsewhere.⁴⁷

The government of Japan's policy helped to speed up the growth of the facsimile industry, compared to elsewhere in the world.⁴⁸ Early demand for facsimile machines for example was created when the government approved the use of faxed documents for legal purposes.

The foregoing examples show that government actions can vary from: adopting a national policy of cluster-based economic development; funding cluster assessment/analysis and strategy development; increasing R&D spending and tax incentives; infusing technology through incubation/industrial/research parks; utilizing laboratory facilities; funding marketing and advertising; and, government procurement and restructuring programs and services.

Specific areas where the government can contribute to cluster strength recognizing that:

- No other economic development model with such wide spread appeal to a broad spectrum of academic disciplines, professions and lay people has emerged yet;
- Examples from around the globe show that clusters, rather than single companies or industries, are the main sources of income, jobs and export growth; and,
- Economic development policies that target individual firms or industries are no longer viable options for regions.

Government occupies a unique position. They are best suited to apply their influence and resources to advance clusters where it can be difficult or expensive for any single firm or organization to. The effectiveness of the government role in cluster development noted under Section 3, can be enhanced when the following are considered:

⁴⁶ Sybil Rhomberg, Export Council South Africa, personal interview, 20 October, 2002.

⁴⁷ Michael E. Porter, "The Competitive Advantage of Nations" (New York: The Free Press, 1990)

⁴⁸ Ibid

1) Set and communicate an economic vision

A role that government can play is to communicate a long term economic vision for its region or nation, set priorities, establish concrete timelines and provide a road map for adopting cluster as an economic development model.^{49 50}

2) Assess and benchmark clusters

Cluster assessment is needed to establish the context for a cluster strategy identifying strategic priorities and establishing performance goals and an action-oriented plan. Without a proper assessment, there have been instances where cluster-type policies were employed without understanding. The assessment identifies the cluster's innovation strength and global competitive advantage and, assesses and ranks its relative standing with other jurisdictions. It looks at existing programs at all government levels related to innovation, technology and infrastructure as these may contribute to the success of the cluster. The cluster implementation plan identifies the course of action required to support strategic directions, projects and initiatives and allocate funding.

3) Restructure programs and services to support clusters

In the old model, governments would drive economic development through policy decisions and incentives and focus on the individual needs of specific firms and industries. In the new model, government emphasizes collaboration involving multiple levels of government, companies and educational and research institutions. This would require a paradigm shift from traditional programs designed to ease access to general sources of capital, labour, equipment, subsidy, grants or markets,⁵¹ to new opportunities that promote inter-firm cooperation and the well-being of the cluster as a whole.

4) Invest in learning

The government must adapt to new realities and its investments must be driven by an understanding of global trends and what it takes to build a productive economy. The broad definition of prosperity goes beyond the financial measure of wealth.⁵²

⁴⁹ Ontario. Ontario Job Investment Board, *A Roadmap to Prosperity* (Toronto: Province of Ontario, 1999). Developed an economic vision and action plan for the 21st century and called for government business and education institutions to work together to support clusters

⁵⁰ <http://www.ic.gc.ca/cmb/innovation.nsf/MenuE/InnovationStrategy> Government of Canada, *Canada's Innovation Strategy* (Ottawa, 2002) the Strategy, released in 2002 embraced the cluster approach.

⁵¹ Robert C Turner, "A Framework for Cluster Based Economic Development Policies", (The Nelson A Rockefeller Institute of Government, 2001)

⁵² Joe Babiec, 2003

The new role of the government is to first, understand and then diffuse the knowledge and insights. For example, what are the sources of competitiveness;⁵³ ⁵⁴ the different forms of capital; preconditions to improving competitiveness;⁵⁵ and, the challenges of making the shift from old to new models of competitiveness?⁵⁶ Operating without the benefit of knowledge inhibits government institutions' ability to respond to changing or new economic conditions. There is a need for government to understand the importance of soft skills such as cultural values and attitudes.⁵⁷ ⁵⁸ This requires a shift from reactivity to proactivity diffusing insight to facilitate action and change.

5) Promote technology

“Governments can and must provide a leadership role in supporting and preparing for technological change and competing in the new and ever-changing global economy,”⁵⁹ noted the Mining Association of Canada and the Canadian Mineral Industry Federation in their briefing to the government. Technological innovation is the process that drives a concept towards a marketable product or service by raising productivity and competitiveness – the engine of economic growth.

⁵³ www.worldbank.org/wbi/mdf/mdf1/advantage.h Michael E. Porter “Building Competitive Advantage Lessons from Other Countries”, (2000).

⁵⁴ R.C. Gutierrez, C. Martinez, A.Sfeir-Younis, M. Fairbanks, S. Lindsay, P. Holden, E.D. Brugger *Challenges for the New Millennium in Latin America: Sustainable Development, Competitiveness and Second Generation Reforms*, 2000. The authors identify seven sources of competitiveness: the value of exports complex products, value added products, knowledge of customer preferences, understanding and improving relative competitive positions, knowledge of when and how to integrate, improving the relationship between firms- inter firm co-operation.)

⁵⁵ Porter, 2000.

⁵⁶ Monitor Country Competitiveness, “An Organizing Model for Building Prosperity through Competitiveness”, (Cambridge, MA, 2000)

⁵⁷ L. E. Harrison and S. P. Huntington, *Culture Matters: How Values Shape Human Progress*, (Basic Books, 2000). The authors state that the role of cultural values and attitudes as obstacles to or facilitators of progress has been largely ignored by government and aid agencies and suggest that these cultural values and attitudes should be integrated into policy development and planning. They argue that the practical reason why some countries are better off than others lies in cultural values. They make an interesting observation between Ghana and South Korea to show how cultural values can make a difference in economic progress. The two countries had comparable levels of per capita GNP, similar divisions of their economy, and comparable economic aid, yet after thirty years South Korea has become an industrial giant and no changes occurred in Ghana.

⁵⁸ Ontario Taskforce on Competitiveness, Productivity and Economic Progress. *Closing the Prosperity Gap*, Taskforce on Competitiveness, Productivity and Economic Progress, (2002). The Report emphasizes the importance of attitudes, mindset, motivations and raising aspirations higher in increasing productivity.

⁵⁹ Mining Association of Canada and Canadian Mineral Industry Federation, *Creating and Sustaining Performance: Taking Action to Keep Canada Competitive*, A brief to the 60th Annual Mines Minister’s Conference, Halifax, Nova Scotia, Canada , (September, 2003)

The Global Competitiveness Report 2002-03⁶⁰ prepared for the World Economic Forum identifies three variables driving economic growth: *technology, public institutions* and the *macroeconomic environment*. Without technological progress, countries may achieve a higher standard of living through a higher rate of capital accumulation but will not enjoy continuously high growth. There is a need for government to continually invest in R&D and technology so that clusters can benefit from new breakthroughs. Clusters that achieve record growth are successful at adopting and adapting to new technology.

6) Make data/information available by clusters

There is a need for new sources of data collection and dissemination practices to understand cluster competitiveness, benchmark against competitors and measure performance and innovation output. Publicly available information and statistics to determine cluster success are sparse. New tools, including surveys, are needed to assess intangible assets and analyze the effectiveness of cluster success, such as inter-firm linkages.

Clusters offer a new way for governments to collect and organize information. The Standard Industrial Classification (SIC) system captures information by traditional groupings such as machinery products and services. Some US states have begun to re-tabulate economic data to focus on clusters.

4. The Ontario Government Mobilizes Mining Cluster Participants

Following is an example of how the Ontario government mobilized the mining cluster participants through a proactive, non-interventionist approach.

The Ontario Ministry of Northern Development and Mines (OMNDM) is a regional ministry within the Ontario Public Service charged with the responsibility to build a healthy, sustainable and competitive economy and minerals sector. The Ministry realises that conventional approaches to economic development may no longer meet the challenges faced by the Northern Ontario economy. There was a need to explore new economic development models to create sustainable growth opportunities around the minerals sector. A Ministry senior official⁶¹ wondered if the cluster approach could be applied to the metals and minerals sector.

⁶⁰ Klaus Schwab and Michael E. Porter, *The Global Competitiveness Report 2002-03*, (Oxford University Press, 2003)

⁶¹ Dr John Gammon, Assistant Deputy Minister of the Mines and Minerals Division, heard about this cluster approach and wanted to know if it could be applied to strategically position Ontario's mining industry to create more jobs, develop new products and increase investment..

The mining sector is a traditional engine of economic growth in Northern Ontario.⁶² Over the last decade, technological advancements in mining have resulted in significant employment reductions, which have not been offset by new business development opportunities. While mining is technologically advanced, it suffers from a poor public image due in part to the myth that the industry belongs to the 'old economy' and in part because it is a commodity industry. Volatility in commodity prices creates further challenges for the industry.

The OMNDM took the following steps:

The clustering project was established⁶³ to undertake research and analysis on clusters as an economic development model. The scope of the project included research and analysis of clusters as an economic development model, numerous case studies, best practices, governance models, competitiveness model and global trends. A preliminary assessment of Ontario's mining cluster found that an Ontario mining cluster exists but lacks an overall competitiveness strategy. As no formal mechanisms existed for the various stakeholders to meet and network.

Ministry senior officials, as a next step, held discussions to engage leaders from the mining industry, academic and educational institutions, the civic sector, community organizations and representatives from other levels of government. Discussions included the sharing of findings on clusters as an economic development model, the examination of global trends; respective roles stakeholders; the steps in developing a cluster strategy; making the transition from the reliance on the exporting raw materials to developing value-added products and services; and, how Ontario mining could benefit from developing a cluster strategy. The OMNDM received unanimous, conclusive support from all stakeholders to develop a long-term strategy for mining using the cluster approach.

Encouraged by this response the OMNDM, with funding from Ontario Ministry of Enterprise, Innovation and Opportunity, convened the Ontario Mining Cluster Forum in February 2003. Close to 100 members of the cluster came together and indicated a proactive desire to win more prosperity for the mining communities of the province. The cluster speakers discussed the challenges facing the cluster including: loss of firms and jobs; difficulties of new entrepreneurs to scale up

⁶² Mining in Ontario provides 18,000 direct jobs and 75,000 indirect jobs offering an average salary of \$59,500/year (CAD). Ontario's 60 producing mines and 117 quarries produce between \$5B and \$6B (CAD) of new wealth each year. The industry's 17,420 employees enjoy one of the country's highest industrial wages. Its payrolls inject more than \$19M (CAD) a week into the provincial economy. In 2001, the industry paid almost \$6,000 (CAD) in payroll tax for each employee – a total contribution of \$104M (CAD). The industry contributed \$84M (CAD) to the province's tax coffers in 2001.

⁶³ Deputy Minister Cameron D. Clark established the cluster project to study clusters, with a special focus on natural resource clusters to determine the applicability of the cluster approach to forest products and mining equipment and services industries. Deputy Clark was inspired by Porter's quote that "A nation can be prosperous and productive in virtually any field...we must stop thinking that traditional industries are bad and that the nation must move into high tech."

some of their early successes; negative public perception of the minerals sector; threats for competitors; and, the difficulties of developing regulations that reconcile proper environmental concerns with practical business operating requirements. Cluster participants agreed that the time had come for them to work together to overcome challenges to success before it was too late. All agreed to develop a strategy using the cluster approach. Two mining executives of commanding stature and high reputation stepped forward to lead the strategy development for the Ontario Mining Cluster.⁶⁴

By bringing together a consultative assembly of key players for the Ontario Mining Forum, the Ontario government helped the cluster build valuable social capital that all participants regarded as a valuable asset by the day's end. This forum attracted participants in the mining industry, from presidents of some of the world's largest and smallest mining companies and senior government officials, to Northern Ontario mayors, college presidents and prospectors. "The forum was hailed by some as historic as the groundwork to form a unique mining cluster in Ontario was discussed," noted Patricia Mills, Publisher of *Northern Ontario Business*.⁶⁵

This was a first and positive step towards mobilizing and securing stakeholder commitment to the cluster approach and building a consensus for a moving-forward agenda. Momentum and energy has been generated and private-sector leadership has emerged. While this is a work in progress, a strong foundation has been laid to move the cluster agenda into an experiential phase, where the stakeholders can come together to develop a shared vision and an action oriented strategy for the Ontario mining cluster.

The government's actions in this case were unique as pointed out by the Keynote Speaker, Joe Babiec, "that Government's response to tensions in the mining cluster was not to reach for the checkbook but for the telephone."⁶⁶

The following quotes provide perspectives, support for an Ontario mining cluster strategy and insights as to why the cluster approach was appealing to various stakeholders.

Jamie Lim, Mayor of the City of Timmins and a Northeastern Ontario Smart Growth Panel member⁶⁷ is keen to see mining realize its full potential in

⁶⁴ George Pirie, Executive Vice President of Placer Dome, President of Placer Dome (CLA) Canada Ltd, and Warren Holmes, President Nuinsco Resources Ltd are in the process of establishing a Leadership Council to accelerate and guide the Ontario mining cluster into a knowledge driven, prosperous and globally competitive cluster.

⁶⁵ Patricia Mills, "Mining Cluster Forum A First", *Northern Ontario Business*, Vol 25. No 5, March 2003

⁶⁶ Joe Babiec, "Winning Prosperity for Ontario's Mining Cluster", 2003

⁶⁷ http://www.smartgrowth.gov.on.ca/scripts/index_.asp In April 2002, the Government of Ontario created 5 Smart Growth Panels. The mandate for the Panels was to advise the provincial government on a strategy to promote growth over the next 30 years. The 15 member Panels represented local government, industry,

communities which need the industry to survive, as well as for the people of Ontario as a whole. Mayor Lim provided the perspective of her community, a remote mining town whose citizens' lives are inextricably linked with mining, at the Mining Forum:

"If we are going to survive in today's global market, we all must work together. Divided we fall and united we conquer. The cluster approach just makes sense. I am confident that communities like mine will absolutely experience a positive impact if we can bring all the mining sectors together and work collectively towards shared goals. The cluster approach would give Ontario's mining industry a strengthened voice - a strengthened vision that will allow us to maximize the full potential of our minerals in Ontario. We can't settle for any less."

According to Patricia Mills, Publisher of Northern Ontario Business, there's an old saying that wisdom lies in knowing what you don't know. Clusters as a way of exchanging ideas and knowledge is essential to all of the participants:

"While the primary objective of a cluster approach may be to market and attract business globally, one cannot overlook the positive impact of a cluster approach on a region itself. Many times, companies in mining communities may benefit from shared collaboration on expertise and products and services that they may otherwise not be aware of. A cluster approach brings participants' expertise, services, resources, and products and interests together first. Clusters are a win/win all around."

Judith Woodsworth, President, Laurentian University considers educational and research institutes as important to the modern-day mining industry as picks and shovels. President Woodsworth is keen on clusters because they facilitate the inclusion of new, informed approaches to mining as a high-tech industry.

"I like the cluster approach because it recognizes the vital role played by education institutions and the importance of collaboration in order to achieve academic objectives. A number of internationally renowned clusters have developed around institutions of higher education. Through its leadership in pure and applied research, Laurentian University is well positioned to play an important role in the development of an effective mining cluster strategy in partnership with governments and the private sector."

Mayor Glen Witherspoon of Fort Frances, Ontario, Chair of the Northwestern Ontario Smart Growth Panel sees attracting new investors and growing the value-added products component of any industry as daunting challenges. He thinks a cluster approach can help achieve these ends:

business, education, tourism and First Nation communities. The Northwestern and Northeastern Ontario Smart Growth Panels embraced the cluster approach as an economic development model.

“The cluster approach can help reduce the reliance on the export of raw materials to finished value-added products. We need all the organizations working together. Value-added products cannot be created by just one firm. Cluster builds momentum and energy. If the energy and the positive attitude are there, the venture capitalists will come to you.”

Warren Holmes, CEO of Nuinsco & Co-Chair of the Ontario Leadership Council believes that the well-being of citizens is inextricably tied with the success their economy enjoys. He thinks that clusters can provide a model to accomplish economic successes:

"I am looking for an approach that enhances the ability of Northeastern Ontario communities to diversify, develop, & strengthen the economic base of their communities and at the same time improve the competitiveness of the mineral industry. This approach seems to do both."

Chief Executive Officer of Placer Dome Canada Placer Dome CEO, George Pirie, thinks the future of his community and countless others whose economies face challenges hangs in the balance. The key to ensuring their success lies with taking new approaches to “grow” age-old industries:

"A good cluster strategy has the potential to breathe life into natural resource-based parts of the economy. It can also help to reconcile sustainable development with economic growth in communities that need both. As ore bodies or other resources get mined out, what will these communities be able to use as the foundation for their continued prosperity? It must be the knowledge and experience the communities accumulated while addressing the economic, cultural, social, health, educational and technological issues associated with resource extraction. This knowledge and experience is valuable and sustainable, and often distributed throughout the many different organizations in a cluster. Consequently, a cluster strategy must pull this knowledge and experience together into products and services that, through cooperation and innovation among the cluster participants, continue to be relevant, competitive, and therefore sustainable."

These quotes illustrate that clustering as an economic development approach is inclusive in nature and synergistic benefits can accrue to all involved. The cluster approach appealed to many who were hearing about it for the first time. The stakeholders came from the Chief Executive Officer of a major mining firm to the Mayor of a small mining town to the President of a university. Each saw a role and benefit for their organization.

5. Conclusion

Cluster-based economic development is at the forefront of promoting innovation, productivity growth and prosperity and clusters have attracted the attention of government officials, business leaders, academics and practitioners alike. While the origins and trajectory of clusters can differ, the key contributing factors to cluster success are intangible assets such as social capital. Clusters have been shown to promote collaboration and to create tacit knowledge.

Can government catalyze clusters? Yes, government has an enduring role in a productive economy and cluster development offers a new model for governments to organize their program and services. This paper has discussed government actions and how they have contributed to cluster success. Actions vary from adopting cluster-based economic development as a national policy, providing funding for cluster assessment and strategies, increasing R&D spending, infusing technology and being a demanding customer for clusters.

The experience of Ontario's Mining Cluster and Arizona's Strategic Planning for Economic Development suggests that government as a facilitator, not a master strategist, creates opportunities for cluster participants to organize, identify and solve common problems, then private sector leadership will emerge to drive the process.

APPENDIX

The following examples provide a broad range of actions taken by governments to support cluster development and upgrading.

In Canada, Industry Canada's Social Sciences and Humanities Research Council provided \$2.5M (CAD) in 2002 to analyze how cluster growth contributes to economic growth and development within five regions in Canada, focussing on more than 27 clusters.

In Canada, the Ontario Government's \$30M (CAD) Biotechnology Cluster Innovation Program will accelerate the development of Ontario's Biotechnology clusters by supporting commercialization infrastructure projects that will help create new companies and introduce biotechnology into other knowledge based and traditional industry sectors. The objective of BCIP is to make Ontario the third largest home to biotechnology clusters in America.

In Canada, Ottawa-Carleton's regional government's Economic Generator Initiatives assessed the region's economy and identified seven export-based clusters. The federal, provincial, regional and local governments provided funding for the study and implementation.

In Canada, Economic Development Edmonton, through its Greater Edmonton Competitiveness Strategy, identified eight clusters and developed implementation plans to strengthen them. Alberta Economic Development, Alberta Capital Region Alliance, Greater City of Edmonton, Industry Canada and Western Economic Diversification were included as financial partners.

In 1992 a major study funded by the Government of Canada and the Business Council on National Issues examined 16 clusters. It recommended in Canada at the Crossroads that governments in Canada work closely with the private sector, academic institutions and R&D institutions and advocated the adoption of a cluster agenda.

In 2001, Canada's Innovation Strategy called for all government levels, businesses and academic institutions to work together to promote clusters so that at least 10 internationally recognized clusters will be developed by 2010. In June 2002, it committed \$220M (CAD) over five years in support of technology clusters.

The US Council on Competitiveness and the US Governors Association sponsored a major study, "Clusters of Innovation: Regional Foundations of US Competitiveness," 2001. This study is aimed at identifying best practices in successful clusters as a blueprint for promoting innovativeness and competitiveness across regions.

In the United States, states and regions have shown remarkable interest in cluster development. States that adopted the approach early on were Arizona, Florida, Massachusetts and Illinois. Some states have focused on regions. Early regional adopters were Silicon Valley, Austin, Wichita and Tucson. Some focussed on one or two clusters; others focussed on the entire economic portfolio for the States.

The US Department of Commerce, Economic Development Administration, sponsored a major project to identify America's industry clusters. The project identified 380 leading clusters accounting for 78% of the nation's exports.

Arizona's state legislature passed three bills to create job training and ongoing funding for cluster initiatives. The Department of Commerce develops staff as experts in particular cluster areas in contrast to the past focus on expertise in individual foreign countries, i.e., Canada and Japan.

In Connecticut, a task force studied the best method to implement cluster-based economic development. Legislation was passed in 1998 to launch Connecticut's Industry Cluster Initiative. The Department of Economic and Community Development provided seed funds of \$425,000 (USD) to three activated clusters.

California's Silicon Valley, initially a private sector led cluster initiative, received a \$1M (USD) grant to the core network, and \$1.1 M (USD) to three cluster initiatives. "The Department of Commerce Economic Development Aid grant was instrumental in the 'incubation' role to nurture cluster initiatives at the startup phase."

In the Netherlands' white paper, "Opportunities Through Synergy – The Public Sector and Innovative Clustering in the Market," a cluster agenda was adopted as a national policy. In the Netherlands cluster development represents an important government priority. Government sponsors forums for bringing companies, government and local institutions together in a constructive dialogue.

The Danish government implemented the Danish Cluster Support Program to focus on core areas such as government regulations, access to knowledge, access to capital and facilitating interaction between the public and the private sectors.

In Finland, every industrial branch has been analyzed through Competitive Advantage Finland, which led to a National Industrial Strategy for Finland introducing the notion of clusters.

Finland's Cluster Programmes: Promote the Economy, Employment and Entrepreneurship, February 2000, identified cluster programs to produce new knowledge, know-how, services, collaboration and networking to the benefit of

the economy and employment. By the end of 2000, 1.5M (FIM) will be allocated to this new program. An independent expert group appointed by the Ministry of Trade and Commerce and the Ministry of Education will evaluate the impact of this program.

Finland has a longstanding national policy to support clusters. In 1992, the government, through the “Competitive Advantage Finland Project” assessed its clusters by their export values, average annual growth in exports and average annual growth potential and ranked them as strong, fairly strong, potential or latent/defensive clusters.

The governments of Mexico and Guatemala each reallocated resources and dedicated offices to cluster promotion as a main government activity. These offices are facilitators and catalyst agencies bringing together businesses, associations and educational institutions to support cluster development.

Costa Rica’s Electronics and Information Technology cluster is an example of government long-term vision to move the economy into a new level of partnership with private firms. As a result, the emerging electronics and information established advanced manufacturing operations leading to the export of medical equipment \$44M (USD), communication equipment \$36M (USD) and hair dryers \$45M (USD).

The UK Department of Trade and Industry in 2001 commissioned a major study called “Business Clusters in the UK- A First Assessment” to provide a snapshot of existing clusters in the UK. It will be used by the regional development agencies as a base source of information for cluster development work.

Egypt, Israel, Jordan and Morocco have created a joint regional, national effort under the Center for Middle East Competitive Strategy to apply a cluster approach to promote regional economic cooperation.

Scottish Forest Industries Cluster - Scottish Enterprise (a government funded non-profit organization) and forest industries developed a strategic framework for action for the Scottish forest industries using cluster approach. Its cluster action plan includes specific targets over the next five years such as the creation of over 1,000 new jobs; the stimulation of an extra – £100M (GBP) of investment in processing capacity; an increase in market penetration from 9% to 15%.

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** Disclaimer: The views expressed in this paper are strictly those of the author.*

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