

Chapter 2

Regional Competitiveness: Key Players in Industrial Cluster in Knowledge-Based Industrial Cluster

Abstract While the first chapter examined the concept and features of Knowledge Economy, this chapter's objectives are to explore the framework of Industrial Cluster in Knowledge Economy and its key players (government, private sector and academe) that are to enhance Regional Competitiveness.

Keyword Regional competitiveness • Industrial cluster • Knowledge economy

Regional Competitiveness Defined

Regional Competitiveness is often emphasized on the comparative advantage of such region in a particular country. A competitive region is one that attracts and maintains achieved companies, while improving inhabitants' standard of living. Skilled workforces, regional resources and investments are often drawn to a competitive region. Storper (1997) defined regional competitiveness as "...the ability of an economy to attract and maintain firms with stable or rising market shares in an activity while maintaining or increasing standards of living for those who participate in it". Kitson et al. (2004) added that "...ultimately competitive regions and cities are places where both companies and people want to locate and invest in". To enhance regional competitiveness of a region, the regional comparative advantage could thus be drawn by different factors such as human resources, financial resources, infrastructure, innovation, natural capital and community support.

Clusters and Networks Towards Regional Competitiveness

In research into the knowledge-based economy, the concept and practices of *clusters* and *networks* have received continuous attention in recent years, not only as an instrument for regional development and competitiveness, but also as instruments enhancing knowledge creation, dissemination and transfer through the knowledge

infrastructure of a region and the interaction of different players (including firms) within an industrial cluster (Cantwell, in DTI 1999; Devol 1999: 9). Clusters are, therefore, often regarded as geographically condensed forms of economic cooperation and knowledge exchange that encourages regional competitiveness (Steiner 2004).

Much interest in the concept of clustering was sparked by the work of Porter (Porter 1998a, b) of the Harvard Business School. Bergman and Feser (1999) explain that most cluster studies use Porter's work as a framework for cluster analysis. Porter (2008) defines clusters as "concentrations of interconnected companies and institutions in a particular field...[which] represent a kind of new spatial organizational form in between arm's length markets on the one hand and hierarchies, or vertical integration, on the other. A cluster, then, is a new way of organizing the value-chain... A cluster of independent and informally linked companies and institutions represents a robust organizational form that offers advantages in efficiency, effectiveness, and flexibility" (Porter 1998a, b: 78–79). While the Department of Trade and Industry (DTI), UK (1998: 22) defines the cluster as "...a concentration of competing, collaborating and interdependent companies and institutions which are connected by a system of market and non-market links", Scottish Enterprise (1998) defines clusters as "...customers, suppliers, competitors and other supporting institutions such as universities, colleges, research bodies, financial institutions and the utilities".

The cluster framework provides tools for an understanding of regional development processes. Clusters generally lead to increased levels of competitiveness including productivity, growth and employment (Porter 2008; Feldman 2000). Clusters are often viewed as a process for promoting national, regional and local economic competitiveness/development.

Saxenian's work (1996) focuses on the concept of regional advantage to promote regional/cluster networks for developing network-based industrial system. The policies on cluster facilitate innovation and support multidisciplinary research networks among industries and academics through information and knowledge exchange/transfer. Clusters are also a practical means of linking research to marketable innovations.

In addition, Saxenian (1996) asserts the importance of "knowledge externalities" on the economics of regional clusters. The emphasis on knowledge reflects the declining relative importance of material input in various manufacturing industries, the increasing roles of service industries and their increasing nature of having similar costs everywhere.

In order to explain the continued essence of "localized knowledge spillovers", most literatures and works invoke the concept of "tacit knowledge". Audretsch (1995) puts it, "The propensity for innovative activity to cluster spatially will be the greatest in industries where tacit knowledge plays an important role... it is tacit knowledge, as opposed to information, which can only be transmitted informally, and typically demands direct and repeated contacts" (Audretsch 1995, p. 23). Tacit knowledge cannot be expressed by words and is highly contextual, unarticulated. It can be transferred only through experiences, face-to-face interaction or through individuals' physical movement. Tacit knowledge is obtained through local networks that develop "localized knowledge" delivering "codified

knowledge” (knowledge in writing or other code and does not require personal contact for transmitting) and “tacit knowledge” (as Polanyi 1966, p. 4, puts “we can know more than we can tell”).

In short, firms and actors within an industrial cluster could be benefited greatly through being belonged to the related or complementary epistemic communities existed around the specific professional practices’ exercise. Respected communities share both the explicit and the tacit elements of knowledge informing their practices. Proximity, with shared codes, tools, theories and understandings, facilitates the exchange and transfer of knowledge, ideas, practices and innovation.

The depth and breadth of clustering have increased as the market competition, and economies have evolved in complexity. Globalization, together with rising knowledge intensity, has greatly supported the role of clusters in competitiveness. Porter introduces a concept of clusters because he feels that *sustained industrial growth* has hardly ever been built on basic inherited factors (land, location, natural resources, labour and local population size), as traditional economic theory maintains, and abundance of such factors may actually not deliver competitive advantage (Porter 2008).

The Origin of a “Cluster”

Clusters emerged through various means. In many cases, pioneering companies/institutions spin off other companies, or employees leave the pioneering companies to establish other firms in the same locality. For example, the birth of Silicon Valley is associated with the departure of eight disappointed employees from Shockley Semiconductor Laboratories in Mountain View California to establish Fairchild Semiconductor. In some other cases, public sector investment and public research laboratories have spawned clusters. For example, the US National Institutes of Health (NIH) in Maryland and their laboratories sparked the emergence of the biomedical cluster. Sometimes unexpected and precipitating events or historical events or circumstances cause cluster to rise. The Fiat tractor factory in Modena in the 1950s, for example, resulted in a local economy of small producers in the mechanical sector (Andriani et al. 2012: 9).

The facilitative conditions that improve the opportunities of cluster formation are a specialized labour force, a technological or market opportunity, and ready access to customers and market channels.

Clusters and Competitive Advantage

It is widely recognized that most cluster studies use Porter’s works and Porter’s model of national competitiveness—the so-called *Diamond Model*—as a starting point for cluster analysis. The analysis looks at clusters where one company’s competitiveness is related to other companies’ and other factors in the value-added chain. The

Diamond Model, as sources of locational or regional competitive advantage, is divided into four factors that become key instrument for the analysis of competitiveness:

- *Factor conditions*: factors are human resources, physical resources, knowledge resources, capital resources and infrastructure. Specialized resources are specific for an industry and important for its competitiveness.
- *Demand conditions*: demand in the local and regional market can enhance companies a competitive advantage, when sophisticated local and regional customers demand firms to innovate more advanced products than those of competitors.
- *Related and supporting industries*: other related and supported industries are important for innovation and competitiveness in global market. These industries could provide cost-effective inputs and upgrading procedure.
- *Context for strategy and rivalry*: strategy, objective and management of companies are essential for their success. Presence of intense rivalry in the local and regional market could provide pressure to innovate in order to improve competitiveness.

The Diamond Model brings about competitive advantage in at least three dimensions. *First*, companies can operate with a higher level of efficiency, drawing on more specialized assets and suppliers with shorter reaction times than they could in isolation. *Second*, companies and research institutions can achieve higher levels of innovation and knowledge sharing. Knowledge spillovers and close interaction with customers and other companies create more new ideas and provide pressure to innovate, while the cluster environment lowers the cost of experimenting. *Third*, the level of business formation tends to be higher in clusters. Start-ups are more reliant on external suppliers and partners, all of which they find in a cluster. Clusters also reduce the cost of failure, as entrepreneurs can fall back on local employment opportunities in many other companies within the same field (Ketels 2003d).

The evolution of the cluster concept leads to the determination of the role of private sector, government, trade associations, and educational or research institutions. It builds a new model of collaboration between government, private sector, universities and research institutions. The new/adapted roles of each player in a cluster-based economic development are as follows:

Government

Ketels (2003d) applied Porter's Diamond Model to clarify the role of government in cluster-based economic development. He explained the four interrelating and influential roles of government in competitiveness:

Roles in factor conditions: to create specialized education and training programmes; to establish local university research efforts enhancing cluster-related technologies; to support cluster-specific information gathering and compilation; and to improve specialized transportation, communications and other infrastructure required by such clusters.

Roles in context for strategy and rivalry: to eliminate barriers to local competition; to focus on efforts to attract foreign investment around clusters; to focus on export promotion around clusters; and to organize relevant government departments around clusters.

Roles in demand conditions: to create pro-innovation, regulatory standards encouraging demand conditions (i.e. reduce regulatory uncertainty, stimulate early adoption of regulation, and encourage innovation or new products and processes); to sponsor independent testing, product certification and rating services for a cluster's products and services; and to act as a sophisticated buyer of the cluster's products/services.

Roles in related and supporting industries: to sponsor forums to bring together cluster participants; to attract suppliers and service providers from other locations; and to establish cluster-oriented free trade zones, industrial parks or supplier parks.

In order to succeed in cluster-based development, Ketels (2003a, b, c) suggested the important role of government at each level.

Federal: the government should set the context through macroeconomic policy and microeconomic regulations, upgrade business environment conditions under national control and enable regional competitiveness efforts.

State: the government should initiate and facilitate state and cluster competitiveness efforts, upgrade business environment conditions under state control and support local competitiveness efforts.

Local: the government should participate in regional and cluster competitiveness efforts and upgrade business environment conditions under local control.

Private Sector

Ketels (2003d) analysed the role of private sector influences on upgrading the cluster by using the four interrelated influences of the “*Diamond Model*” as follows:

Roles in factor conditions: to jointly develop specialized curricula of vocational, technical, college and university education to serve the relevance, to sponsor specialized university research centres, to collect cluster information through trade associations and to maintain close liaison with infrastructure providers to address clusters' needs (i.e. data communications, logistics); and to develop courses for managers on regulatory, quality and managerial issues.

Roles in context for strategy and rivalry: to support the market jointly through trade fairs and delegations, collaborate with government export promotion efforts, and to create directories of cluster participants.

Roles in demand conditions: to work with government to streamline regulations and modify them to encourage innovation, and to establish local testing and standards organizations.

Roles in related and supporting industries: to establish a cluster-based trade association, to encourage the formation of local suppliers and to attract local investments through new suppliers, individuals and collective efforts.

Academe

Academe or tertiary education is broadly referred to all post-secondary education. Universities are definitely an essential part of the tertiary educational system. There are, however, other types of institutions both private and public, namely colleges, technical training institutes, community colleges, research laboratories, centres of excellence, distance learning centres and many more. Many of those establish a network of institutions that support community and industrial demand.

In cluster-based economic development, Ketels (2003a, b, c) analysed the role of tertiary education by stating that tertiary education and non-profit research institutions need to actively cooperate with co-located companies and other institutions to pursue their role as a part of cluster and an engine of the regional growth/business development.

The key roles for tertiary education and universities are to generate knowledge/innovation, to transfer knowledge/innovation to firms and their workforce, to develop a workforce that is competent in relevant skills, to attract new investments due to positive externalities, and to facilitate the players/enhancers of competitiveness. Thus, tertiary education and universities that become more engaged in the development of their regional business environments could lead to direct benefits to the cluster. In addition, universities attract faculty members and students providing positive impact on research, education and workforce of the region. The roles of academe and tertiary education in knowledge-based regional development will be further analysed and explained in next part of this book, Part II (Chaps. 3, 4, and 5).

In conclusion, regional competitiveness is emphasized on skilled workforces, regional resources and investments leading to comparative advantages of such region, which attracts and maintains growing companies and industries. Clustering concept, popularized by the work of Porter (1998a, b), has played essential roles in explaining locational competitive advantage of a region, when companies and actors in such region could be benefited through being belonged to complementary epistemic communities. Lastly, it is important for different players in value-added value chain—namely government, industry and educational sector—to collaborate for the benefits of such regional cluster and actors belonged to.

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