

## Chapter 6

### Competitive Advantage of Nations and Regional Clusters

This Chapter gives an overview of the main sources of national competitive advantages, based on Porter's diamond model, and discusses the role of regional clusters of industries. In this context it is explained, how MNCs can benefit from locating their operations in country markets with a high level of national competitive advantage or in regional industry clusters.

#### National Competitive Advantage

Multinational corporations can benefit from favourable environmental conditions by locating their operations in countries with expedient market conditions. As globalisation of international markets increases and the liberalisation of markets simplifies cross-border transactions, MNCs have a broad selection of potential locations from which to select. Most attractive for MNCs are locations with a high level of national (or regional) competitive advantage. The level of a country's competitiveness reflects the extent to which it is able to provide rising prosperity to its citizens. A nation's prosperity is intimately linked to the productivity of the economy. If a nation is able to improve its productivity, it can improve prosperity.

In this context, Porter (1990, p. 73) argues that: "National prosperity is created, not inherited". Thus, not only firms compete internationally, but, as global competition is increasing, countries also need to position themselves as attractive places to invest and to do business. Following this view, each country needs to explore its potential *sources of competitive advantage* to achieve the sustainable growth which is the basis for long-term economic wealth and prosperity of the nation.

Each year, the *World Economic Forum* publishes the Global Competitiveness Report in which countries are ranked according to their competitiveness (see Table 6.1). The ranking builds on the *Global Competitiveness Index (GCI)* which is developed based on the "12 pillars of competitiveness" that are regarded as sources of national competitive advantage. In this regard, factors such as the institutional environment in a country, its macroeconomic stability, the educational system or the infrastructure are analysed as well as a country's market size or its level of (technical) innovation (Sala-i-Martin et al. 2009).

*Global  
Competitiveness  
Index*

Thus, the determinants of competitiveness are manifold and countries need to explore which dimensions are important to build on to improve the nation's competitiveness.

**Table 6.1** Global Competitiveness Index Ranking 2009-2010

| Country/<br>Economy | Rank | Score | Country/<br>Economy | Rank | Score |
|---------------------|------|-------|---------------------|------|-------|
| Switzerland         | 1    | 5.60  | France              | 16   | 5.13  |
| United States       | 2    | 5.59  | Austria             | 17   | 5.13  |
| Singapore           | 3    | 5.55  | Belgium             | 18   | 5.09  |
| Sweden              | 4    | 5.51  | Korea, Rep.         | 19   | 5.00  |
| Denmark             | 5    | 5.46  | New Zealand         | 20   | 4.98  |
| Finland             | 6    | 5.43  | Luxembourg          | 21   | 4.96  |
| Germany             | 7    | 5.37  | Qatar               | 22   | 4.95  |
| Japan               | 8    | 5.37  | U. Arab Emirates    | 23   | 4.92  |
| Canada              | 9    | 5.33  | Malaysia            | 24   | 4.87  |
| Netherlands         | 10   | 5.32  | Ireland             | 25   | 4.84  |
| Hong Kong SAR       | 11   | 5.22  | Iceland             | 26   | 4.80  |
| Taiwan              | 12   | 5.20  | Israel              | 27   | 4.80  |
| United Kingdom      | 13   | 5.19  | Saudi Arabia        | 28   | 4.75  |
| Norway              | 14   | 5.17  | China               | 29   | 4.74  |
| Australia           | 15   | 5.15  | Chile               | 30   | 4.70  |

Source: Schwab/Sala-i-Martin/Greenhill 2009, p. 13.

## Porter's Diamond Model

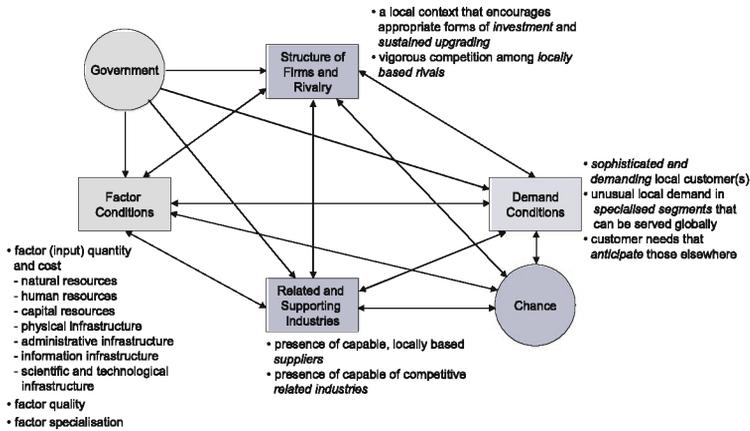
While the underlying understanding of competitiveness in the GCI relates to the economy as a whole, there are differences in the patterns of competitiveness relating to each particular industry. No nation will be competitive in all or most industries. At the *industry level*, Porter (1990a, 1990b) tried to explain why a nation achieves international success in a particular industry. Based on an intensive investigation of 100 industries in ten nations, he identified four attributes that promote or impede the creation of competitive advantage: (1) factor conditions, (2) demand conditions, (3) related and supporting industries, and (4) firm strategy, structure, and rivalry.

These four attributes shape the environment in which local firms compete and determine the success of nations in international competition. They constitute the *diamond* (see Figure 6.1), a mutually reinforcing system in which the effect of one attribute is contingent on the state of the other attributes. Each of the four determinants of national competitive advantage is briefly discussed below.

### Sources of Competitive Advantage

## Determinants of National Competitive Advantage: Porter's Diamond

Figure 6.1



Source: Porter 1990a, p. 127.

## Factor Conditions

The first element of the diamond is the nation's possession in factors of production. Consistent with the *factor proportions theory* (Heckscher-Ohlin), every country has a relative abundance of certain factor endowments. In his diamond model, Porter distinguishes between basic factors and advanced factors.

*Basic factors* are factors such as land, climate, natural resources or demographics, while *advanced factors* relate to more sophisticated factors, including, for example, the nation's stock of knowledge resources (e.g. scientific, technical or market knowledge), the transportation and communication infrastructure or a sophisticated and skilled labour force (Rugman/Collinson 2009, p. 458).

In the diamond model, the *advanced factors* are regarded as being most significant for competitive advantage. These factors can be created through training, research and innovation and thus are a product of investment by individuals, companies or the government. The basic assumption is that a nation must continually *upgrade* or adjust its factor conditions. The basic factors provide the country with an initial advantage that subsequently can be reinforced by investing in *advanced factors*. On the other hand, disadvantages in basic factors entail that countries need to invest in advanced factors (Porter 1990b). Thus, upgrading a nation's advanced factors, such as the

## Basic Factors and Advanced Factors

educational system or infrastructure, is regarded as a means to improve a nation's competitive advantages.

### Demand Conditions

#### Home Market Demand

Demand conditions refer to the *nature and the size* of the home demand for an industry's products and services. Here, the main characteristics of its nature are the strength and *sophistication* of domestic customers' demand. Porter argues that companies are most sensitive to the needs of their closest customers (Porter 1990b, pp. 79-80). Thus, home market demand is of particular importance in shaping the attributes of the companies' products. The more sophisticated and demanding their local customers, the more pressure is created for innovation, for efficiency and for upgrading product quality. Therefore it is assumed that with increasing consumer sophistication in their home markets and, consequently, with increasing pressure on local sellers, their competitive advantage will escalate (Hill 2009, p. 190).

#### Size of Home Market

While the nature of home market demand mainly relates to the pressure to improve local companies' performance, the size of the home market is important as it enables companies to achieve economies of scale and experience curve advantages. This is even more important when scale economies limit the number of production locations. In this case, the size of its market is an important determinant of the country's attractiveness as a potential location. Additionally, empirical evidence shows that efficient firms are often forced to look for international opportunities at stages when their early large home market becomes saturated. Their home markets provide these companies with scale advantages that can be used in the global marketplace (Hollensen 2007, pp. 99-100).

### Related and Supporting Industries

#### Industrial Cluster

The presence of a business environment comprising related suppliers, competitors and complementary firms is regarded as highly supportive for an industry to build competitive advantages. Such a (geographical) concentration of companies, suppliers and supporting firms at a particular location is labelled an *industrial cluster* (Porter 2000, p. 254).

### Firm Strategy, Structure, and Rivalry

This element of the diamond relates to the firm-based theories of internationalisation that focus on the actions of individual firms. National context and national circumstances influence strongly how companies are created,

organised and managed and what the nature of domestic rivalry will be (Porter 1990b, p. 81).

Domestic competition affects companies' ability to compete in the global marketplace. Not only does the presence of *local competitors* automatically cancel advantages that come from a nation's factor endowment or characteristics of home market demand, but the higher domestic competition is, and the more strong rivals are present on the home market, the more companies are forced to become more efficient and to adopt new technologies. The high pressure in a competitive home market leads to *selection processes* and leaves only the most efficient firms as survivors. At the same time it is associated with a continuous pressure on companies to innovate and to improve (Griffin/Pustay 2010, pp. 188-192).

Not only does the competitive pressure vary between countries but also managerial practices, organisational modes, company goals and individual achievement goals differ significantly between countries. These differences lead to *dissimilar international strategies* of the firms. Additionally, Porter argues that specific managerial systems are needed to be successful in each of the diverse industries. Thus, if a nation's firms follow a specific managerial system this only can be successful in selective industries. Thus, such differences also play an important role in the diamond model because different management ideologies influence the ability to build national competitive advantage (Porter 1990b, pp. 81-82).

### Evaluation of the Diamond Model

Each of the four elements of the diamond model has an influence on the nation's competitive advantage in a specific industry with all of these attributes depending on the state of the others. Usually, the presence of all four components is required to increase competitive advantage with weaknesses in any one determinant constraining an industry's potential for advancement and upgrading. While the diamond is regarded as a *self-reinforcing system*, the role of two additional forces is important: *government* and *chance* (see Figure 6.1). A controversial debate centres on the role of MNCs in the diamond model. Several researchers have argued that *multinational activity* should be included as a third outside variable because MNCs are influenced in their competitiveness by the configuration of the diamond in other than their home countries and this in turn influences the competitiveness of the home country (e.g. Dunning 1993b).

*Domestic  
Competition*

*Managerial  
Systems*

*Role of  
Multinational  
Companies*

### Government Interventions

## The Role of Chance and Government

As already mentioned, the basic underlying view of the diamond model is that competitive advantage can be created. Therefore nations can influence competitive advantage by systematically improving each of the elements of the diamond. In this connection it is important to note that *government interventions* must be considered in terms of their impact on domestic company activities as the underlying view in the diamond model is that “firms, not nations, compete in international markets” (Porter 1990a, p. 33).

Governments can, for example, cultivate new and superior *factor endowments*, influence the nature of *local competition*, home market *demand* or *clustering of firms* by using measures such as subsidies, investing in the educational system, monetary and fiscal policy (e.g. tax incentives or low interest loans), the development and maintenance of a strong infrastructure (e.g. IT, communication systems, transportation), antitrust regulations or enforcing product and safety standards. However, one must not forget that such well-intentioned government actions also can *backfire* and lead to the creation of a “sheltered” domestic industry that is unable to compete in the global marketplace (Rugman/Collinson 2009, p. 459).

### Role of Chance

Additionally, the role of *chance* in building competitive advantage is recognised in the diamond model. However, this influence of chance is *not predictable*. For example, chance influences the creation of new ideas or new inventions. Also wars, significant shifts in world financial markets, discontinuities in input costs (e.g. oil price shocks) or major technological breakthroughs can have a significant impact on a nation’s competitive advantage.

## Stages in National Development

The diamond model can be used to distinguish three growth stages of national competitive development (Porter 1990a, pp. 555-565):

- *Factor-driven stage*: The first stage, the factor-driven stage, relates to industries that draw their advantages solely from the nation’s factor endowments, mainly from basic factors of production such as natural resources (e.g. mineral deposits). These industries can be successful internationally but they compete primarily on price.
- *Investment-driven stage*: This stage implies efforts of upgrading of the nation’s industry as companies invest in modern technology and more efficient facilities.
- *Innovation-driven stage*: While in the second stage investment in modern, but already existing technology dominates, the third stage, the innovation-driven stage, is characterised by the creation of new technology or

(production) methods. These improvements are yielded by internal innovation as well as by innovation in cooperation with, or with assistance from, suppliers and companies in related industries.

This model mainly relates to the stages of a nation's industries. Usually, countries span two or more stages in this model because there are likely to be industries (or companies) in all countries that are operating at each stage.

## Regional Clusters

In the diamond model, the regional clusters have a prominent role. "A cluster is a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by communalities and complementarities" (Porter 2000, p. 254). Therefore, clusters are closely linked with the dimensions "related and supporting industries" and "firm strategy, structure, and rivalry" of Porter's diamond model.

### Actors in Regional Clusters

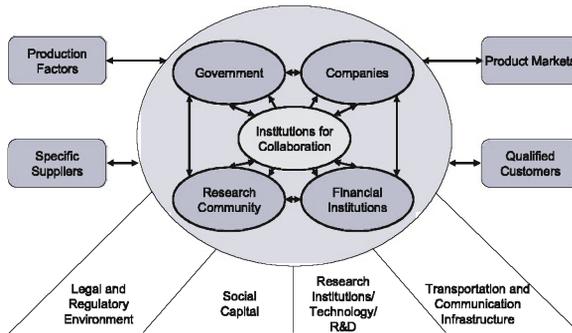


Figure 6.2

Source: Adapted from Sölvell/Lindquist/Ketels 2003, p. 18; Andersson et al. 2004, p. 31.

Clusters can include, for example, *suppliers* of specialised inputs (e.g. components, machinery, and services) or providers of specialised *infrastructure* (see Figure 6.2). They are usually extended downstream to customers and laterally to complementary industries and companies in industries related by technologies, common inputs or skills. Often, clusters also encompass governmental and other institutions (e.g. universities, think tanks, or stan-

*Competition and Cooperation*

dard-setting agencies) that provide specialised research, education, training, and technical support (Porter 1998, p. 78).

This nature of clusters leads to an internal constellation that promotes both competition and cooperation. *Competition* occurs between the rival companies located in geographical proximity while *cooperation* mainly relates to vertical channel relationships with related companies, related industries or local institutions.

### Advantages of Regional Industry Clusters

The advantages from such clustering of firms mainly stem from the presence of a specialised *infrastructure*, industry-sector-specific *factors of production* and *skilled labour* in the specific professional field, from *information and knowledge synergies*, and the access to appropriate or *superior inputs*.

If an industry is located close to its suppliers it will enjoy better *communication* and the exchange of cost-saving ideas and inventions with those suppliers. This is mainly a result of geographical proximity which enables close working relationships in which advantages from short lines of communication and a quick and constant flow of information with companies having the opportunity to influence their suppliers' technical efforts can help to accelerate the pace of innovation (Cavusgil/Knight/Riesenberger 2008, p. 105).

The nation's industry benefits most from clustering if the suppliers or the complementary firms themselves are internationally competitive (Porter 1990b, p. 81).

### Cluster Lifecycle

Cluster development can be explained as an ongoing process with clusters passing through a number of stages. Even though the patterns of cluster development may not be identical and the pace of cluster evolution may vary, it is possible to discern certain characteristic patterns. In the ideal *life-cycle of cluster development*, six phases (see Figure 6.3) can be distinguished (Schramm-Klein 2005; European Commission 2002; Sölvell 2008, pp. 39-44):

1. *Emergence of pioneers*: Cluster development is usually stimulated by several causes, including a combination of basic or advanced factors in a region, such as natural resources, specific knowledge (e.g. in universities or research institutions), specific customer demand or technological innovation. According to the *diamond model*, these diverse drivers can be regarded as sources of competitive advantage. Primary companies emerge that focus on the deployment of these advantages. In the initial stage of

cluster development, more and more companies emerge that focus on these specific competitive advantages, often they are *spin-offs* of these primary companies. Thus, an agglomeration of companies with similar production structures evolves. This increases local competition which in turn drives improvement and innovation among the local competitors.

2. *Development of specialised suppliers:* In the second stage of the lifecycle specialised suppliers and service companies locate close to the core companies. Partly, this may be a result of (local) *outsourcing* activities. Additionally, in this stage of cluster development, the development of a specialised employment market occurs. The *specialisation* of companies and suppliers, which is associated with lower *transaction costs*, access to lower-cost and more *specialised inputs* (e.g. components, machinery, or business services), as well as access to highly *specialised personnel* lead to quality improvements and increased efficiency in the industry. These advantages are not available for competitors located in less agglomerate regions and are an important source of competitive advantage stemming from the external effects of firm clustering.
3. *Emergence of related institutions:* In the next stage, institutions such as *universities, research institutes* or *governmental institutions* locate in the cluster. These institutions foster local cooperation, mutual learning processes, and the local diffusion of technological developments. Thus, a cluster-specific knowledge base is established.
4. *Attraction of related companies and specialised workforce:* The cluster externalities attract related firms and specialised personnel to locate in the cluster region. This in turn leads to an additional enhancement of cluster attractiveness and of cluster externalities.
5. *Development and upgrading of informal and personal relationship quality:* This stage is characterised by the development of relationships between cluster members on an *informal* and personal level. Such relationships foster informal cooperation and knowledge transfer between companies and institutions in the cluster. In this context the transmission of *tacit knowledge* is of main importance.
6. *Decline or transformation of the cluster:* After a period of positive development, most regional clusters enter the *declining stage*. Often, the further advance of clusters is inhibited by technological, institutional or socio-cultural factors that initially fostered positive development but in the long term can cause *inflexibility* or even *inertia*. In this case, clusters are trapped in their specialisation and further innovation is impeded. On the other hand, if such stages of inflexibility can be avoided, clusters at some stage of their development will need to adapt to change in market, proc-

*Outsourcing and  
Specialisation*

*Local  
Cooperation*

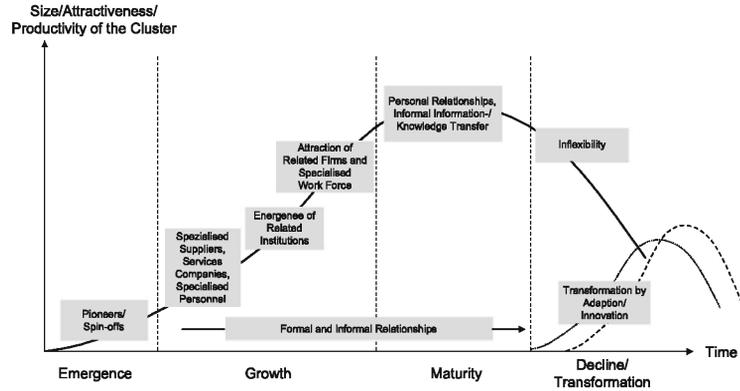
*Informal  
Cooperation*

*Inertia and  
Inflexibility*

ess or technology. This leads to a *transformation* of the clusters into new forms, such as by focusing on new or diverse activities.

Figure 6.3

## Cluster Lifecycle



Source: Adapted from Schramm-Klein 2005, p. 542.

## Cluster Initiatives

Clusters can emerge and develop without any governmental influence, simply as a result of specific beneficial constellations of a region (e.g. factor endowment or specific technology). On the other hand, the diamond model implies that governments can try to influence cluster development and to initiate clusters by providing specific benefits in a region to improve the competitive advantage of the nation (or specific regions).

Cluster initiatives (CI) are organised efforts to enhance the growth and competitiveness of a cluster. They involve private industry, public authorities and/or academic institutions (Sölvell/Lindqvist/Ketels 2003, p. 9). Public authorities can make use of different means to enhance and improve cluster development, such as, for example (Sölvell 2008, pp. 53-54):

- *Human resources upgrading:* enhancement of the available skills pool, e.g. by vocational training or management education
- *Cluster expansion:* measures to increase the number of firms, e.g. through incubators that are designed to promote new business formation or by promoting inward investment within the region

- *Internationalisation*: promotion of firm internationalisation, e.g. export promotion
- *Promotion of commercial cooperation*: encouraging firms to communicate and interact with each other
- *Promotion of innovation*: promotion of product, services and process innovation, e.g. through enhanced cooperation and networking between firms or through cooperation between firms and research institutions (e.g. university spin-offs)
- *Enhancement of environmental conditions*: enhancement of conditions for business, e.g. through improving the legal and institutional setting or the physical infrastructure.

These means are mainly meant to create a favourable environment that promotes the conditions for operating in the cluster to improve competition, growth and innovation in the cluster. In this connection, the enhancement of the attractiveness of a cluster for all (potential) actors in the cluster is one of the main motives of public authorities.

## Conclusion and Outlook

Nations as well as companies strive to build competitive advantage to improve their role in the global marketplace. An important model to explain competitive advantage for specific industries of a country is *Porter's diamond model*.

The main idea of this diamond model is that the *characteristics of the home country* play a central role in a company's international success. A firm's competitive advantage results from an effective combination of national circumstances and company strategy. The specific conditions in their home base may create an environment in which firms can attain international competitive advantage, but it is important to notice that it is up to each company to seize the opportunity (Hollensen 2007, p. 98).

In this connection, the role of regional clusters is stressed. Competitive advantage in regional clusters can be explained by basically three forms of *cluster externalities* (Porter 1998, p. 80):

- *Enhancement of productivity and efficiency*: The sophisticated nature of competition forces companies continually to improve productivity. Additionally, synergies resulting from specialised inputs, specialised personnel, specialised infrastructure and information transfer between cluster companies reinforce such improvement.

*National  
Circumstances  
and Company  
Strategy*

*Cluster  
Externalities*

- *Facilitation of innovation processes and pace of innovation:* Potential areas for innovation are often detected earlier and proceed faster in regional clusters because of the access to specialised resources, information sharing, close communication and cooperation between cluster members.
- *Stimulation of the foundation of new businesses:* The foundation of new businesses is fostered because of the favourable site-related factors in regional clusters such as specialised suppliers, infrastructure or customers. Additionally, outsourcing and specialisation lead to new business cluster actors realising new business opportunities earlier and therefore, for example, spin-offs are brought forward.

### Further Reading

PORTER, M. (1998): *On Competition*, Boston, MA, Harvard Business School Press, pp. 197-287.

PORTER, M.; DELGADO, M.; KETELS, C.; STERN, S. (2008): *Moving to a New Global Competitiveness Index*, in: PORTER, M.; SCHWAB, K. (Eds.) (2008): *World Competitiveness Report 2008-2009*, Geneva, World Economic Forum, pp. 43-63.

TALLMAN, S.; JENKINS, M.; HENRY, N.; PINCH, S. (2004): *Knowledge, Clusters, and Competitive Advantage*, in: *Academy of Management Review*, Vol. 29, No. 2, pp. 258-271.

## Case Study: Basel Region Cluster<sup>1</sup>

### History

Located in the heart of Europe, Basel is situated at a relatively short distance from nearly all the important cities as well as transshipment points in Europe. The Region of Basel is one of the most dynamic economies and marks a perfect gateway to the EU market. Therefore, it is a very interesting location for diverse industries. The “*Basel Region Cluster*” which is discussed in this case study benefits strongly from these site-related factors and belongs to the world’s top three pharmaceutical clusters today.

---

<sup>1</sup> Sources used for this case study include the web sites [www.isc.hbs.edu](http://www.isc.hbs.edu), [www.swissbiotech.org](http://www.swissbiotech.org) and [www.basel.ch](http://www.basel.ch) as well as explicitly cited sources.

Nevertheless, the primary reason behind the birth of the *Basel Region Cluster* has been the related and supporting industries. With Basel being the centre of the silk and ribbon industry of Switzerland in the past, the demand for the dyestuff industry was high. In addition, in the nineteenth century, French scientists and industrialists fled France after the French government prohibited the use of synthetic dyestuffs to protect the domestic natural dye industry and the dependent farmers. As a result, around 1860 the so-called dyestuff cluster was established in Basel. Due to the close connection of this industry with the pharmaceutical sector, pharmaceutical companies started to settle around Basel as well. Therefore, in the 1890s, the pharmaceutical cluster grew out of the dyestuff industry.

Chemistry education in Switzerland was very strong, guaranteeing both the dyestuff and the pharmaceutical industry high competitiveness. The river Rhine aided Basel as well, providing a route of transport and allowing the discharge of effluent. Furthermore, the two World Wars cut off Germany as the main competitor from the world markets and therefore pushed the expansion of the Swiss pharmaceutical producers.

Nowadays, Basel impresses with its world-renowned research and innovation capabilities which reflect in its large number of Nobel Prize winners, one of the highest densities of patent registration and leading-edge medicine at the University Hospital.

## Profile

The literature often uses different terms for the cluster around Basel. Besides the *Basel Region Cluster*, terms like “*metrobasel*”, “*BaselArea*”, “*BioValley*” and “*Life Science Cluster Basel*” are used. While most terms include the whole economic region around Basel, *Basel Region Cluster* contains the main parts of the cluster which are presented below.

*Metrobasel*, for instance, covers the functional trinational economic region (Switzerland, Germany and France) around Basel (BAK Basel Economics 2008, p. 3). As such, Basel belongs to the most successful economic regions worldwide. *Metrobasel* generated approximately 219,000 USD added value per employee in 2006 and put itself in second place amongst the regions compared, while New York is No. 1. Looking at the increase in real gross value added, *metrobasel* is No. 4 of all regions behind Geneva, New York and Øresund. Besides, *metrobasel*, along with the clusters in Munich and Zurich, belongs to the top three concerning patents in all fields of knowledge.

The high share of the total employment in the life sciences sector already points to the existence of another description of the *Basel Region Cluster*. However, the term “*Life Science Cluster Basel*” only encompasses the life

*Metrobasel*

*Life Science  
Cluster Basel*

sciences industries. The term "Life Sciences" is used to cover development and manufacturing in the fields of pharmaceuticals (active pharmaceutical compounds, medicines and medicinal diagnostic products), agricultural inputs and medical technologies, including institutions that devote the majority of their efforts to the various stages of research, development, technology transfer and commercialisation.

### *BaselArea and BioValley*

In addition to the diversity and density of the life sciences companies, the plurality of various organisations is another characteristic of the *Basel Region Cluster*. *BaselArea* and *BioValley Basel* illustrate such organisations that support companies and institutions by providing access to the member's network as well as its broad range of knowledge and expertise especially in the field of life sciences. Thereby, small Swiss start-ups and spin-offs benefit from the powerful multinationals. *BaselArea* covers biotech, nanotechnology, medical equipment, pharmaceuticals, agribusiness and specialty chemicals. *BioValley* is a trinational network that combines the already recognised centres in North-western Switzerland, Southern Baden (Germany) and Alsace (France). It is funded following the American model of Silicon Valley, but with the aim to establish a cross-border biotechnology cluster.

Besides those networks, the companies of the *Basel Region Cluster* cooperate with partner organisations like the *Messe Basel*, *Basel Banks*, *i-Net Basel* and *Basel Tourism* as well as universities and training institutions. Consequently, this implicates one of the world's highest densities of research specialists in life sciences, with about 10,000 researchers at work.

### *Industries in the Basel Region Cluster*

Nowadays, the so-called "*Basel Region Cluster*" composes the following industries:

- Pharmaceuticals & Biotechnology
- Chemicals & Nanotechnology
- Agribusiness & Food
- Medical Technology
- Commerce & Logistics
- Microtechnology & Mechanical Engineering
- Finance
- IT
- Art, Fashion, Design & Architecture.

To demonstrate the success of these industries it is important to have an overview of the resident companies. Among these are pharmaceutical com-

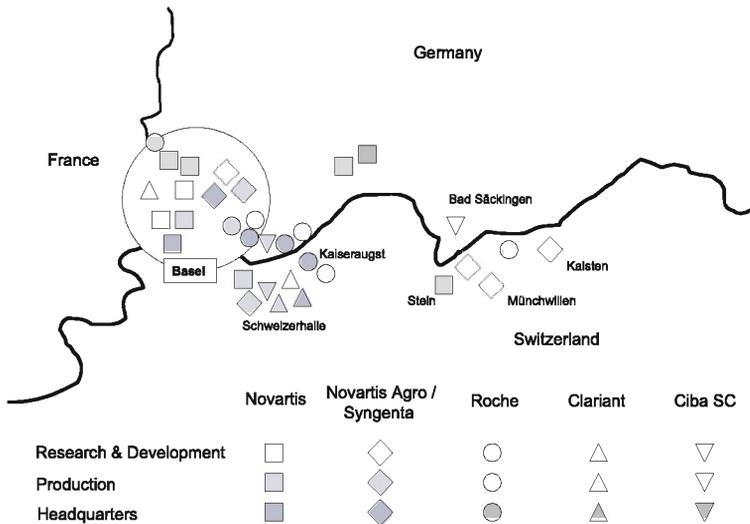
panies such as *Novartis*, the third largest pharmaceutical company in the world, *Roche*, one of the most highly capitalised Swiss companies at the market, and *Syngenta*, which is listed in the Financial Times Global 500 Index as one of the most important companies worldwide. In addition, chemical and nanotechnological companies like *Ciba* and *Clariant*, as well as micro-technology and mechanical engineering companies, with multinationals like *Endress+Hauser*, are strongly represented. Nevertheless, besides the headquarters of those global players, several young, internationally ambitious and growing small and medium-sized companies are located in the Basel area, such as *Actelion*, which is amongst the fastest growing biopharmaceutical companies in the world. In addition, suppliers and small related concerns are based around Basel.

Despite the high importance of the variety of industries for the *Basel Region Cluster*, the focus of this case study will be the life sciences sector, especially the pharmaceuticals. With 900 companies, Basel has one of the highest per capita concentrations of successful life science businesses worldwide.

*Success of the Pharmaceutical Cluster*

Location of Important Pharmaceutical and Chemical Companies in Basel 2001

Figure 6.4



Source: Adapted from Zeller 2001, p. 27.

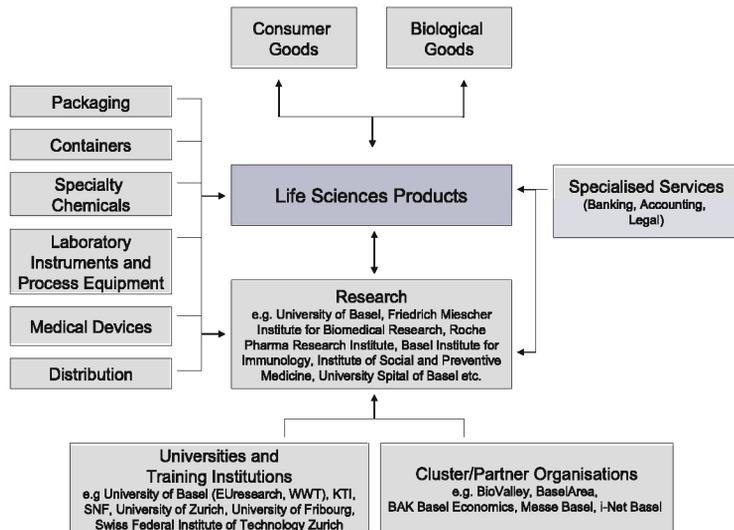
These companies achieve annual revenue of 100 billion USD and annual profit of close to 20 billion USD (BaselArea 2008, p. 2). *Novartis* describes the

*Basel Region Cluster* as the most important and successful location in Europe for the pharmaceutical industry.

To sustain this image, *Novartis* created the *Novartis Campus* which should offer an optimal environment for innovation and central functions. This working district is organised like a campus, which comprises the whole plant area, to facilitate communication and teamwork as well as recruiting the best talents. Likewise, *Roche* has shifted its main efforts in R&D, production and administration of the Pharmacy and Diagnostics division to the headquarters in Basel. Regarding the location of these companies (see Figure 6.4) it has to be affirmed that the expansion of R&D, production and headquarters has proceeded in the urban region of Basel as well as along the Rhine. The reasons for this development, in particular the advantages of the Basel region, will be illustrated within the description of the diamond model of Porter. The whole competitive position of *Basel Region Cluster* (see Figure 6.5) shows that the Basel area is a vibrant environment for life sciences, with the best conditions for success and growth.

Figure 6.5

Competitive Position of Basel Region Cluster



Source: Adapted from Porter 2001, p. 40.

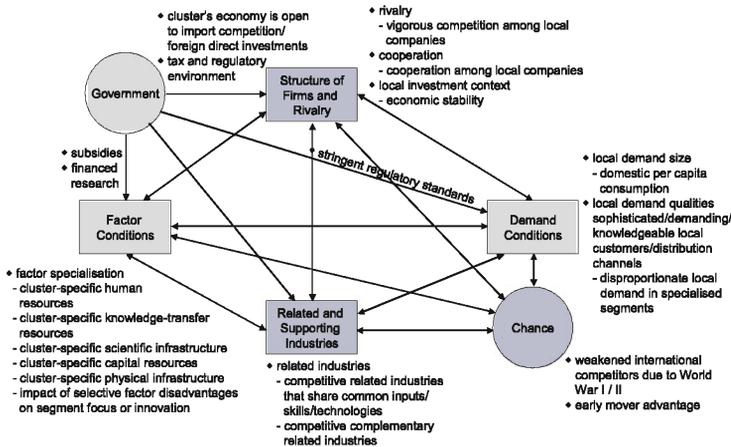
### Driving Forces of the Cluster Formation

Based on Porter’s Diamond Model, the main attributes that promote or impede the creation of competitive advantage could be divided into: (1) factor conditions, (2) demand conditions, (3) related and supporting industries, (4) structure of firms and rivalry, and (5) other advantages.

Based on the work of the *Institute for Strategy and Competitiveness* of the *Harvard Business School*, these assumptions are transferred to the *Basel Region Cluster*, especially the pharmaceutical industry (see Figure 6.6), and presented in the following. The context for strategy and rivalry can be declared as the primary reason behind competitiveness. The order of importance in this case is context for strategy and rivalry, factor conditions, related and supporting industries, demand conditions and other reasons.

The Basel Region Cluster in the Porter Diamond Model

Figure 6.6



Source: Adapted from Porter 1990a, p. 127.

### Factor Conditions

The factor conditions in general are advantageous for the pharmaceutical cluster in the Basel region. In addition, the cluster benefits from the existing specialised factors:

*Cluster-specific  
Factor  
Conditions*

- *The cluster-specific human resources* are distinguished by a highly specific skilled labour. Additionally, Switzerland excels as the most rewarding work environment and has the most motivated workers in Europe. Nevertheless, the industry is fighting a shortage of available personnel.
- *The Basel Region Cluster* is amongst the world's best for *cluster-specific knowledge-transfer resources*. In Basel as well as Zurich there are very good universities with world-leading teaching programmes. The IMD (*Institute for Management Development*) worldwide report even declared Switzerland as being the best nation for basic research and knowledge transfer between industry and academia.
- *The cluster-specific scientific infrastructure* counts among the world's best. Several world-leading research institutes such as the *Tropical Medicine Institute*, the *Basel Institute for Immunology*, the *Miescher Institute* and the *Sandoz Institute* are located in Basel, as well as the *Swiss Pharmacy and Pharmaceutical Museum* and the *Swiss Academy of Medicine*. Since 1950 five Nobel Prizes have been awarded to Basel-based chemical researchers.
- *The cluster-specific physical infrastructure* is one of the world's best. While heavy goods can be transported by ship along the Rhine from the North Sea to Basel, Basel airport is built for air freight. Long-haul flights for American and Asian cities leave from Zurich airport, an hour away from Basel. The main road and rail routes for Europe all intersect in Basel and connect Basel with cities including Paris, Frankfurt and Milan.
- The *government* never offered any direct subsidies but financed some specialised research projects. In addition, life sciences companies are able to raise more money in Switzerland than elsewhere.
- Switzerland's lack of easy access to *raw materials* is detected as being beneficial. Because of the need to import raw materials, Switzerland focused on high quality from the start on. Therefore the impact of selective factor disadvantages on segment focus or innovation turned out to be an advantage.

### Demand Conditions

*Local Demand,  
Size and  
Qualities*

The demand conditions have to be subdivided into two relevant factors. On the one hand, the local demand size is important for a cluster, on the other hand, the local demand qualities play a decisive role. As both display only weak advantages, the demand conditions are not the fundamental criteria for the *Basel Region Cluster*:

- The local demand size is an advantage in a paradoxical way because the Basel Region is so small that the industry had to focus on exports from early on.
- Concerning the local demand qualities, three major assumptions stand out. The Basel region is distinguished by having very sophisticated end customers and hospitals, disproportionate local demand in specialised segments and stringent regulations for product, energy, safety and environment by the government.

### Related and Supporting Industries

As described in the “History” section, the *Basel Region Cluster* is not solely composed of the pharmaceutical industry. Several related industries, such as dyestuffs, are also located around Basel. These industries, the Swiss hospital industry for instance, share common inputs, skills and technologies and thus they are strongly linked. These industries are supplementary in that they attract not only domestic but also foreign clients. A very advantageous factor for the *Basel Region Cluster* is the competitive complementary and related industries. Switzerland has a strong position in hearing aids, orthopaedic devices, medical instruments, sterilisation equipment, hospital planning and hospital building. Indeed, Switzerland is the second most competitive economy in the world, behind the USA (see Table 6.1).

### Structure of Firms and Rivalry

The “Structure of Firms and Rivalry” attribute includes several conditions that result in strong advantages of the *Basel Region Cluster*. The vigorous competition among the local companies and individuals is a very important driver for innovation. Government does not restrict imports. The economy is almost open for import competition and foreign direct investments, leading to a high percentage of imports in total consumption.

Besides the strong competition in the Cluster Region, several resident companies cooperate with local companies, for instance, in joint research institutes in outside laboratories. Such cooperation between competitive companies is called “co-opetition”, and leads to further advantages. The participating companies learn from each other, increase their economies of scale as well as economies of scope, and are more competitive in certain fields. Therefore, co-opetition usually results in a win-win situation and is a strong advantage for the *Basel Region Cluster*.

The government encourages risk investing by its tax and regulatory environment while economic stability lowers hurdle rates. In summary, the local

### Co-opetition

investment context of the *Basel Region Cluster* strongly encourages investment.

### Other Advantages

Alongside the strong benefits of the four categories, *Basel Region Cluster*, especially the established pharmaceutical industry, has some more advantages that are noteworthy. On the one hand, the industry was not severely damaged in both world wars, different to other European locations. On the other hand, Basel benefits from being an early mover, particularly with respect to the international distribution infrastructure which cannot be built from scratch anymore today.

In summary, it has to be maintained that the *Basel Region Cluster*, especially for the pharmaceutical industry, records some strong advantages concerning the factor conditions as well as other attributes described in the diamond model. The pharmaceutical industry around Basel is a consistently growing market which deserves to belong to the top three pharmaceutical clusters in the world today.

*Basel as a Major  
Location for the  
Pharmaceutical  
Industry*

### Questions

1. What are the conditions for cluster formation in general and especially in the case of *metrobasel*? Elaborate in this context on the diamond model of Porter.
2. Describe the influence of clusters on innovation with regard to the different types of organisation and cooperation of clusters.
3. Discuss the advantages and disadvantages of the cluster location for the participant companies in a cluster. Reflect which consequences the location of Basel has for the resident businesses.

### Hints

1. See Porter and Linde 2004.
2. See the OECD Proceeding, Boosting Innovation: The Cluster Approach 1999.
3. See BAK Basel Economics 2008 and Baselarea 2008.