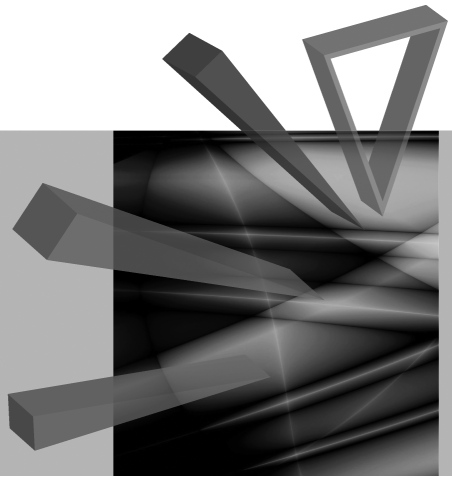
# Faces of Competitiveness in Asia Pacific



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## Streszczenia

RESEARCH PAPERS OF WROCŁAW UNIVERSITY OF ECONOMICS No. 191
Faces of Competitiveness in Asia Pacific 2011

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# CLUSTER MODELS IN JAPAN ON THE EXAMPLE OF TOYOTA CLUSTER

**Summary:** Clusters are a way of enhancing the competitiveness of both businesses and the region in which they arise. Although one can distinguish the characteristics of all the clusters, each cluster is different. This is due to different historical circumstances, a different political environment, economic and social development. Based on these factors, we can distinguish various types of clusters in different economies. Characteristic clusters exist in Asian countries, particularly in Japan. This article presents models of clusters occurring in Japan and contains basic information about the cluster built around a Japanese corporation in the automotive industry – Toyota.

**Keywords:** clusters, Asian clusters, Toyota cluster.

## 1. Introduction

In the modern global economy, companies are faced with many challenges. They are exposed to enormous competition operating on the international market, and hence the interaction with others is crucial for their development. Examples of such a co-operation, but also competition are clusters. Clusters are not a new phenomenon; but more and more companies are choosing to operate in a cluster recognizing many benefits. Clusters operating in Europe are based on specific models which were also adapted in North America and partly in Asia. However, Asian clusters are characteristic models – they grow dynamically as their home economies. Specific models of clusters occur in Japan. One of these types of cluster is a company town cluster, whose example is Toyota City. Toyota is a company with great strength of the impact mainly on the Japanese economy, but also on the economies of host countries and the global economy. The transnational corporation forms clusters wherever it works. Moving its operations to China or Poland, for example, also led to the creation of the cluster which consists of components and parts manufacturers and their suppliers.

## 2. Clusters in economic knowledge

One of the first definition of clusters was given by M.E. Porter. He conducted a series of studies on clusters and networks of links of companies, as well as on their

competitiveness and usefulness. According to his definition, "clusters are geographic concentrations of interconnected companies, specialized suppliers and service providers, firms in related industries, and associated institutions (e.g. universities, standard agencies, and trade associations) in particular fields that compete but also cooperate. Such clusters are a striking feature of virtually every economy, especially those of more economically advanced areas".[1] It is assumed that a cluster may arise in a particular territory if:

- there is a large concentration of small- and medium-sized enterprises;
- small- and medium-sized companies from the territory are relatively homogeneous and belong to the same market segment;
- between businesses there is a strong and lasting relationships of different nature,
- companies existing in the system have access to business and non-business services;
- there is a common culture, especially industrial culture – a characteristic for the region type of product, production technology, type of contacts between economic operators.[2]

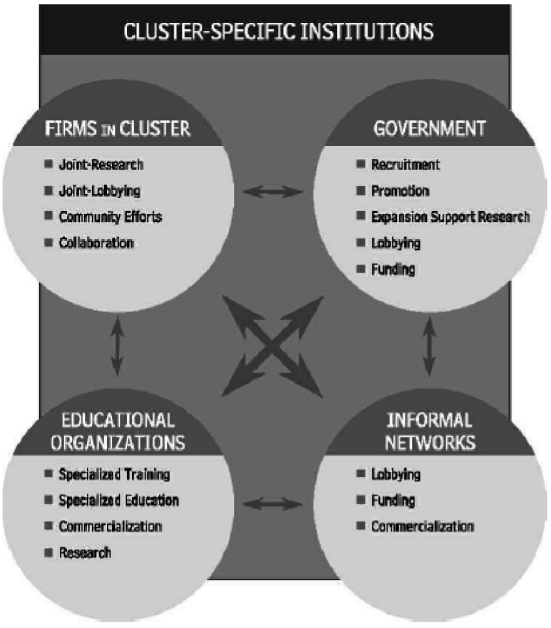


**Figure 1.** Tasks for the cluster participants

Source: M.E. Porter, *Clusters of Innovations. Regional Foundations of U.S. Competitiveness*, Council of Competitiveness, Washington 2001, p. 54.

[1] M.E. Porter, *On Competition*, A Harvard Business Review Book, 1998, p. 253.

[2] P. Fabrowska *et al.*, *Rozwój klastrów w regionie dolnośląskim*, ECORYS Polska [commissioned by the Lower Silesian Marshal's Office], Warszawa 2009, p. 8

Clusters differ in a number of dimensions:

- some clusters are well-established whereas others are just emerging;
- large and dense clusters with a multitude of related industries and associated organizations and institutions as opposed to thin and smaller clusters;
- manufacturing-oriented clusters such as automotive versus more service-oriented clusters such as financial services;
- science-driven clusters and clusters in traditional sectors;
- clusters with strong external linkages and global reach ("hot spots") as opposed to clusters with a mere regional reach.[3]

In clusters, there are many operators that are assigned specific roles (see Figure 1). The main task for each group is to engage in or support research to market introduction of the newest innovations. In addition to research, subjects should be addressed by the development of mutual co-operation, collaboration and the promotion and lobbying for the cluster. Most of these tasks should lead to increased activity and development of all the participants in a cluster.

## 3. Clusters in Japan

Clusters that occur in Europe are built mostly by models specific to individual European countries. There are three models of clusters in Europe: the Italian model (the smallest share of the national authorities, where companies combine their own initiative to improve its competitiveness), Danish model (where the focal point of the cluster is the broker network which co-ordinates its activities) and Dutch model (with a large research center leading the importance of R & D for the needs of all the participants in a cluster). Different models and types of clusters can be identified in Asian countries, where there are also clusters' traditions. In Japan, where there is a centuries-old tradition of creating clusters, they are very peculiar. The shape of clusters is undoubtedly influenced by factors of Japanese history, geography and culture. The clusters significantly contributed to Japanese economic development.

Industrial clusters have come in different types in Japan. T. Ozawa identifies the following types of clusters that exist in Japan:[4]

- *jiba-sangyo* – localized industrial communities of the traditional type, which are dispersed throughout Japan, and where small- and medium-sized firms congregate in close proximity to one another as industrial clusters;
- *sangyo-shusek*i – industrial agglomerations in a particular locality of a more recent origin where small- and medium-size firms gather together in support of one

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[3] Ch. Ketels, G. Lindqvist, Ö. Sölvell, *Clusters and Cluster Initiatives, Center for Strategy and Competitiveness*, Stockholm School of Economics, June 2008, p. 3.

[4] T. Ozawa, *Structural Transformation, Flying-Geese Style and Industrial Clusters. Theoretical Implications of Japan's Postwar Experience*, paper presented at the Conference on Clusters, Industrial Districts and Firms: The Challenge of Globalization, Modena, Italy, September 2003, pp. 2, 7.

another in a new industrial activity or around a large-sized enterprise as input suppliers in a centripetal fashion, or around an academic community (universities and research institutions);

- *konbinato* –combined by government policy, geographical attributes, and industrial characteristics; an outcome that turned out to be an unexpectedly efficient way of organizing resource raw-materials-based production by reducing production and transaction costs. In fact, this particular type of industrial clustering enabled Japan to once become the world's largest and most competitive steel producer and exporter,
- *just- in-time-delivery clusters* – occurring in such industries like parts-intensive manufacturing of "assembled goods" such as automobiles, TV sets and other early-generation electronics goods (e.g., pocket calculators). This cluster came into existence in assembly-based industries, which are governed by vertical conglomeration through the supply chains of parts, components, modules and accessories. The Toyota castle town is a good example of this type of cluster.

According to Small and Medium Enterprise Agency (SMEA), which is the unit of Ministry of Economy, Trade and Industry of Japan, there are four types of clusters in the Japanese economy:

- *company town clusters* – these are clusters formed by the sitting of numerous subcontractor groups around the mass-production plant of a particular large enterprise. Typical examples include the Hiroshima region around Mazda, the area around Toyota City in Aichi, which has Toyota Motor at its heart, and the Kitakyushu region in Fukuoka Prefecture, which has formed around Yawata Steel (now operated by Nippon Steel Corporation);
- *production region clusters* – clusters of this kind are formed by enterprises belonging to a specific industry (such as consumer goods) concentrating in a particular region, and they have grown through their members' mutual use of raw materials and technologies that have accumulated in the region. Typical examples include the Tsubame-Sanjo region in Niigata Prefecture, where cutlery and blade manufacturers have clustered, the spectacle-making cluster in the Sabae region of Fukui Prefecture, and the furniture-making cluster around Asahikawa City in Hokkaido;
- *mixed urban clusters* – these clusters have formed in urban areas around pre-war production bases or munitions plants, or wartime factories set up to disperse production, around which related enterprises have concentrated. There are many such clusters in the machinery and metalworking industries, and there often occurs a division of labor between enterprises in the same cluster and business relations that cut across traditional industry groupings. Typical examples include the Jonan region in Tokyo, Ota region in Gunma Prefecture, Suwa region in Nagano Prefecture, Hamamatsu region in Shizuoka Prefecture, and Higashiosaka region in Osaka Prefecture;
- *mixed invitation clusters* – these clusters are formed as a result of local government efforts to attract enterprises and the implementation of industrial reloca-

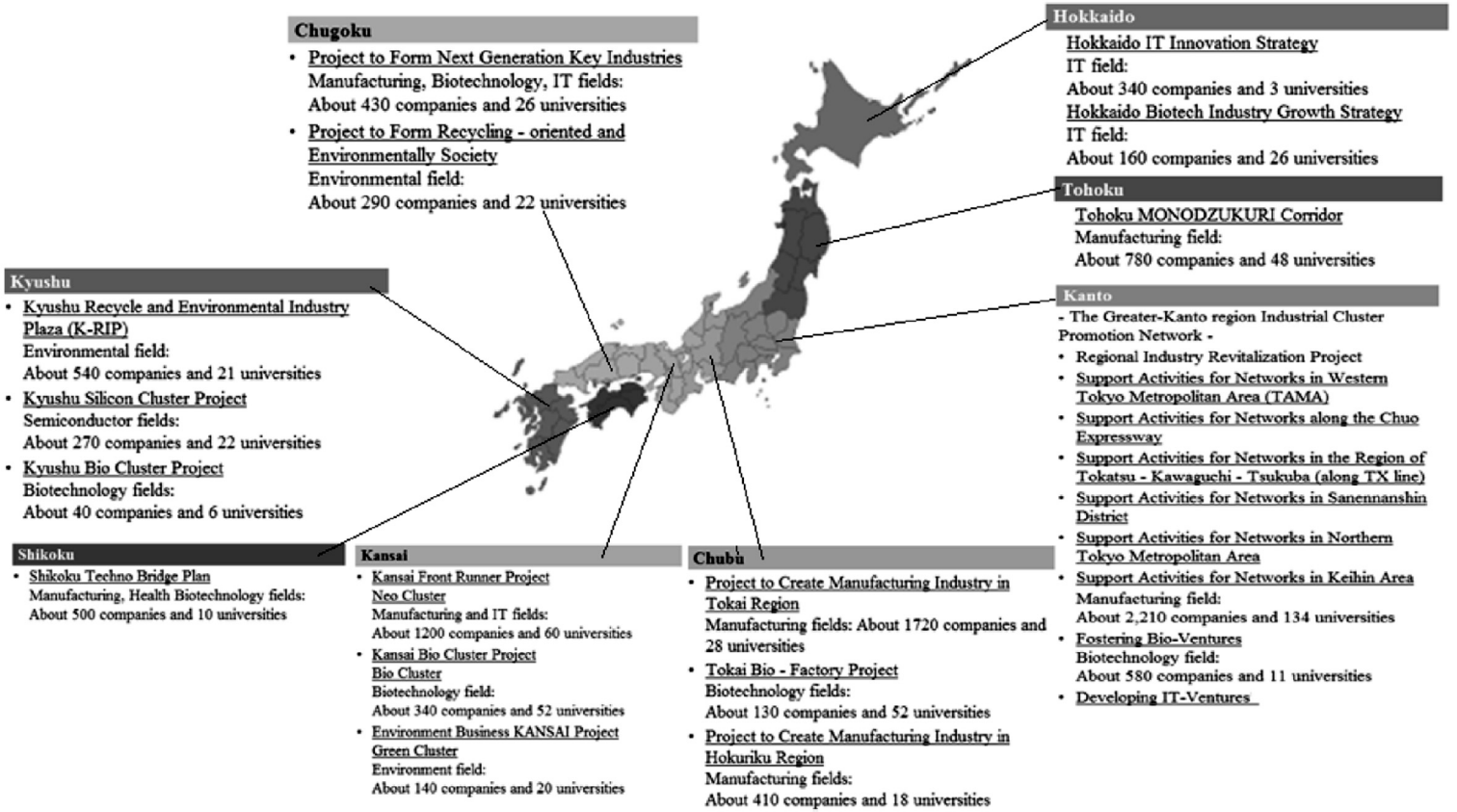


**Figure 2.** Industrial clusters in Japan

Source: Industrial Cluster Project, www. cluster.gr.jp.

tion plans. Many of the enterprises invited belong to industry groups outside the cluster, and the collaboration within such clusters is often not very advanced. Typical examples include the Kitakamigawa basin region, the Kofu region, and the Kumamoto region.[5]

Association of clusters of companies in Japan has lasted for many years, hence there exists a large number of clusters in different industries and services. In addition to industrial clusters (see Figure 2), there are clusters of advanced IT technology, biomedical, aviation equipment, medical, etc. The summary of clusters in the Japanese economy is presented in Table 1.

**Table 1.** Clusters in the Japanese economy

| Industry | Number of clusters | Number of firms/cluster | Employment/ cluster | Employment/ firm (average) |
|---|---|---|---|---|
| Food processing | 83 | 82 | 1260 | 15.37 |
| Textiles | 126 | 241 | 1518 | 6.30 |
| Clothing | 34 | 208 | 4986 | 23.97 |
| Wood products and furniture | 78 | 102 | 823 | 8.07 |
| Clay, stone and glass products | 62 | 125 | 920 | 7.36 |
| Machinery | 56 | 128 | 1986 | 15.52 |
| Miscellaneous | 98 | 111 | 1175 | 10.59 |
| Total | 537 | 145 | 1496 | 10.32 |

Source: H. Yamawaki, *The Evolution and Structure of Industrial Clusters in Japan*, World Bank Institute 2001, p. 14.

## 4. Toyota cluster

Toyota was founded by Kiichiro Toyota in 1937. And ever since Toyota has been one of the most favorite cars of Japan and America. Toyota manufactures its cars and parts for them in many different places around the world. Undoubtedly, the center unit is Toyota City, which is located in major business units and factories. Around this city there is a cluster. This cluster can be classified in accordance with the typology of the Japanese, as a company town cluster.

Toyota City has Toyota Motor Corporation at its heart. Cluster regions have developed as a result of enterprises cutting the cost of expensive tasks such as

[5] *White Paper on Small and Medium Enterprises in Japan*, Small and Medium Enterprises Agency, Japan Small Business Research Institute, 2006, p. 135.

production management and the acquisition of new customers, and their move to the specialization in certain production processes. SMEs benefit from being within the same business groups as the large enterprises. The success of Toyota Motor Corporation raised the number of employees living in Toyota City, as well as the value added by 1.5% and 0.6% between 1997 and 2007, respectively.[6]

Toyota has set up a cluster in Aichi Prefecture. Aichi Prefecture has one of the world's largest concentrations of automotive and automotive-related companies, centered on global vehicle sales leader Toyota Motor Corporation, which provide the driving force behind the region's economy. The number of business facilities for transportation-related equipment and machinery is more than 2,225, and they employ more than 300,000 people. All of this is supported by advanced production technology capabilities, outstanding human resources and legacy of industry. The result is that Aichi's total shipment amount for transportation equipment and machinery makes up 38,1%[7] of the national total, which puts it in the position of Japan's automotive industry leader. Main actors in the cluster:

- *Principal Japanese companies in the industry* – e.g. Toyota Motor Corporation, Toyota Industries Corporation, Aichi Steel Corporation, JTEKT Corporation, Toyota Auto Body Co., Ltd., Toyota Tsusho Corporation, Toyota Boshoku corporation, Toyota Central Research and Development Laboratories Incorporated, Toyoda Gosei Co., Ltd.;
- *Principal foreign companies in the industry* – e.g. Volkswagen Group Japan K.K., Magna International Inc. Japan, Continental Automotive Corporation;
- *Major education/research institutes of the industry* – e.g. Toyota Central R&D Labs, Aichi Industrial Technology Institute, National University Corporation Nagoya University EcoTopia Science Instiution;
- *Major industry cluster plans, special zones and industry-government-academia collaboration of the industry* – e.g. Aichi FCV Promotion Council, Aichi Hydrogen Energy Industry Council.[8]

In the auto cluster in Toyota City, the dominating company – Toyota – plays a double role as a production provider and system organizer. The foundations of Toyota's success are in "transferring productivity-enhancing knowledge" throughout the set of companies with which it is interconnected. The creation of learning routines is apparent and results from the fact that Toyota has most to gain from "public goods" that span the entire set of companies in its cluster. In the early stages of cluster formation in Japan, Toyota "heavily subsidized" the cluster. This transnational company tried to engineer the creation of a fresh set of identity based ties, e.g. by promoting a "co-existence and co-prosperity" agenda with its suppliers.

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[6] S. Uchikawa, *Regional Variation of Industrial Clusters, Small and Medium Enterprises in Japan. Surviving the Long-Term Recession*, 2009, http://www.adbi.org/workingpaper/2009/11/27/3388.japan.sme.recession/regional.variation.of.industrial.clusters/.

[7] *Investing in Japan*, Japan External Trade Organization(JETRO), www.jetro.go.jp.

[8] *Ibidem.*

The adoption of a very long term perspective by the core firm in a calculative cluster may lead this firm to trying to mimic the key characteristic of organically growing, identity based clusters. This ideology was given substance through four elements: a supplier association that acted as an instrument of socialization and transfer of explicit knowledge, a core firm consulting division that was given the "responsibility to acquire, store and diffuse valuable production knowledge" residing within Toyota's cluster, voluntary (small group) learning teams, interfirm employee transfers.[9]

## 5. Conclusion

Clustering with both top-down initiatives and initiatives as companies themselves is very popular in the present global economy. This is undoubtedly a way to increase the competitiveness of the economy and the company itself. Such initiatives have exist edin Japan for many years. Cluster models in Japan are different from the European models. Throughout the country there are located industrial and service clusters. Also, one of the most powerful Japanese transnational corporations – Toyota – is based on the cluster. The company is surrounded with their suppliers to be able to efficiently produce their products. The cluster is also suitable for suppliers and other entities, which derive much benefit from interaction with the dominant car manufacturer. Toyota cluster has a huge impact on the functioning of the region in which it operates. Effects can be seen even in the employment structure, since 80% of the 410,000 inhabitants of Toyota City are employed in the corporation. Over 2,000 companies are members of the cluster which also collaborates with many of the universities and research units.

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## MODELE KLASTRÓW JAPOŃSKICH NA PRZYKŁADZIE KLASTRA TOYOTA

**Streszczenie:** Klastry są sposobem na podniesienie konkurencyjności zarówno przedsiębiorstwa, jak i całego regionu, w którym powstają. Choć można wyróżnić cechy charakterystyczne dla wszystkich klastrów, to każdy klaster jest odmienny. Wynika to z różnych uwarunkowań historycznych, odmiennego otoczenia politycznego, ekonomicznego i społecznego. Na podstawie tych czynników można wyróżnić różne modele klastrów w poszczególnych gospodarkach. Charakterystyczne klastry występują w państwach azjatyckich, w szczególności w Japonii. Artykuł przedstawia modele klastrów występujących w Japonii oraz zawiera podstawowe informacje o klastrze zbudowanym wokół japońskiej korporacji z branży motoryzacyjnej – Toyoty.