

Cobweb Theorem: PPP-model in Cluster Innovation and European Benchmark

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Abstract: This study explores cluster innovation, and it benchmarks Styria Model of Austria as model for cluster innovation and it recommends a new model for cluster innovation. This model is named as Cobweb Theorem. Styria model is a model for cluster formation, and it is a model for innovation in cluster. There are four success-story in Styria for cluster innovation. First is public support by Styria Business Promotion Agency. Secondly, link between firms, R&D partners and public authorities. This linkage is strengthened by Styria Business Promotion Agency. Thirdly, Styrian firms are suppliers of big automakers: Steyr, Daimler, Puch. This guarantee production and sales for suppliers. Finally, technical infrastructure is available in Styria to establish a cluster. It is state-owned metal industry. Styria is named as PPP-model in innovation. This study adds technopark dimension to PPP-model, and it is called Cobweb Theorem. In Cobweb theorem, government establish technopark in clusters, and R&D partners bring together in this technopark to do innovation.

Key words: cobweb theorem; cluster innovation; PPP-model; Austria

JEL codes: M10, O31, O32, O38, P51

1. Introduction

This study aims to argue Cobweb theorem of innovation in clusters.

2. Cluster Make-ups: Value chain, Industry and Path-Dependence Theory

Americans identify clusters as geographic concentrations of interconnected companies. Interconnection is important to cluster. Because interconnection makes innovation in clusters through cooperative R&D.

EU defines clusters as agglomeration of companies. EU perceives cluster firms as an associated network. Therefore, clusters are built on interconnections and association among a group of companies.

Interconnections among cluster companies develop network among the companies, and this network generates value chain in clusters. Value chain is relations between suppliers, producers and marketings to supply products to customers. Therefore, path-dependence theory exists in clusters. Path-dependence theory assumes that, firms need raw materials and spare parts to do manufacturing, and therefore, firms aim to secure raw materials' supply and spare part's supply into manufacturing. Otherwise firms cannot produce products, if raw materials and spare parts do not flow to the firms.

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Management of firms should be aware of advantage of path-dependency theory. Path-dependence theory assumes that firms need suppliers in manufacturing for raw materials and spare parts. Therefore, SMEs role in cluster may be to become “suppliers” in order to become competitive.

This is the second quality of cluster: path-dependence. First is building “value chain”.

In addition, clusters build “industry”. There are production and distribution in an industry and in a cluster. Industry is made up by suppliers, producers and marketing (value chain). This is the third quality of a cluster formation: “industry”.

In addition, there are regional specialization and industrial cooperation in clusters. All these qualities by clusters enable firms to do cooperative R&D and innovation. This cooperation is named as “cobweb theorem” in this study.

3. Europe 2020 Strategy: Innovation and Clusters

EU 2020 Strategy adds third dimension to innovation agenda of EU: cluster. Lisbon 2010 Strategy of EU has two dimensions: innovation and entrepreneurship.

2020 Strategy proclaims that network is important to innovation for cooperative R&D, and clusters built network among cooperative firms.

Cooperative R&D can be done in technoparks in clusters. Cooperative R&D is that, R&D partners come together, and collaborate for innovation. R&D partners are firms, R&D institutions, universities, libraries, suppliers, public authorities, trade associations. Technoparks permits R&D partners for knowledge-sharing. The most important thing in establishing cooperative R&D is public support. This is the case in Styria model of Austria.

There are three factors for innovation in clusters: public support, network and technoparks. Network and technoparks enable firms for knowledge sharing and organizational learning.

First dimension is government’s support, technically and financially. Second dimension is network among R&D partners, and third dimension is technoparks. Governments develop technical and financial infrastructure for innovation. For example they establish a cluster and they establish technoparks in clusters. Technoparks are important to cooperative R&D because technoparks set “science-R&D-innovation” perception:

Universities have scientific knowledge, and they do scientific research. R&D partners do R&D with this scientific knowledge for innovation. Universities and R&D collaborated their strengths in technoparks for innovation. With this sense, “government-science-business” linkage is important to do R&D and innovation. Governments are to support scientists to develop science and scientific knowledge. R&D acquires scientific knowledge to develop products. So, we can assume that, “innovation is to put knowledge into practice”.

Scientific knowledge is crucial to R&D and innovation. Universities do have scientific knowledge. Therefore, for example, PhD programs are to focus on obtaining scientific knowledge for PhD students. This is organizational learning: Organizations should obtain technical knowledge, and share. Knowledge-sharing and organizational learning are important to innovation.

Technoparks facilitate knowledge-sharing between R&D partners in clusters, and cooperative R&D (network) has organizational learning potential. With this knowledge-sharing, firms improve their products in technoparks.

4. Austria Model to Cluster Innovation

Austria can become a benchmark for innovation in cluster. Styria automotive cluster is the first cluster in Austria, and Styria can be a model for innovation in cluster. The success story is: “careful linkage between research, firms and public authorities to do R&D and innovation”. Secondly, there is a heavy public support in Styria model that enforces this linkage between R&D, partners and firms. Public institution is Styria Business Promotion Agency. For example, technoparks can strengthen this linkage between R&D partners for innovation.

Styria is PPP-model: private-public partnership. Firms, R&D and public institutions have closer cooperation in Styria. Styria model has intensive public support by Styria Business Promotion Agency. Styria Business Promotion Agency encourages information, communication, network and cooperation among firms, R&D and universities.

Styria cluster consists of supplier’s producers making spare parts for big automobile companies. There was a state-owned metal industry in Styria. This industry was the base for cluster-formation in Styria. After this automotive cluster is established, marketing and technology company of Austria established six other clusters: automotive cluster, diesel-technology cluster, plastic cluster, renewable energy cluster, wood cluster and food cluster.

There are four stories in Styria for innovation:

- (1) Public support: Styria Business Promotion Agency.
- (2) Linkage between firms, R&D and public authorities strengthened by Styria Business Promotion Agency.
- (3) Styrian firms are suppliers of big automakers: Steyr, Daimler, Puch. This guarantees production and sales for suppliers. Therefore, becoming suppliers is vital to SME business and competitiveness.
- (4) Technical infrastructure is available in Styria to establish a cluster: a state-owned metal industry.

5. Cobweb Theorem of Innovation: Technopark Dimension

To establish a cluster, three factors are crucially: natural resources, technology and public support. Clusters can be built upon natural resources and raw materials: forest industry in Finland, wooden industry in Latvia, tourism in Malta, flora industry in Netherland. Secondly, a cluster can be built on technology such as automobile cluster in Slovakia, biotechnology cluster in Hungary, microelectronics in France, and ecoenergy in Austria. Thirdly, public support is incredible to cluster formation such as in the case Styria in Austria.

Innovation obtained key priority in EU agenda. Knowledge is criticized to R&D and innovation. “R” is research in R&D to obtain scientific knowledge. “D” is to use this knowledge to develop products. For example, “pressure inside a machine increases the heat of gas inside machine”, and “gas get cold after pressure”. This is a kind of scientific knowledge. R&D uses this knowledge to produce a product such as machine leverage or machine compressor. Therefore, in R&D, “R” is to learn scientific knowledge. Therefore, corporate R&D can be named as organizational learning. “D” is to devise this knowledge to a product. For example, therefore, PhD programs in doctoral education may focus on obtaining, learning and finding out scientific knowledge. Therefore, corporate R&D can be associated with organizational learning in innovation. And technoparks can be associated with knowledge-sharing in innovation.

For example, a scientific knowledge is: “HRM increases firm performance 40% in Germany, 50% in Japan and 30% in Turkey”. So, corporate R&D in a MNC should clarify that, they should establish HRM department in their office in Germany, Japan and Turkey. Because a scientific knowledge advise that HRM application increases

firm performance in these countries. Therefore, corporate R&D is to find and learn this knowledge to improve their organization.

Technoparks provided of infrastructure for R&D partners to do innovation. Because technoparks provide of knowledge-sharing for R&D partners. Firms, universities, public organizations, R&D, associations integrate and share their knowledge in technoparks. Therefore, theoretical representation of cobweb theorem of cluster innovation is:

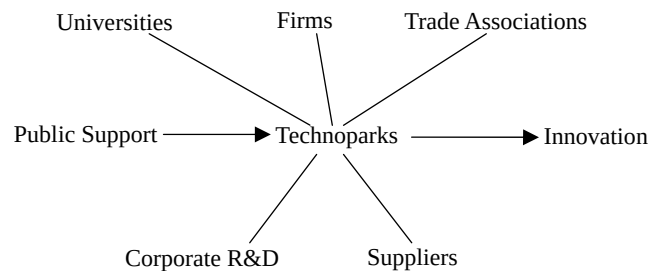


Figure 1 Cobweb Theorem of Cluster Innovation

This model represents a cooperative R&D that can be processed as a business model innovation in clusters. It is also aligned with EU 2020 Strategy for innovation. R&D partners come together in cooperative R&D in technoparks in cluster for innovation. In this model, governments set clusters and technoparks. For partners, universities have scientific knowledge, firms have intellectual capital (technical and informational), Trade associations perceive innovative products have marketing potential, Corporate R&D knows doing R&D, and suppliers may give useful feedbacks for product innovation. Therefore, technoparks bring together R&D partners to do science and innovation.

In addition, SME's role must be "supplementary" in business life. SMEs must be a supplier to continue business activities. Therefore, becoming supplier is vital to SME life.

Finally, this study identifies EU and American definition of cluster. This definition is crucial to understand an industry in a cluster. Because an industry has value chain in network; therefore, path-dependence theory exists in cluster's business activities.

Finally, Styria modelis proposed as a model for cluster innovation. Styria is a PPP-model in innovation: public-private partnership. PPP-model establishes cobweb theorem above. This study adds technopark dimension to PPP-model in cluster as a business model innovation. Secondly, there is an intense government support in Styria in innovation. Styria model has two competencies: it is a model for cluster formation, and it is a model for innovation in cluster. This study pluses "technopark" dimension to Styria model to establish cobweb theorem. Finally, secret of Styria is, there is a strong public commitment in Styria cluster to do innovation, and to form a cluster for competitiveness.

References:

- Bialic-Davendra Magdalena (2011). "An investigation of a new concept of world-class clusters in Europe: A case study of the visegrad group of countries", *Journal of Competitiveness*, No. 2, pp. 43-57.
- Chlebkova Darina and Janka Mrazikova (2009). "Clusters: A new form of regions development in Slovakia", *Theoretical and Empirical Researches in Urban Management*, Vol. 2, No. 11, pp. 134-142.
- European Commission (2007). "Regionanl research intensive clusters and science parks", Report by expert group, Chairman Christian Saublens, European Research Area, Regions of knowledge.

- European Commission Enterprise and Industry Directorate General (2011). "Promotion and development of world-class clusters in Europe".
- EuropeInnova, The European Cluster Observatory (2009). "EU cluster mapping and strengthening clusters in Europe", Europe Innova paper.
- European Commission (2012). "European Union support programmes for SMEs: An overview of the main funding opportunities available to European SMEs".
- Hsuan Juliana and Volker Mahnke (2011). "Outsourcing R&D: A review, model and research agenda", *R&D Management*, Vol. 41, No. 1.
- Ketell Christian (2004). "European clusters: Structural change in European 3—Innovative city and business regions".
- Kyoung-Joo Lee (2011). "From interpersonal networks to inter-organizational alliances for university-industry collaborations in Japan: The case of the Tokyo Institute of Technology", *R&D Management*, Vol. 41, No. 2, pp. 190-201.
- Opale (2008). "Cities and clusters in Europe: How cities are supporting clusters?"
- Pohl Hans and Maria Elmquist (2010). "Radical innovation in a small firm: A hybrid electric vehicle development project at Volvo Cars", *R&D Management*, Vol. 40, No. 4, pp. 372-382.
- Sakakibara Mariko (1997). "Evaluating government-sponsored R&D consortia in Japan: Who benefits and how?", *Research Policy*, Vol. 26, pp. 447-473.
- Sölvell Örjan (2008). "The European cluster observatory", in: *EU-Japan Regional Cluster Forum*, Dec. 2-3, 2008, Yokohama, Japan.