

Evolution of global paper and pulp industry 1800 – 2000: regional sources for competitiveness of clusters

By Jari Ojala and Juha-Antti Lamberg

A common expectation in evolutionary cluster studies (e.g. Pouders & St. John, 1996) is that national and regional industrial clusters engage in competitive interactions that lead to continuous stream of changes in global dominance. Paper and pulp industry is a typical example of this kind of process: during the past 200 years the dominance of this line of business has changes from Britain and Germany to US and Canada, to Nordic Countries and lately to South America and Asia. As an angle to dynamics of regional (also national) clusters in this paper is to see the rise and the decline of clusters as evolutionary, path dependent processes.

Clusters have an important role in economic development both at national and regional level (Porter, 1998). Generally, the literature related to clusters has offered a large amount of evidence of the positive effects of clusters particularly on the performance of the firms that locate in them (Baptista, 2000; Klepper, 2007; Swann, Prevezer, & Stout). Considerable number of studies has also investigated the factors leading to this difference between clustered and non-clustered firms but also the factors that are necessary in creating cluster level success or vitality. One of the earliest and most prominent contributions of the latter type of research is that of Porter (1990), suggesting that factor conditions, demand conditions, related and supporting industries, and strategy, structure, and rivalry of the firms in the cluster are the most important factors of cluster level vitality.

Originating to Porter's (1990) pioneering works in cluster studies, we have broad understanding on the factors that are necessary for well-functioning national and regional clusters. In the relevant literature, such factors are listed to include the basic economy of then industry (factor conditions demand conditions, related and supporting industries; Porter, 1990), institutional and legislative environment (e.g., Mowery & Nelson, 1999), entrepreneurial resources (e.g., St. John & Pouders, 2006), competitive dynamics and density in the focal population (e.g., Hannan & Freeman, 1989), technological and academic knowhow (e.g., Pinch, Henry, Jenkins, & Tallmann, 2003), government policies (e.g., Sölvell, Lindqvist, & Ketels, 2003), geographical position (e.g., Audia, Freeman, & Davidson Reynolds, 2006) and proximity to information, and complementary relationships among industries and complete infrastructure (e.g., St. John & Pouders, 2006).

Industrial papermaking during the past 200 years offers an excellent opportunity to study regional evolution of industrial clusters - though in this paper will concentrate especially to post WWII era. First, the industry has gone through periods of growth, maturation, and decline in different segments, technology, and use of raw materials. Second, paper consumption and consequently production were already global in the nineteenth century – since then industry dominance has constantly varied among different countries and areas. Third, paper industry growth has evolved hand in hand with industrial and commercial development during the past 200 years. The pulp and paper industry as a whole has systemic properties that partially explain the variation between countries. The dominance in paper and pulp industry has changed during the period between different countries and regions.

We argue that the shifts in this dominance can be largely explained by the path depended regional sources for competitiveness in each given period of time. Though raw materials and markets do explain the emergence of paper industry in different regions, the path dependence in technology and institutional structures are important drivers both for success and failure of industry. For example, favorable institutional environment can further reinforce the possibilities of the industry, as well as the technological know-how. An object of major interest is whether international

dominance in the paper industry has followed the technological leadership – or does market emergence create opportunities to gain technological leadership among higher sales and profits.

Based on earlier research in cluster studies and evolutionary field, we may identify five highly interrelated factors potentially affecting cluster vitality. The factors are (1) production factors and (2) demand factors related to the industrial cluster in question, (3) density of firms in the cluster, (4) phase of the life cycle of the industrial cluster, and (5) value chain architecture of the cluster.

In this particular paper we will concentrate on the production and demand factors especially. Production and demand factors have a central role in Porter's (1990) theory of cluster vitality. First, with regard to the production factors or factor conditions, Porter (1990) further divides them to 'basic factors' (such as natural resources, climate, location, and demographics) and 'advanced factors' (such as communications infrastructure, sophisticated skills, and research facilities). According to Porter (1990), advanced factors are the most significant for cluster vitality and, unlike factors whose supply depends upon exogenous 'endowment', advanced factors are a product of investment by individuals, companies, and governments. However, the importance of many of the production factors varies according to the type of cluster in question (e.g., based on an industry). Second, by definition, demand factors are essential for the vitality of any cluster because they create the market for the products or services of the firms in the cluster. Within the framework, Porter places particular emphasis on the role of home demand in providing the impetus for cluster vitality. Because firms are typically most sensitive to the needs of their closest customers, the characteristics of home demand are particularly important in shaping the differentiation attributes of domestically made products and in creating pressures for innovation and quality. In paper industry particularly, the concept of "home market" is varied: for paper producing countries such as US, Germany or Japan these markets are domestic ones, but for Nordic Countries and Canada the markets are more international - though also in nearby areas.

The paper is based on two volumes published on the matter, first analyzing the paper industry from company level (Lamberg J-A, Näsi J, Ojala J, Sajasalo P (eds) (2006) *The evolution of competitive strategies in global forestry industries. Comparative perspectives.* Springer, Dordrecht) and second one analyzing the issue from industry level (Lamberg J-A, Ojala J, Peltonniemi M, Sarkka T (eds) (2012) *The Evolution of Global Paper Industry 1800 – 2050.* Springer, Dordrecht)