

**IDENTIFYING TRADED CLUSTER INDUSTRIES IN LATVIA****Zanete Garanti**<sup>+</sup>, Mg.oec., lecturer<sup>1</sup> Faculty of Economics and Social Development, Latvia University of Agriculture, Latvia

**Abstract.** Cluster based entrepreneurship is an important tool to foster economic growth of companies and regions. Recent studies show a strong positive link between the existence of clusters and productivity, efficiency, innovative capacity, and overall competitiveness of the companies that leads to competitive regions. Considering the benefits of regional clusters, support for cluster initiatives through special programmes and other tools supporting cluster formation, is available in Latvia from 2009. The initial stage of regional cluster development is concentration of the economic activity in certain regions; thereby, the author of this article looks at economic activities at regional level and finds those industries that have potential forming regional clusters. Economic activity, both in general and specific industries, has a tendency to concentrate in certain geographic areas. Findings show that all industries are concentrated in Latvia, with an average Gini coefficient being equal to 0.54. Location Gini calculation allows the author to group industries into local, resource dependent, and traded cluster industries. The main focus of the article is put on traded cluster industries that locate in certain regions owing to regional attractiveness and competitiveness, thus, forming regional business clusters. Seven cluster categories with 47 traded cluster industries are identified of which 49% are manufacturing and 51% are service industries. Twenty-nine per cent of all enterprises are engaged in these industries in Latvia but they employ 40% of working population; 40% of net turnover of enterprises is concentrated and 40% of nonfinancial investment are attracted there. Available cluster support is also concentrated in these industries.

**Key words:** regional clusters, cluster development.

**JEL codes:** L16, R12, O18

**Introduction**

Michael E. Porter (1990, 1998a, 1998b, 1998c, 2000, 2003) introduced clusters as a tool for competitiveness, although, the cluster concept is known since the work of Marshall in the 1920s where he discussed the importance of industrial districts. Regional clusters can be defined as the combination of five dimensions – single sector enterprises that cooperate and compete; supportive enterprises from a wide range of sectors; public and government institutions, interested in economic development of the sector and region; other institutions, such as research, educational, financial, and other ones; and the fifth are the regional dimension which combines all the four above-mentioned dimensions into one region (Garanti Z., 2013a; Garanti Z., Zvirbule-Berzina A., 2013a, 2013b). **Regional clusters promote regions' growth and development (Garanti Z., Zvirbule-Berzina A., 2013a, 2013b) by increasing firms' efficiency and productivity, innovation capacity, and competitiveness.** There are several methods developed to identify regional clusters, while for the most of them (Porter E.M., 2003; Solvell O., et al., 2003; Szanyi

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M., 2012; Szanyi M., et al., 2010) the starting point is identifying industries that have potential forming regional clusters. In the present research, the author uses location Gini coefficients developed by Paul Krugman (1991). The main idea behind this method is measuring regional inequalities in distribution of the workforce, thus, identifying agglomeration of companies that is a starting point of clusters (Saxenian A., 1994) that locate in a specific region (Marshall A., 2009; Chatterjee S., 2003; Gordon I.R., McCann P., 2000; Xiang L., Yingchuan Y., 2005; Boja C., 2011). A cluster is an agglomeration in which special cooperation ties emerge among the **agglomeration's companies and institutions** (Porter E.M., 1998a; Krugman P., 1991; Palacios J., 2005; Malmberg A., Solvell O., Zander I., 1996).

Regional clusters are promoting a steady growth and reducing regional inequalities (Porter E.M., 2003; Fritsch M., 2008; Baptista R., Escaria V., Madruga P., 2008; Rocha H., Steinberg R., 2005; Romero-Martinez A.M., Montoro-Sanchez A., 2008, Delgado M., Porter E.M., Stern S., 2010, 2011). The important role of regional clusters in a regional economy has promoted the research on the industries forming regional clusters. The aim of the research is to identify those industries in Latvia that have potential forming regional clusters. The following research tasks are set up to achieve the aim:

- 4) to group industries into local, resource dependent, and traded cluster industries;
- 5) to analyse the impact of traded cluster industries on the national economy.

The research materials and methods include data of the Central Statistical Bureau (CSB) and both national and foreign research papers. The author employed the monographic method, analysis and synthesis as well as the calculation of location Gini coefficients to group industries into local, resource dependent, and traded cluster industries. Time series analysis was employed to determine the impact of traded cluster industries on the economy.

## **Research results and discussion**

### **Methodology**

The author measures geographic concentration of economic activities by using the location Gini coefficient (G). The location Gini coefficient is a modification of the Gini coefficient method in which individuals are replaced with regions and their weights are set based on the proportion of a region in total unemployment (Spiezia V., 2002). The location Gini coefficient method was developed by Paul Krugman (Krugman P., 1991), and this method is a modification of the traditional Gini index. The location Gini coefficient is widely used in research on concentration and unequal location of industries in regions both by researchers (Shelburne R.C., Bednarzik R.W., 1993; Guillain R., Le Gallo J., 2007; Amiti M., 1998) and by international institutions such as the Food and Agriculture Organisation (FAO) (Bellu L.G., Liberati P., 2006), the Organisation for Economic Cooperation and Development (Spiezia V., 2002, 2003). The critique of this method is based on the fact that the location Gini coefficient attempts to eliminate the difference between inequality and concentration, even though these are very different terms (Arbia G., 1989), besides, a small sample of location data can lead to imprecise results (Deltas G., 2003). The researchers who used the Gini coefficient in their research came to a conclusion that all industries, to a greater or smaller extent, were concentrated. Based on a methodology developed by scientists (Krugman P., 1991; Shelburne R.C., Bednarzik R.W., 1993; Bellu L.G., Liberati P., 2006), the location Gini coefficient is calculated as follows:

- 1) the proportion of every region's unemployment relative to total unemployment:

$$S_i = \sum_j E_{ij} / \sum_i \sum_j E_{ij} \quad (1)$$

- 2) the proportion of a region's employment for every industry:

$$S_{ij} = E_{ij} / \sum E_{ij} \quad (2)$$

where E- number of jobs,

i- region;

j- industry.

- 3) the coefficient R is calculated for every industry:

$$R = S_{ij} / S_i \quad (3)$$

- 4) industries are arranged in ascending order based on the coefficient R value;

- 5) Si is calculated as a cumulative value p;

- 6) Sij is calculated as a cumulative value q;

- 7) by depicting p and q values graphically, a Lorenz curve is obtained. In the case of equal distribution of employment, the Lorenz curve will match a 45 degree angle. The more unequally employment is distributed, the more the Lorenz curve moves away from the 45 degree angle;

- 8) the location Gini coefficient may be obtained from the Lorenz curve:

$$G = 1 - 2Z \quad (4)$$

where Z- a concentration area under the Lorenz curve.

- 9) the Gini index may be calculated as follows:

$$G = 1 - \sum [(q_i + q_{i-1})(p_i - p_{i-1})] \quad (5)$$

The developer of the method, Paul Krugman (Krugman P., 1991), points out that the location Gini coefficient ranges from 0 to 1. If employment in every region is evenly proportional to overall employment in the particular industry, the industry does not tend to concentrate in a certain region and **the coefficient will be equal to 0. If the industry's employees are located only** in one region, the coefficient will be equal to 1, indicating full equality. Porter assumed a Gini coefficient of 0.3 to be a sufficient indication of concentration that indicates traded cluster industries (Porter E.M., 2003).

### Industry grouping

All industries in Latvia are somewhere concentrated. The location Gini coefficients computed for groups of industries are presented in Table 1.

The average location Gini coefficient for industries in Latvia is equal to 0.54 (Table 1), which **indicates high inequality for industries' employment across the regions. The location Gini coefficient** indicates industrial differences which affect the formation of clusters. M. E. Porter (2003), O. Solvell (2003), and Z. Garanti (2013b) have discussed that location Gini coefficients clearly show main trends in industry distribution:

- **some industries are distributed proportional to population**, thus, ensuring local demand for goods and services. These industries include retail trade, health care, water supply, education, and others. These local industries do not have an aim to form clusters;

- **some industries locate close to natural resources.** According to Porter (2003), there are resource dependent industries in which businesses are located where necessary resources are available, for instance, part of agriculture, fishery, mining, logging, and quarrying. These industries do not form clusters themselves but provide resources to cluster industries;

Table 1

Location Gini coefficients for industries in 2012

Gini value range	Industries	Average Gini values
Low Gini values (G < 0.5)	Public administration and defence; compulsory social security	0.26
	Education	0.26
	Human health and social work activities	0.30
	Agriculture, forestry and fishing	0.37
	Construction	0.40
	Electricity, gas, steam and air conditioning supply	0.41
	Water supply, sewerage, waste management and remediation activities	0.43
Average Gini values (5 < G < 7)	Manufacturing	0.50
	Wholesale and retail trade; repair of motor vehicles and motorcycles	0.50
	Arts, entertainment and recreation	0.58
	Other service activities	0.58
	Real estate activities	0.62
	Professional, scientific and technical activities	0.62
	Administrative and support service activities	0.65
High Gini values (G > 7)	Mining and quarrying	0.70
	Transportation and storage	0.70
	Accommodation and food service activities	0.73
	Information and communication	0.73
	Financial and insurance activities	0.79

Source: author's calculations, 2013

- **some industries are located in the regions because of the competitive advantage.** There are enterprises located in certain regions not owing to the availability of resources, but owing to their competitive advantages. According to Porter (2003) and Solvell (2003), these are called traded cluster industries. These industries tend to form clusters to become more competitive both in local and global markets. Identified traded cluster industries are summarised in cluster categories, as shown in Tab.2.

In total, the author identified 7 cluster categories and 47 subcategories with industries that have a potential forming regional clusters (Table 2). Forty-nine per cent of the industries are manufacturing, while 51% - are service industries.

Table 2

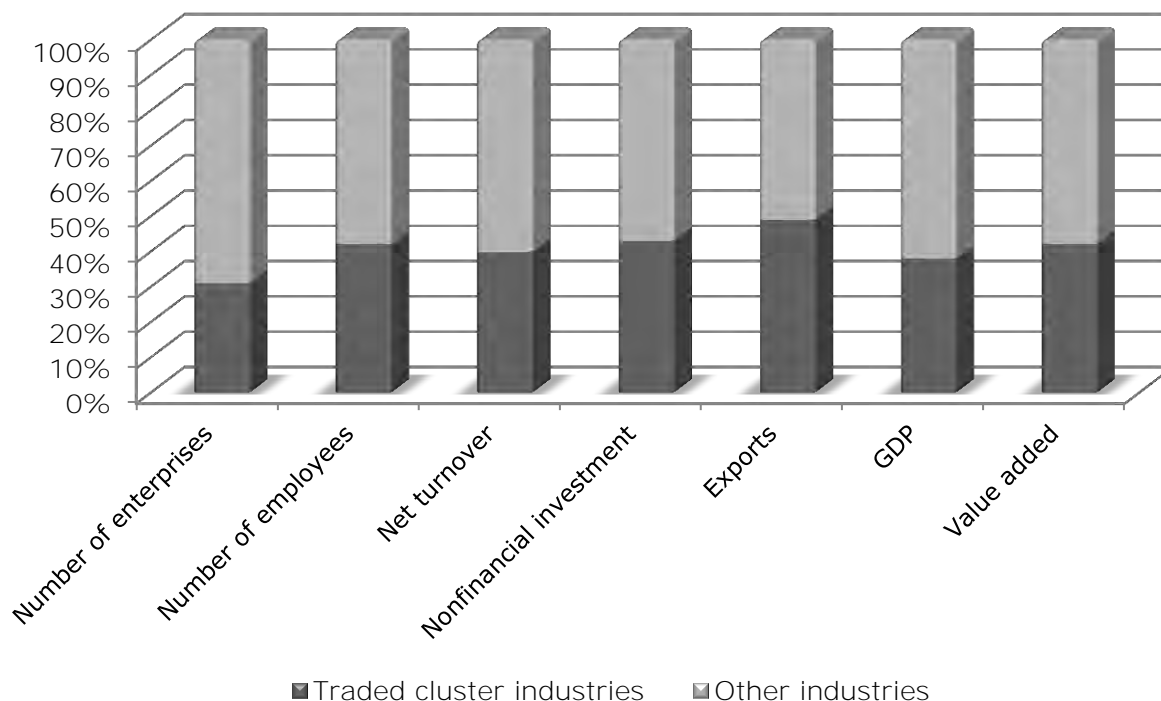
## Traded cluster categories in Latvia

No	Cluster category	Subcategory
1	Manufacturing	23 (includes the manufacture of food and dairy products, textile, leather, footwear, paper, chemicals, metallic and non-metallic products, wood products and others)
2	Construction	3 (construction of buildings, civil engineering and specialised construction activities)
3	Transporting and storage	4 (land transport and transport via pipelines, water and air transport, warehousing and support activities)
4	Accommodation and food service activities	2 (accommodation and food service)
5	Information and communication	6 (includes publishing activities, programming, broadcasting, telecommunication, computer programming, information service activities and others)
6	Financial and insurance activities	3 (financial activities, insurance and activities related with financial activities and insurance)
7	Business services	6 (legal, accounting, management consultancy, scientific research and development, market research activities and others)

Source: author's construction, 2014

## Traded cluster industries' impact on economy

Traded industries have a large impact on the economy. Traded industries' share in employment, number of enterprises, and other economic indicators is shown in Figure 1.



Source: author's calculations, 2013

Fig. 1. Contribution of traded cluster industries to Latvia's national economy in 2011

On average, 29% of all enterprises were engaged in the traded cluster industries, employing 40% of all employed individuals, thereby, one can conclude that larger enterprises operated in the traded cluster industries than in the other industries – 37 and 24 employees per enterprise, respectively. In Latvia, less than one third of all enterprises operate in the traded cluster industries, however, 40% of the net turnover and 40% of the nonfinancial investment are concentrated at the enterprises of these industries, besides, they account for 50% of total export, 39% of GDP, and 43% of total value added. According to the US study (Porter E.M., 2003), traded industries employed 32% of all employees, and average wages were 33% higher in these industries than in other industries. According to the data, in 2012 in Latvia, the average gross wage was 24% and the average net wage was 23% higher in the traded cluster industries than in the other industries.

Traded industries form regional clusters. Clusters have been established in Latvia since 2009 with the EU funding and government support are found in traded industries:

- wood processing and furniture;
- logistics and distribution;
- machinery and heavy industry;
- IT;
- apparel and light industry;
- food production.

According to previous research (Garanti, Zvirbule-Berzina, 2013c; 2013d), more traded industries have high potential to form clusters in the regions of Latvia.

### Conclusions, proposals, recommendations

1. All industries in Latvia are somewhere concentrated as the average location Gini coefficient equals 0.54.
2. The location Gini coefficient calculation indicates that some industries like health care, water and electricity supply, education are not concentrated but distributed proportional to population, thus, ensuring local demand.
3. Industries that depend on natural resources, like quarrying, agriculture, fishery, and others, locate close to natural resources and the location Gini coefficient tend to be high in these industries.
4. The author identified 7 cluster categories and 47 industries that are located in particular regions because of their competitive advantage. These industries have the potential forming regional clusters.
5. Wages, export capacity, and contribution to GDP and value added are higher in traded industry clusters. The available support is also concentrated in these industries.

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