THE OCCURRENCE AND STRENGTH OF CLUSTERS IN UKRAINE AND POLAND

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1. Introduction

Agglomeration of economic activity is believed to cause possible positive outcomes generated in an economy. Clusters are one of the forms of agglomeration that are believed to be vital for economic development and competitiveness. They are geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (for example universities, standards agencies, and trade associations) in particular fields that compete but also cooperate [1, p.248]. Within their borders the occurrence of many phenomena takes place. Spillover effects may be considered one of them [2, p.378].

Based on Marshall's industrial districts, the concept of clusters has been a way to unravel the reasons behind economic success of some regions (e.g. the Silicon Valley, the City of London, Hollywood) and failure of others. Clusters are formed in all economies, irrespective of their stage of development. They can also be present in all industries [3, p.2]. Clusters have been a major focus of scientists and policymakers throughout the past decade. They have been incorporated in many policy agendas in the European Union. Perceived as drivers that foster competitiveness, clusters are mentioned in the Europe 2020 growth strategy [4]. Their presence and role in the economy is also underlined at country, regional, and local levels.

Identifying and analyzing clusters can be a quite tricky pursuit as many effects generated among the entities that form them are elusive. Cluster mapping has been performed by few scientists as mainly it requires two things: data necessary to establish which relationships between firms are of key importance but most importantly resources do access this kind of data. In this paper we use the methodology on cluster mapping from the works of the European Cluster Observatory [5] which in turn is based on Porter's cluster mapping in the United States [6; 7]. We turn our attention to various types of clusters in Ukraine and Poland based on data on employment and number of enterprises, searching for the most prominent clusters within these countries. Looking at numerous dimensions we try to answer a question on existing similarities and differences between clusters in both economies.

2. The concept of clusters

The concept of business clusters has appeared in scientific discourse some time ago, in conjunction with considerations on the location of economic activity, theories of urban and regional development, innovation, and competitiveness.

The distinguishing feature of clusters when compared to other concepts that deal with the distance between entities that form them, is their multifaceted nature. Disaggregation of the definition of a cluster allows identifying several of their dimensions. One of their basic attributes is the geographical proximity. Companies, but also other institutions and organizations benefit from their location that is within a short distance from one another, unlike other representatives of any industry that are scattered throughout significant spatial distance. The accumulation of entities in space is intended to facilitate the occurrence of interactions that may be beneficial for members of the cluster, provided they reach a certain critical mass of this accumulation.

Companies and other entities that form clusters are connected with one another through different types of relations. These relations are dependent on the profile of the area that these entities

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represent. Cluster structures are created by members that come from three key areas: the private sector, the public sector, and supporting institutions. What should be underlined is the fact that determining cluster boundaries is debatable. In connection with local conditions, these boundaries may vary significantly between regions. Clusters are formed by and in numerous industries. In depth analysis is being carried out by numerous scientists to ascertain whether and what role they play in innovation, economic development or competitiveness at different levels of economic aggregation.

Interest in clusters and their role in the economy exists to some extent at the expense of industries or individual companies. The reason for this is the fact that by analyzing clusters we enable identification of various aspects of competition in a way that was not possible up to now, while recognizing the role of the location in the process of developing a competitive advantage [1, p.246]. One of the reasons why the discussion on the existence of clusters is taking place is due to the fact that several changes have occurred in the economic landscape, and a substantial increase in its complexity is one of them. Clusters are considered to be creations, which in their essence, being a broader concept than an industry in its traditional sense, depict more accurately relationships determining competition and competitiveness and allow identifying sources of competitive advantage. Cluster structures generate benefits not only for individual businesses. Their presence also affects functioning of entire industries, regions and national economies.

3. The occurrence of clusters in Ukraine and Poland

Clusters exist in every economy. Some of them have developed many years or even centuries ago, now being artifacts of the development that have taken place in the regions where they are located. Others have appeared recently as a result of changes in modern times. Clusters differ significantly between one another not only because of discrepancies in their geographic scope but also due to the number of industries that form them.

The fundamental dimension that is essential when separating a cluster from the matrix of market relations in a region is the level of employment that accompanies them, which is noticeably higher than in other regions. With this assumption we use a dataset published by the European Cluster Observatory (ECO) on clusters in a majority of European countries which is based on works of Porter concerning clusters in the United States. The methodology used by the researchers at the ECO aggregates industries at 4-digit levels into 41 standard-type industry clusters and eight creative and cultural industry clusters. Each of these categories is comprised of industries which were proven empirically to co-locate. In both cases we chose to analyze the most up to date dataset which in the case of Poland is from 2010 and for Ukraine it depicts the state of clusters in 2011.

Among all of the 49 cluster categories one may take a closer look into the number of employees within each of them. The biggest clusters based on employment in Poland and Ukraine have, to some point, the same industrial profile (see Fig. 1 and 2). In Poland, the top three of the biggest clusters are: Processed food, Construction, and Financial services, whereas in Ukraine the top three list is comprised of Transportation and logistics, Processed food, and Construction clusters.

A quite interesting feature of the profiles of the main clusters in both countries is the fact that in Poland four of the clusters within the top 10 list are mainly service type (Financial services, Education and knowledge creation, Transportation and logistics, and Business services). For Ukraine that would be the case of three clusters (Transportation and Logistics, Telecom, and Distribution). At the same time a great number of employees is observed in Ukraine within all of the food and agricultural types of clusters (Processed food, Farming and animal husbandry, and Agricultural products).
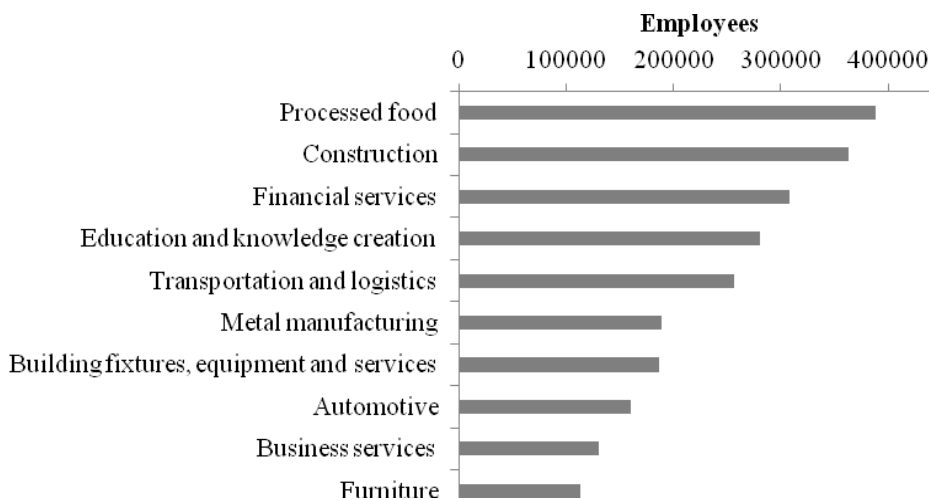
Fig. 1. Top 10 clusters in Poland by employment in 2010
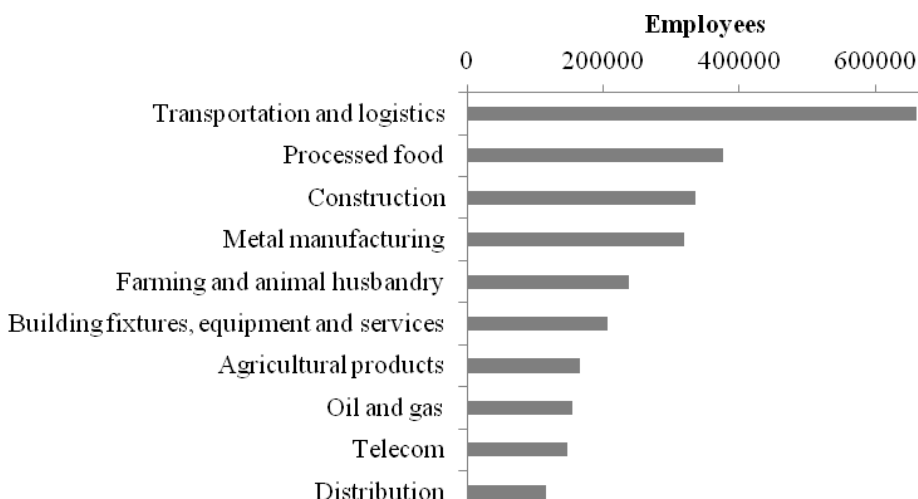
Source: own elaboration based on [5]

Fig. 2. Top 10 clusters in Ukraine by employment in 2011

Source: own elaboration based on [5]

Another way to look closely into clusters is to focus ones attention on the number of enterprises apart from analyzing the number of employees. That way one can extend the scope of the research. In both countries the number of enterprises is the largest in the case of the Construction cluster (see Fig. 3 and 4).

The other two clusters among the top three in Poland are: Tourism and hospitality, and Business services whereas in Ukraine: Business services, and Farming and animal husbandry. Once again, Ukraine stands out with reference to the food and agricultural types of clusters. This is clearly the effect associated with the fact that Ukraine is a country in transition. As the economy of Ukraine will progress we should witness expansion of other types of clusters, mainly those associated with the services sector.
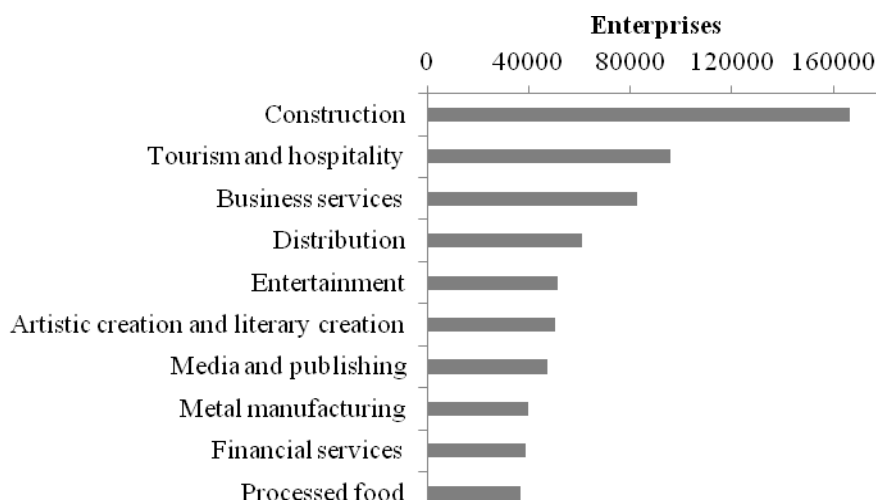
Enterprises

| | 0 | 40000 | 80000 | 120000 | 160000 |

Construction

Tourism and hospitality

Business services

Distribution

Entertainment

Artistic creation and literary creation

Media and publishing

Metal manufacturing

Financial services

Processed food

Fig. 3. Top 10 clusters in Poland by number of enterprises in 2010
Source: own elaboration based on [5]

Enterprises

| | 0 | 5000 | 10000 | 15000 | 20000 | 25000 |

Construction

Business services

Farming and animal husbandry

Processed food

Agricultural products

Distribution

Media and publishing

Printing and publishing
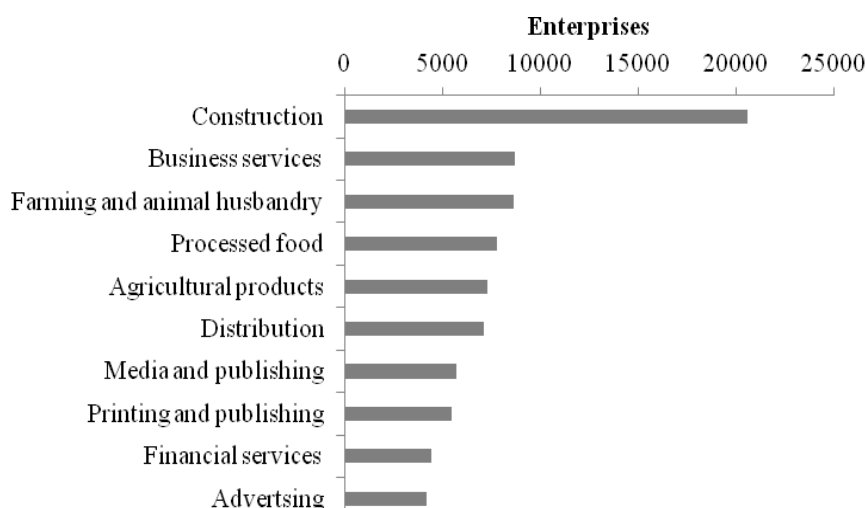
Financial services

Advertsing

Fig. 4. Top 10 clusters in Ukraine based on number of enterprises in 2011
Source: own elaboration based on [5]

4. The strength of clusters in Ukraine and Poland

Focusing on relative measures rather than the absolute ones allows performing a more in depth analysis of the strength of clusters. Based on the European Cluster Observatory methodology we assess cluster strength using three dimensions: size, specialization, and focus. Within each of these dimensions a cluster may be granted recognition in form of a star when previously formulated conditions are met. By using that system identification of the strongest ones is performed by awarding each cluster with between 0 and 3 stars. Within the dimension of "size" employment in each cluster category is compared to overall employment within that category in Europe (10% of the largest clusters within a given category in Europe are considered star-worthy). "Specialization" is assessed using the location quotient (LQ) as its measure (clusters with location quotient of at least 2 receive a star). Finally, "focus" compares employment in a cluster category and compares it to overall employment within the analyzed region (10% of clusters with the largest share in a region's employment are considered star-worthy). "Size" of the clusters, as defined by the ECO researchers, is most prominent in the following cluster categories in Poland: Furniture, Museums and preservation of historical sites and buildings, Stone quarries, Oil and gas, and Building fixtures, equipment and services, whereas in Ukraine it is the case of Oil and gas, Tobacco, Farming and animal husbandry, Stone quarries, and Agricultural products. Highest values in "focus" are

achieved by Processed food, Construction, Financial services, Education and knowledge creation, and Transportation and logistics clusters in Poland, and Transportation and logistics, Processed food, Construction, Metal manufacturing, and Farming and animal husbandry clusters in Ukraine.

Location quotient is one of the most widely accepted measures of specialization of an economy, whether at local, regional or national levels. It compares the proportion of employment in a cluster in a region over the total employment in that region, to the proportion of total European employment in that cluster over total European employment [5]. When comparing LQ of Polish and Ukrainian clusters a higher specialization of certain clusters in Ukraine is clearly visible. In Ukraine 12 clusters when analyzed at national level have their LQ of at least 12 whereas in Poland it is the case of only three clusters (see Tab. 1). The most prominent values of specialization occur in the Oil and gas cluster in Ukraine and Furniture cluster in Poland.

Tab. 1. Top 10 clusters by location quotient in Poland and Ukraine

No.	Poland		No.	Ukraine	
	Type of cluster	LQ		Type of cluster	LQ
1.	Furniture	2.77	1.	Oil and gas	15.11
2.	Museums and preservation of historical sites and buildings	2.52	2.	Tobacco	7.26
3.	Stone quarries	2.28	3.	Farming and animal husbandry	5.41
4.	Oil and gas	2.12	4.	Stone quarries	4.52
5.	Building fixtures, equipment and services	1.95	5.	Agricultural products	4.15
6.	Education and knowledge creation	1.91	6.	Biotech	3.68
7.	Processed food	1.88	7.	Transportation and logistics	2.98
8.	Apparel	1.75	8.	Aerospace	2.91
9.	Paper products	1.55	9.	Heavy machinery	2.78
10.	Maritime	1.5	10.	Power generation and transmission	2.55

Source: own elaboration based on [5]

Focusing on 41 standard-type industry clusters we have looked into the relative strength of clusters at regional level. The regions taken into consideration at this point were: 24 oblasts, Crimea and Kyiv in the case of Ukraine and 16 voivodeships in the case of Poland.

Given the conditions imposed on strong clusters Ukrainian regional clusters have been awarded with three stars in 34 cases, two stars in 106 cases and one star in 138 cases. Polish regional clusters have been awarded with three stars in 10 cases, two stars in 48 cases and one star in 95 cases (see Tab. 2). The distribution of strong clusters in both countries varies among regions. The regions with most three-star clusters are: the Donetsk oblast in Ukraine (5 clusters: Building fixtures, equipment and services, Metal manufacturing, Oil and gas, Production technology, and Transportation and logistics) and Wielkopolskie voivodeship in Poland (3 clusters: Building fixtures, equipment and services, Furniture, and Processed food).

Tab. 2. Strength of clusters in Polish and Ukrainian regions

Region	Number of stars			Region	Number of stars		
	3	2	1		3	2	1
Cherkasy oblast	2	3	6	Volyn oblast	0	3	7
Chernivtsy oblast	0	5	3	Vynnytsya oblast	2	2	5
Chernyhiv oblast	1	4	5	Zakarpattya oblast	0	4	8
Crimea	1	4	6	Zaporizhya oblast	4	3	10
Dnipropetrovsk oblast	2	9	1	Zhytomyr oblast	1	4	8
Donetsk oblast	5	6	1	Dolnoslaskie	0	6	6
Ivano-Frankivsk oblast	0	4	6	Kujawsko-Pomorskie	0	2	8
Kharkiv oblast	3	8	5	Lodzkie	1	4	5
Kherson oblast	0	6	4	Lubelskie	0	2	4

Khmelnytskyi oblast	0	4	7	Lubuskie	0	3	8
Kirovohrad oblast	0	5	5	Malopolskie	1	3	4
Kyiv	2	3	8	Mazowieckie	2	7	7
Kyiv oblast	2	4	2	Opolskie	0	3	5
Lugansk oblast	2	1	7	Podkarpackie	0	2	7
Lviv oblast	1	2	11	Podlaskie	0	2	6
Mykolayiv oblast	1	4	3	Pomorskie	0	2	9
Odesa oblast	2	1	3	Slaskie	2	4	4
Poltava oblast	3	4	3	Swietokrzyskie	0	2	5
Rovno oblast	0	4	2	Warminsko-Mazurskie	1	2	5
Sumy oblast	0	5	6	Wielkopolskie	3	3	3
Ternopil oblast	0	4	6	Zachodniopomorskie	0	1	9

Source: own elaboration based on [5]

5. Conclusions

According to researchers and policymakers clusters are one of the drivers of competitiveness. Both Poland and Ukraine differ in terms of the relative strength of clusters that occur within their borders. Given a fixed list of cluster categories proposed by the European Cluster Observatory we have looked for similarities and differences of clusters in both countries. When compared to other European countries and regions Ukraine holds a strong position within the clusters of food and agricultural profile as well as the Oil and gas cluster. Poland, at the same time, stands out with its Furniture cluster. One of the main differences in the type of clusters that are most developed is the fact that Ukraine is lagging behind Poland when it comes to clusters pertaining to the services sector. If focused on future economic development a growth in this area should occur as a shift towards a more competitive economy is expected.

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Summary

Clusters are agglomerations of elements remaining in relationships of different kind between one another. The core type of connection between companies in a cluster is rivalry. This is due to the fact that they have to compete in order to gain access to finite resources that are used to thrive on the market. Another type of relations between entities that form clusters is cooperation. As Europe is trying to figure out a way to strengthen its competitive position against its main global competitors, clusters have recently been dubbed as means for Europe and European regions to become more competitive. The main aim of this paper is to depict the current state of clusters in Ukraine and Poland and to underline the most prominent similarities and differences with reference to their occurrence and strength.