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## **Correlation between the state of cluster development and national competitiveness in the Global Competitiveness Report of the World Economic Forum 2012–2013**

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This paper explores the correlation between state of cluster development in a country and its national competitiveness. Our research hypothesis is that high positive correlation exists between cluster development and national competitiveness, meaning that the countries in which clusters are deep and well-developed are at the same time countries that have a high national competitiveness in certain segments of industry and vice versa. The source of the data analysed in this paper is the Competitiveness report of the World Economic Forum 2012–2013 (hereinafter WEF), which includes 144 economies. Linear correlation, including confidence intervals, was used in data analysis. Research hypothesis is accepted by the data. Developing countries cannot follow the direction from building high competitiveness to the development of clusters, but national competitiveness can significantly be improved by development of clusters and encouraging innovation and productivity within the framework of cluster-directed economy.

**Keywords:** clusters; productivity; competitiveness; correlation; World Economic Forum

**JEL classification:** O 21, O 31, R 11

### **1. Introduction**

The purpose of this paper is to explore the correlation between state of cluster development and the levels of national competitiveness of countries, based on WEF's data of GCI and its components. Our research hypothesis is that countries in which clusters are deep and well-developed have a high national competitiveness and vice versa: high national competitiveness leads to well-developed clusters. This is reflected in a high standard of living of the population and stable and long-term economic growth of the country.

Transition countries, as well as developing countries seek to increase export, wages and build a global competitive advantage on the basis of many favourable natural resources (large natural wealth) and cheap raw materials, labour and final products (competition based on low prices and low costs). However, this strategic orientation of a country, even when export is growing, does not lead to a higher standard of living of the population (GDP per capita is not growing), or to the global competitiveness of a country in a particular industry segment. Using the strategy of comparative advantage

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(or relying on traditional sources of competitiveness), transition and developing countries are proving that plenty of cheap factors of production is not a competitive advantage in the international market, as developed countries are proving that lack of some (but not most) factors of production can be a competitive advantage for a particular sector or a particular product. In the latter case, a constant pressure is put (some kind of stimulation) on the companies to create innovation and to improve technology, in order to eliminate lack of resources (factors of production) and ensure successful competition of national companies (Porter, 2008).

Traditional sources of competitiveness (raw materials/favourable natural resources, cheap and unskilled labour, the exchange rate, budget deficit, positive balance of payments, government intervention, subsidies) in a modern economy are unsustainable for several reasons (Fairbanks & Lindsay, 1997; Porter, 1986, 2008): (1) there will always be other competitors that can offer a lower price of the products; (2) today progressive companies easily obtain certain factors of production (labour, natural resources) through global strategy (acquisitions in abroad, foreign investments) or can easily avoid certain factors by using advanced technology (e.g. production of synthetic materials). In addition, price competition creates pressure to keep wages low (low standard of living), leading to the depletion of natural resources (as opposed to sustainable development), high dependency of exporters on changes in the exchange rate and world price fluctuations and the like.

Modern economic theories of national and international competitiveness and sources of competitiveness (which are given below) have led to deeper understanding and analysis of clusters, recognising clusters as an important factor in creating competitiveness.

Theories of competitiveness and economic growth and development (Dragutinović, Filipović, & Cvetanović, 2005; Mervar, 2003; Porter, 1990, 2008) have changed and evolved over time. In response to the question of which production factors contribute most to economic prosperity of a country and its competitiveness, the researchers first considered the natural resources and importance of availability of the production factors (capital accumulation enables specialisation and division of labour and contributes to a higher productivity). Afterwards, they realised the importance of technological progress as an endogenous variable (a variable that depends on the company and government investment in human capital, that is, in education and skills), the importance of innovation and knowledge (accumulated human capital of high expertise and specialisation), their spreading through externalities (which are most visible in clusters), as well as the importance of a proactive, dynamic and challenging business environment. According to Porter (1990, 2008), although global companies prefer to transfer some activities in a value chain from the home country (external procurement system, transferring the facility to other locations), the role of home country and clusters in gaining the competitive advantage is very important. For example, locations with low wages and taxes or cheap raw materials often lack developed infrastructure and other numerous conditions for improvement of companies and development of their productivity and innovation. According to this author, a crucial role in gaining sustainable competitive advantage of companies and national economies in the modern economy has the presence of factors of production whose mobility is not significantly improved by the processes of globalisation. These factors are best developed in a local community, through local processes and clusters – i.e. the specialised knowledge and skills, specialised suppliers, motivation and confidence, intensive cooperation and exchange of knowledge and ideas, intensive local competition, institutional development, scientific and technological base, developed information infrastructure, etc.

In economic literature that deals with the theory of foreign trade (Krugman & Obstfeld, 2009; Porter, 2008; Salvatore, 1998), sources of international competitiveness of countries have significantly changed. The theory of comparative advantage (traditional view of competition) directs the countries to compete on the basis of plenty/availability of the basic factors of production (natural resources, labour and capital) and high efficiency of their use (advantage based on low costs or price structure of production and high labour productivity). New trade theories (the theories of competitive advantage), which are complementary to the theory of comparative advantage (H-O theory), base the international competitiveness of countries on the following factors: economies of scale, product differentiation (mass production of branded products within monopolistic competition), changes in preferences, the presence of clusters, the application of science, technology changes, market segmentation.

## **2. The relationship between clusters and national competitiveness**

Many authors emphasise the role of clusters in building national competitiveness. The largest contribution to the promotion of clusters was given by Michael Porter. Specificity of Porter's interpretation of sources of national competitiveness (Porter, 1990, 1998, 2000, 2008) is reflected in the importance and significance that this author gives to the quality of the business environment and clusters, as an integral part of the business environment, in creating national competitiveness or international competitiveness of companies in specific industries or industry segments. According to this author, globally competitive and export oriented companies do not succeed in isolation, but in the cluster of industries, which is composed of strong horizontal (common customers, technology, channels) and vertical links (customers/suppliers) between companies and institutions.

Fairbanks and Lindsay (1997) point out seven patterns of uncompetitive behaviour of the governments and entrepreneurs in developing countries and at the same time they observe them as sources or opportunities for the future success of an economy (so called hidden sources of productivity growth, innovation and competitiveness). One of the patterns of uncompetitive behaviour, but also an opportunity for development of national competitiveness is: 'lack of cooperation between the companies and institutions in value chain, or non-existence of clusters'. In an interesting analysis of a weak competitive position of Colombian leather bags in the US market, the authors concluded that the main reason for this market position of Colombian leather industry 'lies' in the absence of cooperation between companies in a long production chain: from farmers, through slaughterhouses and tanneries, to manufacturers of leather products.

Sölvell, Lindqvist, and Ketels (2003) point out that cluster initiatives are central points of industrial, regional and innovation policies in developed countries. Cluster initiatives are being developed in three different areas of policy: (1) regional, industrial and SME policy; (2) the policy of attracting foreign direct investments and (3) scientific research and innovation policies, and all these policies are directed towards the ultimate goal of developing microeconomic and national competitiveness.

Krugman and Obstfeld (2009) make a distinction between internal (on the company level) and external economies of scale (sector level) and emphasise that clusters are an important factor of external economies of scale and source of international competitiveness. External economies of scale arise when the cost per unit of product does not necessarily depend on the size of any particular company, but the size of the sector (production capacities and sector capability respond to export demand) and the presence of clusters in the sector (concentration of many small enterprises).

Reviewing the literature on clusters (Sölvell, Lindqvist, & Ketels, 2003; Porter, 1990, 1998, 2000, 2008) and analysing the reports on clusters of numerous international institutions (European Commission, 2006, 2008; England's Regional Development Agencies, 2003; Organisation for Economic Co-operation and Development, 2007; United Nations Conference on Trade and Development, 2002; World Economic Forum, 2008; World Bank, 2009) the following relationship between state of cluster development and national competitiveness and its characteristics can be noticed:

- Clusters have a key role and they are very important in the development of micro-economic competitiveness. Clusters affect the competition of companies in three ways: by increasing the productivity of companies, by driving the direction and pace of innovation (which underpins future productivity growth) and by stimulating the formation of new businesses. For example, countries with well-developed clusters in many industrial segments have internationally successful and globally competitive companies, and the nature of the company competitive advantage is based on sophisticated and differentiated/unique processes and products (compared with the competition based on low costs and natural resources in companies that do not operate in a cluster environment). Through microeconomic competitiveness, clusters contribute to building the sustainable competitive advantage of a region and nation in the global economy in a particular industry sector. It is important to point out the huge impact of clusters on creating a stimulating and desirable business environment, through which an indirect impact of clusters on national competitiveness is achieved. The impact of clusters on the quality of the business environment is reflected in: (1) encouraging the local competition (many studies show that local rivalry is the key driver of international competitiveness, and clusters encourage exactly the competition among the local companies); (2) the development of entrepreneurship; (3) the presence of numerous and specialised suppliers in the local market; and (4) the established public-private partnership and the like.
- Many countries, such as Israel, the Netherlands, Finland, Germany, thanks to their high level of productivity and high investments in research and innovations, have built high national competitiveness, which further promotes the development of innovative world-class clusters.
- On the other hand, the quality of the business environment, as well as the stage of development of a country (seen through a national competitiveness) significantly affect the opportunities for cluster development in a country, their depth, externalities, etc. In general, in all transition and developing countries clusters are still not fully developed (they do not have critical mass) and 'suffer' from the lack of many supporting industries and institutions, specialised local infrastructure, undeveloped forms of association and the like.
- It is important to note that clusters affect national competitiveness in conjunction with other components of the business environment, as well as with components that are in the area of macroeconomic sources of competitiveness (fiscal and monetary policy, rule of law, political institutions, etc). At the same time, cluster development in a country depends on the development of all components of the business environment and stimulating measures in the field of macroeconomic competitiveness.

### 3. Data sources and research methodology

Having in mind that this paper explores the existence, nature and strength of the correlation between state of cluster development and national competitiveness, brief definitions and explanations of what is meant by the terms clusters and national competitiveness are given below.

In numerous studies and scientific works that have clusters as the topic, researchers start from Porter's definition of clusters. According to this Porter (1998, p. 78), 'clusters are geographic concentrations of interconnected companies and institutions in a particular field' or 'critical masses in one place, of unusual competitive success in particular fields'. In addition, Porter (2008, pp. 213–214) also defines clusters as a 'geographic concentration of interconnected companies, specialised suppliers, service providers, companies in related industries and associated institutions (universities, agencies, chambers of commerce) in a particular field of activity that compete but also cooperate'. Basic terms associated with clusters are: (1) concentration/density of clusters (refers to the number of companies included in the cluster and their economic strength); (2) cluster width or established horizontal links (developed relationships with companies that produce/provide complementary products/services and that have similar market position); (3) cluster depth or vertical links (level of vertically connected companies in a cluster, or links of the companies in a value chain from input purchase, to sale); (4) established public-private partnerships (especially in the field of university–industry collaboration in R&D; cooperation of private companies with government bodies); (5) externalities (effects of transferring benefits, knowledge and innovation between the companies in a cluster, but also outside of the cluster).

In economic literature there is no unique and universally accepted definition of *national competitiveness*. Porter (1990) points out that no nation can be competitive in everything and that we cannot talk about competitiveness at the level of the entire economy, but about competitiveness in specific industries and industry segments. Most economists and institutions (Mankiw & Taylor, 2006; Porter, 1990, 2008; Salvatore & Diulio, 2003; WEF, 2008) equate national competitiveness with economic prosperity, high standard of living, prosperity, and dynamic economic growth of a country. Increasing the productivity of a company is seen as a source of competitiveness. Productivity depends on the quality and characteristics of the products, as well as on the efficiency of using the production factors, that is company strength, to continuously improve, innovate and specialise factor inputs in one location. Productivity allows a nation to support high wages, strong currency, and high investment income, which all lead to a higher living standard and the rapid growth of a country over the medium to long run. For research purposes, the WEF definition of national competitiveness will be used in this paper, which ranks countries, over decades, based on their competitiveness. WEF (2008, p. 3) defines national competitiveness as 'the set of institutions, policies and factors that determine the level of productivity of a country'.

In this paper, data of World Economic Forum's Competitiveness report are analysed. WEF is an independent international organisation that is committed to improving the state of the world, by engaging business, political, academic and other leaders of society to shape global, regional and industry trends. Every year, WEF publishes the 'Global Competitiveness Report', which gives an assessment and ranking of countries according to their national competitiveness (GCI) and variables that compose national competitiveness (GCI). Many institutions, in addition to WEF, deal with measuring the national competitiveness (IMD/Competitiveness Yearbook; The World Bank/Doing business

Index; Heritage Foundation/Index of Economic Freedom; EBRD/Progress index in transition countries). However, according to a survey (Lovrinčević, Mikulić, & Rajh, 2008, p. 641), national competitiveness is best described by WEF using the cluster analysis. For this reason and because of the fact that WEF has provided data on clusters and national competitiveness for a large number of countries (144 countries worldwide), the World Economic Forum's worldwide rankings in the Global Competitiveness Report 2012–2013 is used as data source.

For testing the research hypothesis the following WEF data are used:

- (1) 'Global Competitiveness Index (hereinafter GCI)' or index of national competitiveness. WEF assesses GCI by using a large number of variables (over 100 variables). All variables for assessing GCI are organised into 12 pillars of competitiveness and grouped into three sub-indexes of competitiveness: (1) Basic requirements; (2) Efficiency enhancers; (3) Innovation and sophistication factors. For assessing a large number of variables, use is made of the Executive Opinion Survey of randomly selected companies in each country (sampling of companies that are the subject of survey is followed by dual stratification, based on company size and sector of activity). The survey is carried out through partner institutions in each country, which guide the survey. Questions in the survey instruct respondents (company managers) to assess competitiveness variables on a scale from 1 to 7. One end of the scale (score 1) represents the worst possible situation, while the other end of the scale (score 7) represents the best possible situation. Some of the variables that compose the GCI are called 'hard data' by WEF and these variables are transformed to a scale of 1–7.
- (2) 'State of cluster development' at the level of national economy. This variable, which enters into the calculation of GCI, is contained in the 11th pillar of competitiveness ('Business sophistication') and belongs to the third sub-index of competitiveness ('Innovation and sophistication factors'). The data are provided on the basis of personal assessment of managers in surveyed companies about cluster development in their country. The question that surveyed entrepreneurs are being asked is: 'In your country, how prevalent are well-developed and deep clusters?' The entrepreneurs answer to this question by giving scores on the scale from 1 to 7, where score 1 means an absence of clusters in the country, while score 7 indicates well-developed and deep clusters in many fields.

A statistical method of simple linear correlation is used to explore the nature and strength of correlation between the state of cluster development and national competitiveness, where both observed phenomena are treated as random variables (Žižić, Lovrić, & Pavličić, 2001).

The research hypothesis is: there is a strong positive linear correlation between the state of cluster development and national competitiveness. We will consider that values of Pearson's correlation coefficient  $\rho$  above 0.7 represent a strong positive correlation (Sheskin, 2004). Then, formally written, the null versus alternative (research) hypothesis is:  $H_0: \rho = 0.7$  versus  $H_1: \rho > 0.7$ .

The basic assumptions for applying the method of simple linear correlation were fulfilled:

- relationship between variables is linear (as seen on the scatter plot);
- observed variables have normal distribution.

The following test statistic is used for testing the null hypothesis:

$$Z = (Z_r - Z_{0.7})\sqrt{n-3} \quad (1)$$

where  $Z_r = \frac{1}{2} \ln \frac{1+r}{1-r}$ . Test statistic  $Z$  has, under null hypothesis, standard normal distribution  $N(\frac{1}{2} \ln \frac{1+\rho}{1-\rho}, \frac{1}{n-3})$ .

The 95% confidence interval for Pearson's correlation coefficient is determined according to the formula:

$$I_\rho = \left( \frac{e^{2Z_1} - 1}{e^{2Z_1} + 1}, \frac{e^{2Z_2} - 1}{e^{2Z_2} + 1} \right) \quad (2)$$

where

$$Z_1 = Z_r - \frac{1.96}{\sqrt{n-3}}, Z_2 = Z_r + \frac{1.96}{\sqrt{n-3}} \quad (3)$$

Data were analysed using the statistical software R and SPSS.  $P$ -values  $<0.05$  were considered significant.

#### 4. Research results and discussion

The working hypothesis is tested by using the parametric statistical method of a simple linear correlation on a sample of 144 countries worldwide, using the latest data on cluster development and national competitiveness of WEF 2012–2013 (The Global Competitiveness Report 2012–2013).

The indicator 'National competitiveness' is presented by 'Global Competitiveness Index/GCI 2012-13' and three sub-indexes of competitiveness. Indicator 'Clusters' is presented by 'State of cluster development', which is one of the variables of GCI (Table 1). The sample of 144 countries worldwide is large and representative, as countries in the sample together produce around 98% of world gross domestic product (WEF, 2012–2013, p. 69).

Based on the analysis of data from Table 1 and the scatter plots (Figure 1) of the correlation between clusters and national competitiveness in the sample, research results are presented below.

Table 1. Correlation between state of cluster development and national competitiveness, WEF 2012–2013.

| Correlation                | GCI 2012-2013 <sup>1</sup> /<br>cluster | I sub-index GCI/<br>cluster | II sub-index GCI/<br>cluster | III sub-index GCI/<br>cluster |
|----------------------------|---|-----------------------------|------------------------------|-------------------------------|
| Pearson's<br>correlation   | 0.814                                   | 0.738                       | 0.812                        | 0.860                         |
| 95% confidence<br>interval | (0.751,0.863)                           | (0.654,0.805)               | (0.748,0.861)                | (0.810,0.897)                 |
| Test statistic             | 3.229                                   | 0.942                       | 3.150                        | 5.052                         |
| $P$ -value                 | $<0.001^*$                              | 0.173                       | $<0.001^*$                   | $<0.001^*$                    |

<sup>1</sup>GCI – The Global Competitiveness Index is a highly comprehensive index that captures the microeconomic and macroeconomic foundations of national competitiveness.

\*high significance.

Source: The Global Competitiveness Report 2012–2013 (World Economic Forum, 2012, pp. 14–20, 504) and calculations by authors.



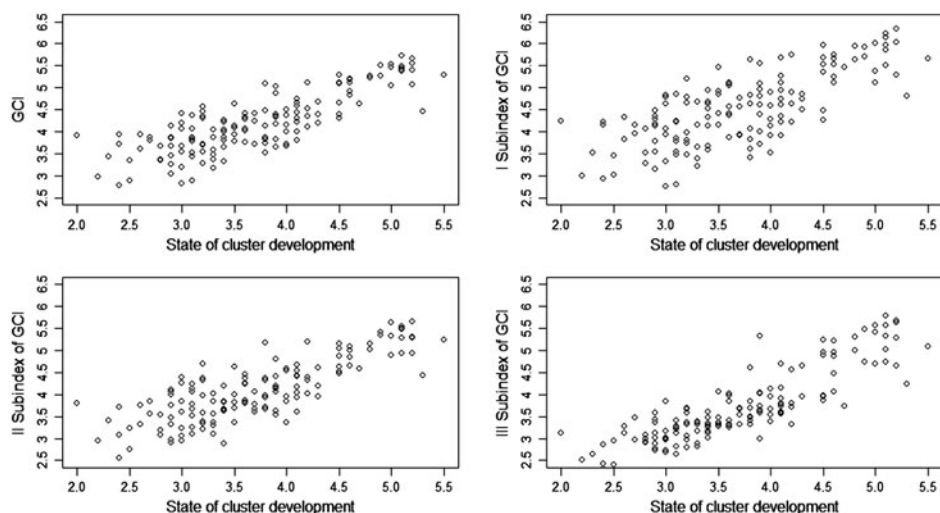


Figure 1. State of cluster development and national competitiveness (upper left); state of cluster development and I sub-index of GCI (upper right); state of cluster development and II sub-index of GCI (lower left); state of cluster development and III sub-index of GCI (lower right). Source: The Global Competitiveness Report 2012-2013 and calculations by the authors.

The coefficient of a simple linear correlation indicates that there is a strong positive correlation in the sample between:

- state of cluster development in a country and its national competitiveness ( $r = 0.814$ );
- state of cluster development and I sub-index of GCI 'Basic requirements' ( $r = 0.738$ ). The first sub-index of competitiveness includes four pillars of competitiveness: Institutions, Infrastructure, Macroeconomic environment, Health and primary education;
- state of cluster development and II sub-index of GCI 'Efficiency enhancers' ( $r = 0.812$ ). The second sub-index of competitiveness includes the following pillars of competitiveness: Higher education and training, Goods market efficiency, Labour market efficiency, Financial market development, Technological readiness and Market size;
- state of cluster development and III sub-index of GCI 'Innovation and sophistication factors' ( $r = 0.860$ ). The third sub-index of competitiveness includes the following two pillars of competitiveness: 'Business sophistication' and 'Innovation'. This highest correlation is not surprising, given that clusters are one of the variables that makes the third sub-index of competitiveness, and 11. Pillar of competitiveness 'Business sophistication'.

Regarding the strength of correlation between the analysed variables, the following conclusions can be made.

- The research hypothesis that strong positive correlation exists between cluster development and national competitiveness (global competitiveness/GCI and competitiveness expressed through II and III sub-indexes of GCI) can be accepted.

Table 2. Countries ranked highest and lowest according to cluster development and rank of these countries according to GCI in the Global Competitiveness Report 2012–2013.

|                        | State of cluster development 2011–12 |                               | GCI 2012–2013 |             |
|------------------------|--------------------------------------|-------------------------------|---------------|-------------|
|                        | Rank/144                             | Value, weighted average (1–7) | Rank/144      | Score (1–7) |
| Taiwan, China          | 1                                    | 5.5                           | 13            | 5.28        |
| Italy                  | 2                                    | 5.3                           | 42            | 4.46        |
| Singapore              | 3                                    | 5.2                           | 2             | 5.67        |
| United Arab Emirates   | 4                                    | 5.2                           | 24            | 5.07        |
| Japan                  | 5                                    | 5.2                           | 10            | 5.40        |
| Finland                | 6                                    | 5.2                           | 3             | 5.55        |
| Qatar                  | 7                                    | 5.1                           | 11            | 5.38        |
| Germany                | 8                                    | 5.1                           | 6             | 5.48        |
| Switzerland            | 9                                    | 5.1                           | 1             | 5.72        |
| United Kingdom         | 10                                   | 5.1                           | 8             | 5.45        |
| ...                    | ...                                  | ...                           | ...           | ...         |
| Bosnia and Herzegovina | 135                                  | 2.6                           | 88            | 3.93        |
| Benin                  | 136                                  | 2.6                           | 119           | 3.61        |
| Burkina Faso           | 137                                  | 2.5                           | 133           | 3.34        |
| Haiti                  | 138                                  | 2.5                           | 142           | 2.90        |
| Algeria                | 139                                  | 2.4                           | 110           | 3.72        |
| Moldova                | 140                                  | 2.4                           | 87            | 3.94        |
| Burundi                | 141                                  | 2.4                           | 144           | 2.78        |
| Kyrgyz Republic        | 142                                  | 2.3                           | 127           | 3.44        |
| Yemen                  | 143                                  | 2.2                           | 140           | 2.97        |
| Albania                | 144                                  | 2.0                           | 89            | 3.91        |

Source: The Global Competitiveness Report, World Economic Forum, Switzerland, 2012, p. 14–15, 504. © World Economic Forum. Reproduced by permission of World Economic Forum. Permission to reuse must be obtained from the rightsholder.

- The research hypothesis is not only accepted in the case of exploring the correlation between state of cluster development and I sub-index of GCI, but also based on the 95% confidence interval for the correlation coefficient (0.654, 0.805) it can be concluded that the correlation in the population varies between the upper limit of moderate correlation and strong correlation.

In Table 2, the WEF 2012–2013 data are presented for countries that were ranked highest (top 10) and lowest (last 10) according to the score of the ‘State of cluster development’ indicator. For these countries, scores of their competitiveness and ranks are given based on GCI.

Generally, countries with well-developed clusters are highly ranked and assessed according to GCI (they have a high national competitiveness) and vice versa. In the sample of 144 countries worldwide, the highest imbalance in cluster development and national competitiveness (expressed through GCI) can be found in the following countries:

- Italy, Mozambique, Kenya, Mauritania, Zambia, Bangladesh, Liberia, Pakistan, Nigeria: these countries have a much higher rank of cluster development in relation to GCI rank;
- Lithuania, Kuwait, Kazakhstan, Poland, Albania, Ukraine have a much higher GCI rank in relation to the rank of cluster development, which means they have a higher national competitiveness in relation to cluster development.

## 5. Conclusion

A lack of understanding of the difference between the traditional theory of comparative advantage and the theory of competitive advantage for creating the wealth of a company and nation is one of the main causes of problems in the economic prosperity of transition and developing countries. Relying on comparative advantages (factor advantages in the form of cheap labour and natural resources/raw materials, macroeconomic indicators, such as the exchange rate or government interventions) the poor countries remain even poorer, with no possibility for long-term economic growth and increasing the standard of living.

Instead of traditional sources of competitiveness, which are unsustainable for creating a global competitive advantage of companies and nations, in modern market conditions, which are characterised by the globalisation and liberalisation of all flows, as well as communication speed and high mobility of production factors, importance is given to specific factors, which cannot be easily copied or acquired, and which are best developed in a local and cluster environment. We are talking about the following factors, which are crucial for creating a sustainable competitive advantage of companies, regions and nations: innovations, specialised knowledge and skills, specialised suppliers, intensive cooperation and exchange of knowledge and ideas between companies, as well as between public and private sectors, intensive local competition, sophisticated strategies of companies, institutional development, a scientific and technological base, a developed information infrastructure.

Having in mind the characteristics of clusters and their impact on creating the competitiveness of companies and economies, the research hypothesis that there is a strong positive correlation between cluster development in a country and its national competitiveness is accepted. For testing the hypothesis, the statistical method of simple linear correlation is used. For analysing the 'cluster' and 'national competitiveness' indicators, the latest WEF data for 144 countries worldwide are used (The Global Competitiveness Report 2012–2013). Given that national competitiveness in WEF Competitiveness Reports is expressed through the Global Competitiveness Index, as well as through three sub-indexes of competitiveness, testing the general research hypothesis in this paper is also extended to exploring the correlation between clusters and each particular sub-index of competitiveness.

Regarding the strength of correlation between the analysed variables, the following conclusions can be made.

- The research hypothesis that strong positive correlation exists between cluster development and national competitiveness (GCI and competitiveness expressed through II and III sub-indexes of GCI) can be accepted.
- The research hypothesis about the existence of strong positive correlation in the basic set between clusters and I pillar of competitiveness is not accepted, regarding the  $p$ -value of the test. However, based on the 95% confidence interval it can be concluded that the correlation coefficient in the population varies between the upper limit of moderate correlation and strong correlation. The fact that the sample of 144 countries worldwide represents countries that produce 98% of world domestic product indicates the great importance of the obtained correlation coefficient in the sample ( $r = 0.738$ ), which indicates the existence of a strong positive correlation between the analysed variables.

Developing countries cannot follow this direction (from building high competitiveness to the development of clusters), but national competitiveness can be significantly

improved by the development of clusters and encouraging innovation and productivity within the framework of a cluster directed-economy. In this way, cluster development can be one of the sources of competitiveness for emerging market and developing economies to increase productivity and economic wealth.

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