Differences of Regional Development in Russia and Mexico: Is Cluster Policy Reducing the Gap?

René F. Lara Cervantes[a] and Julia V. Dubrovskaya[b]

[a] University of Economics in Prague, Prague, CZECH REPUBLIC;
[b] Perm National Research Polytechnic University, Perm, RUSSIA.

ABSTRACT

Clusters have been of interest to researchers since the 19th century. Today clusters are viewed as an integral element in broader industrial innovation processes or systems. In this paper we focused on the current cluster policy in Russia and Mexico. The main questions concern the effects of a cluster policy and the implications they have for the differentiation of regions. Using the theory of economic growth and the models of modern economic geography, as well the methods of spatial analysis and spatial econometrics, we have constructed the regression model of resource and institutional groups of factors influence on the level of regional development. This model allows us to substantiate the dominance of different groups of factors above the level of regional development in economic systems with high differentiation of local territories. The results of econometric analysis have proved our assumption that the differences among regions in Russia and Mexico mostly arise due to geographical location and natural resources endowments. These considerations have become the starting point of the conception of territorial differentiation decrease on the base of clustered forms of interaction. However, our findings suggest that, in both cases, the current cluster policy increases the regional development gap due to a centralised economic policy that often disregards regional needs and capabilities.

Introduction

The problem of the differentiation of socio-economic and innovative territories development is actually not only experienced by federal states. In the subnational level (states and municipal administrations), the difference in the levels of development is also observed between their territories. High skewness in territories' development is able to considerably decelerate the setting of an innovation system founded in a progressive and uniform development in the national economy.

This fact actualises the problem of choice of methods, instruments and solutions aimed at stimulation of innovative activity of territories. One of these

CORRESPONDENCE Julia V. Dubrovskaya ✉ i uliadubrov@mail.ru

instruments is regional innovative clusters. During the previous 30 years, the experience in developed countries with cluster policy was a success in the stimulation of innovative development. Innovative and industrial clusters are utilised as a tool to enhance competitiveness at the local, regional and national level in different countries. It should be mentioned that most papers connected with the problems of innovative partnership are devoted to the study of cluster structures functioning in developed countries such as the United States, Israel, Japan, Singapore, Sweden, Norway, Finland, Germany, France, Italy, etc.

The study aims to identify the different paths of the creation and outcome of clusters, given the similarities of Russia and Mexico. These countries have a high level of interregional differentiation and share many significant characteristics of economic, social and innovative development. Both analysed countries have their own very specific challenges, but they have the common task of improving their competitiveness and quality of life for their inhabitants. Understanding the issues of the effectiveness of cluster policy as the factor of differentiation reduction of regional development levels is needed exclusively for the elaboration of the strategy of innovative development by governmental authorities.

Literature review

The problem of interregional differences in the levels of welfare and economic development is broadly addressed by researchers (Evans & Karras, 1996; Rey, 2001). Most of them agree that a differentiation decrease of the territories' development is possible due to the instruments and institutes of innovative development (Freeman, 1995; Kotsemir & Abroskin, 2013). Thus and so, the problems of innovative processes' formation and development, including the processes on the mesolevel, are studied considerably by scientists all over the world (Morgan, 1997; Gennaioli, La Porta, Lopez de Silanes & Shleifer, 2013).

It must be stressed that theoretical and applied research determining territorial clusters is agreed to be the most important condition for the innovative development of economy (Feser, 1998; Woodward, 2012; Ushakov & Shieh,2013, Kutsenko, 2015). Recognition of effectiveness of cluster policy application as the important factor of motivation for the innovative growth of territories is extremely essential for bodies of power and management in developing national long-term strategies. Clusters systems are multitask oriented, flexible, productive and stable; thus, they can be easily augmented or modernized to improve the benefits from globalization and economic openness. In order to maintain these features, it is necessary to understand the principles of clusters' evolution to elaborate proper measures to improve socioeconomic development (Aitbayeva, Zhubanova, Kulgildinova, Tusupbekova & Uaisova, 2016**).** Moreover, to become beneficial long-term strategies, the institutional framework must be well designed in order to avoid distorting competition and to promote economic growth.

This is critical, since if further specialization indeed contributes to innovation, economic growth will be less uneven if the neighbouring regions are also technologically specialised (Moreno, Paci, & Usai, 2005; Sang-Chul & Seong-Keun, 2004).

Insufficient consideration of the problems above, as well as the theoretical and practical importance of their solution, are the base of the idea and the main goal of the present research.

Research question

The objective of the research is to conduct an assessment of the weight of first nature factors and second nature factors proposed by Krugman (1993) in the regional differenciation of the Russian and Mexican economies. In addition, the research aims to answer whether or not clusters policy is having a positive impact in reducing the gap of regional development in both countries.

Methodology and data

According to information from the National Bureau of Economic Research (Gennaioli, La Porta, Lopez de Silanes & Shleifer, 2013), the difference between the level of GRP per capita in the richest and the poorest regions varies greatly across different countries. They used the most recent year for which they had regional data since 2001 through 2011. The representation of interregional differentiation in countries is shown in Figure 1.
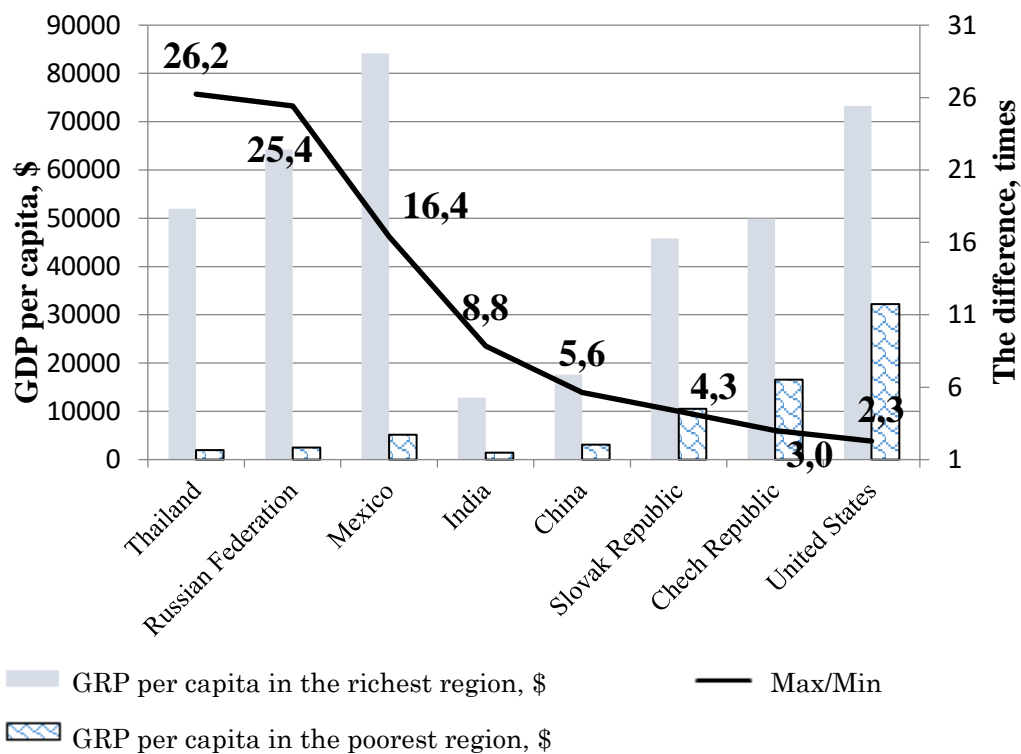

Figure 1. The interregional differentiation in the world

The sharp interregional differentiation in few countries leads to the increase of the number of regions with lower income per capita than the national average. At the same time, high level of per capita income, which indicates high level of socio-economic development of the region, does not determine a high level of innovation activity. As a result, scientists have mentioned the processes

of the divergence of regional socio-economic systems. These processes reduce the rate of the socio-economic development of the national economy.

It should be noted here that, according to the economic geography, all factors forming the competitive advantages of the territories can be classified into two main groups: advantages of the 1st nature and advantages of the 2nd nature (Krugman, 1993). Advantages of the 1st nature include factors that are independent of human activity (natural advantages), such as the natural resources supply of the territory, profitability of geographical position and the boundary position on the global market. Advantages of the 2nd nature include factors that are created by human activity and society, including the concentration of population and production, the agglomeration effect, human capital, institutes of development and the infrastructure of the territory. In Krugman's interpretation, it also implies that the favourable location of centres is not wholly determined by the underlying natural geography (advantages of the 1st nature), but can also be influenced by history, self—fulfilling expectations and development institutions (Krugman, 1993). According to the given theoretical conception we systematised the factors of the first and the second kinds (Table 1).

Table 1. Factors forming the competitive region advantages

Groups of advantages		Factors of divergence	Statistical indicators
Factors of the 1st nature		Natural resources	• Share of mining operations' profit in GRP of the region
		Profitability of geographical position (boundary position on the global market, climate conditions)	• Share of the region's export in the total export of the country • Touristic activities' share in GRP of the region
Factors of the 2nd nature	Formal institutes	Infrastructure of the territory	• Total area of living space per one citizen, on average; • Population size per one hospital bed; • Density of public roads with a hard surface
		Ecological factors of territory's development	Pollutant emission from stationary sources
		Level of R&D growth	• Number of personnel involved in R&D; • Number of students trained according to the programs of five-year, undergraduate and MA course studies (per 10000 individuals); • Internal R&D costs
		Life interval of population	Expected life interval at birth
		Scale of development of manufacturing industries	Total value of manufacturing industries
	Informal institutes	The level of shadow economy	• The level of corruption; • Number of registered penal acts in the sphere of economics
		Social feeling of population	Rating of social feeling in the regions

Source: author's version.

Further, systematised indicators were included in the following econometric model (1).

$$Y = aX_1 + bX_2 + c \qquad\qquad (1)$$

Y – gross regional product per capita;

X_1 *–integral indicator of the factors of the 1st nature;*

X_2 *– integral indicator of the factors of the 2nd nature;*

a, b, c – coefficients of regression equation.

It should be mentioned that we identified the level of the region's GRP per capita as the explanatory variable for determining the effect of two groups of macro-economic indicators on the level of territories' development according to Krugman's classification.

Analyses and results

On the basis of main factors of formation of regions' competitive advantages, we built a hierarchical model of factors of the territories' differentiation (Figure 2). We used the main provisions of hierarchical analysis and Krugman's classification. It should be pointed that, in accordance with the hierarchical analysis of the socio-economic systems, we distributed the zone of regional' factors of differentiation between levels of the economic system in the order of the objects and subjects of management.
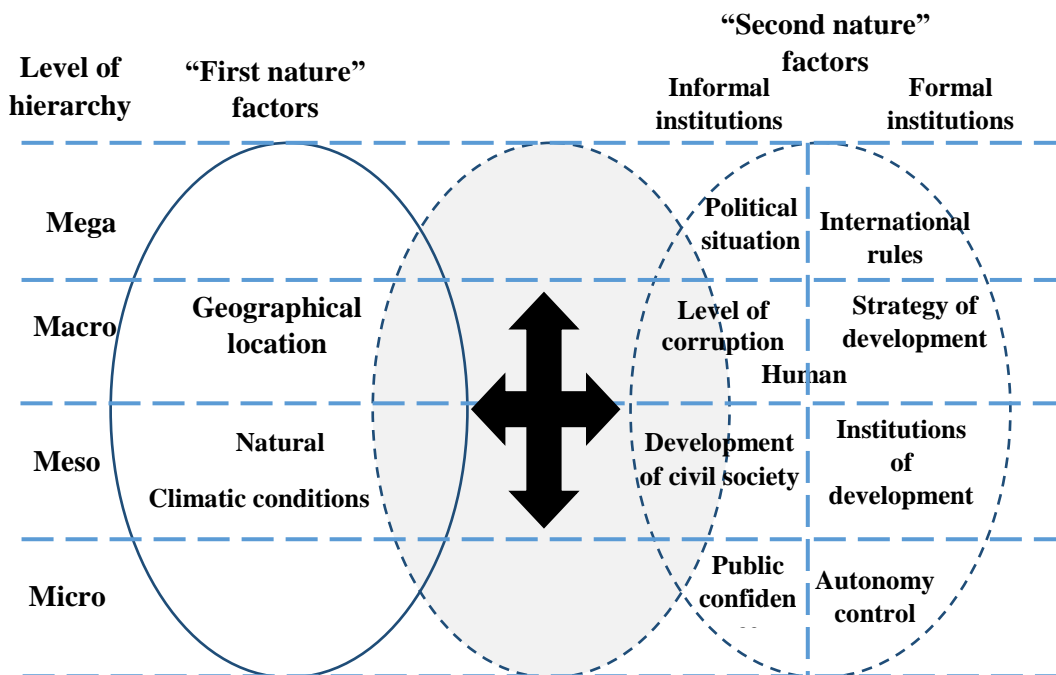

Figure 2. Hierarchical model of factors of the territories' differentiation

Then we selected the defined indicators in different regions that have similar economies: Russia and Mexico. As mentioned earlier, both countries

have a high level of interregional differentiation and share many significant characteristics of economic, social and innovative development (Table 2.).

Table 2. Indicators of socio-economic development of Russia and Mexico

Indicators (year)	Mexico	Russia
Population, million people (2015)	121.7	142.4
Difference between the level of GRP per capita in the richest and the poorest regions, times (2013)	16	11
GDP per capita, thousand dollars (2015)	18.5	23.7
Budget revenues, billion dollars (2015)	259.6	216
Gini Index [Mexico (2008); Russia (2014)]	48.3	42
Stock of direct foreign investment-at home, million dollars (2015)	361.0	360.9
Stock of direct foreign investment-abroad, million dollars (2015)	142.8	404.4
Corruption perceptions index/rank (2015)	95/168	119/168
Literacy rate, % (2009)	93.4	99.6
Life expectancy, years (2009)	76.47	68.6
The index of economic freedom, rank (2015)	62/178	153/178
Human development index, rank (2015)	74/188	50/188
Global innovation index, rank (2015)	42/141	57/141

Sources: The Central Intelligence Agency, Transparency International—The Global Anti-Corruption Coalition, The Heritage Foundation, Federal State Statistics Service of The RF, National Institute of Statistics and Geography in Mexico, Cornell University, INSEAD, The World Intellectual Property Organization, The United Nations Development Programme.

It is known that the innovative development of the country depends on the development of their territories. Therefore, the study of innovative development at the regional level is of particular significance today since innovative regional development is impossible without interregional integration that provides free movement of products, investment and labour. In this regard, the success of clusters as tools for regional development depends largely on the building of a complete national chain on innovation support to develop a new economy based on innovation (Doskaliyeva, Orynbassarova, Omarkhanova, Karibaev & Baimukhametova, 2016). Also, to improve the economic and social results of economic management is necessary to solve the scientific problems associated to the structural parts of regional production and innovation. Thus, the consideration of geopolitical, environmental and infrastructural factors is crucial to reduce the development gap of regional economies. This is the key to form comprehensive measures to maintain the balance of socioeconomic development, by objectively orienting the management of technological and resource-related elements of the regions. (Uraev, Mingaleev, Kushimov & Kolesov, 2016)**.**

In Russia, the formation of interregional integration is complicated, given the long distances between regions and the undeveloped transport infrastructure. Consequently, the Russian economy is characterised by strong, uneven spatial development, both socio-economic and in terms of innovation.

According to the statistics, in Russia about 10% of the total number of regions form more than half of the total gross regional product of the country

(FSSS, 2015). A significant part of the Russian Federation's consolidated budget consists of the revenues from oil and gas resources. Only oil and gas contributed to more than half of the actual amount of the federal budget. In this regard, the current political situation will have a negative impact on the budget revenues and, consequently, it will affect the domestic economy performance. Indeed, the recession in the rate of growth of industrial production in the country in 2015 has amounted to 3.7%, compared with the identical period in 2014 (FSSS, 2015). This was mainly due to the imposed trade sanctions and sharp recession on oil prices in 2015. Thus, there is an obvious need to minimise the dependence of the domestic economy from oil prices fluctuations through the development of internal production, particularly through the development of innovative high-tech industries. These processes are complicated by the low life expectancy of the population, high level of corruption, and low level of the rights and freedoms of society in Russia.

Mexico also faces many challenges to build an interregional integration, given the gap in innovation and socio-economic development. In the country 41% of the GDP is concentrated in only 10% of the regions, which represents a major challenge because the current policy that is oriented to poverty and inequality abatement has been insufficient in seeking to narrow the gap (OECD, 2009). Moreover, the federal public budget of Mexico depends heavily on oil and gas exploitation. Although the share in the budget of this sector is smaller every year, it represents around 30% of the budget and has a significant impact in the finances of all the branches of the Mexican states linked to federal funds (CIEP, 2016). Thus, events such as the recent fall of oil prices have decreased by 30% in the contribution of oil exploitation in the 2016 budget, which will increase the financial stress in several regions of Mexico.

As in the case of Russia, in order to mitigate the dependency of oil profits, it is necessary to innovate in the rest of economic activities and create a development model based on competitive advantages. However, the task is not easy, given that small- and medium-sized firms (Pymes) provide more than 70% of the jobs in Mexico, but they simultaneously face financial restrictions regarding investment in innovation (OECD, 2015). Also, poverty and the gap in education is hindering the offer of specialised human capital since 42% of the population suffers from a certain degree of poverty and the access to superior education is insufficient.

The similarity of Russian and Mexican economies is confirmed by a study of cross-country characteristics economic development (Hernández-Rodríguez & Montalvo-Corzo, 2012). This is shown in Figure 3.
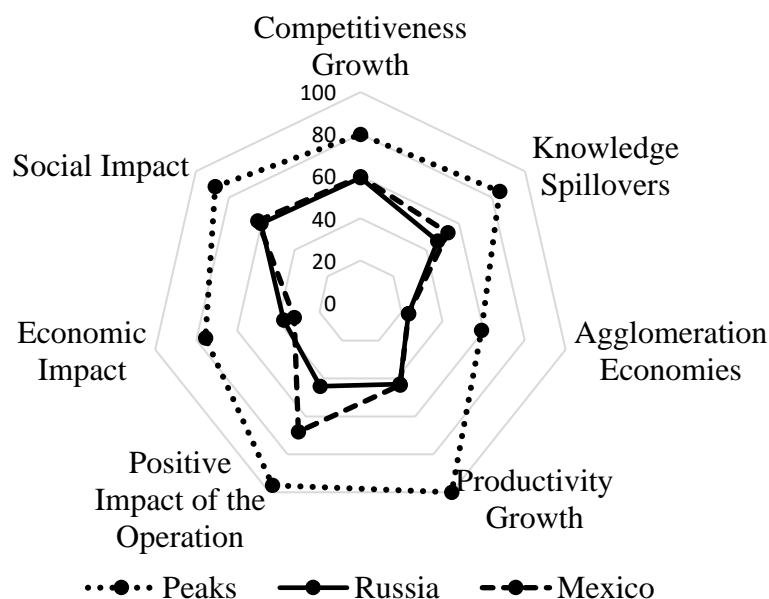
Figure 3. *Comparison of the development indicators in Russia and Mexico*

Figure 3 shows (point line) the peaks reached by the sample of countries analysed (the analysis was carried out according data pertaining to 25 countries). Russia is represented by the solid line and each dimension of Mexico's current situation is portrayed by a dotted line.

Taking into account the high level of budget receipts from oil and gas (vast natural endowments) in Russia and high level of budget receipts from tourism activities (favourable geographical location and climate conditions) in Mexico, it is logical to assume the dominance of factors of the 1st nature in those economies.

To verify this assumption, we selected the indicators of the 1st and the 2nd nature that characterise the development of Russian and Mexican regions in 2013. The general database included 16 indicators from 79 regions of Russia[1] and 32 regions in Mexico. It should be noted that, in this study, the construction of an econometric model (equation) including the 2013 indicators is connected with the necessity to minimise the problems of 'unbalanced selection' that appeared as a result of the fact that the analysis only uses the indicators that are available in aggregate only for the mentioned period.

To calculate the integral index characterising the groups of factors of the 1st and the 2nd nature, the levels of every indicator's importance in their groups of factors were defined with the help of expert appraisal. Integral indexes were calculated by the following formulae:

---

[1]Total number of observations in the subjects of RF − 79 is conditioned by the lack of statistics on Chukchi Autonomous District as well as data consolidation on Tyumen and Arkhangelsk Regions.

$$X_1 = \sum_{i=1}^{n} \alpha_i x_{1i}$$

(2)

where x_{1i} – i-factor, characterising the indicator of the 1st nature, $i = \overline{1,n}$, n – total number of factors, a_i – expert appraisal of i-factor weight, though $\sum_{i=1}^{n} a_i = 1, a_i \in [0,1]$.

$$X_2 = \sum_{j=1}^{m} \beta_j x_{2j}$$

(3)

where x_{2j} – j-factor, characterising the indicator of the 2st nature, $j = \overline{1,m}$, m – total number of factors, β_j – expert appraisal of j-factor weight, though $\sum_{j=1}^{m} \beta_j = 1, \beta_j \in [0,1]$.

All factors that were used for the calculation of integral indexes of the 1st and the 2nd natures were standardised by linear transformation according to the formula:

$$y(x) = \frac{x - x_{min}}{x_{max} - x_{min}}$$

(4)

In the processing of the database, we performed the normalisation of the indicators' values by the linear function of the indicator value membership to the standard interval [0; 1]. At that, with the appearance of rare outlying data considerably exceeding the typical dispersion of showings, they were eliminated in the process of normalisation. After general data files processing, the rare outlying data were set to extreme values of the general scale (minimal 0 or maximal 1 subject to the value of outlying data).

Construction of an econometric model on the base of 2013 indicators made it possible to obtain significant functional dependencies in Russia (5) and in Mexico (6).

$$Y = 1,484X_1 - 0,322X_2 + 0,207$$

(5)

$$Y = 0,971X_1 - 0,346X_2 + 0,161$$

(6)

Verification of multiple regression equations' significance (5 and 6) using Fisher's F-criterion showed that coefficients of determination are statistically important: R^2=72.93% (5) and R^2=55.60% (6).

It has been clarified that, in both cases, *F >F critical*, which proves statistical importance of regression equations. Verification performed according to Student's t-criterion testifies to the statistical importance of regression equation parameters (coefficients of regression).

The constructed models (5) demonstrate the presence of close relation between the levels of the territory's development, stated by the GRP per capita

and selected by us factors of formation of territories' competitive advantages – coefficients of multiple correlation r = 0,85 (5) and r = 0.75 (6).

With it, according to the derived equations the positive impact on the function is made by the explanatory parameter X_1 (integral index of factors of the 1st nature) thus characterising climatic and geographical conditions of the territory). On the contrary, X_2 (the integral index of factors of the 2nd nature) characterising the efficiency of formal and informal institutes of regional development has a negative impact on the function. The obtained results prove our assumption of the fact that, despite the evidence of the basic trend of world economy development that has the growing importance of factors of the 2nd nature at the present stage, factors of the 1st nature are dominant in the development of Russian and Mexican regions.

Thus, the analysis revealed that, in Russia and Mexico, a favourable geographical location and the presence of natural resources are the basic factors in the formation of a regional development advantage. These factors determine high interregional differentiation and are the main cause of the regional divergence.

We agree with the scientists of the 'new economic geography' in the conviction that inequality levels of territorial development cannot be completely eradicated in a market economy. This inequality is a result of objective evolutionary processes. At the same time, we think that government authority must enhance the role of the 'second nature' factors, which is possible by increasing the level of interaction between actors at different levels of the economy both vertically and horizontally. This interaction (the factors intersection zone is depicted in Figure 2) will enable the expansion of the spatial boundaries of economic activity of some regions at the expense of others. We believe that such relationships can be implemented the most effectively by using the cluster form of interaction.

Discussion of the results

The experience of developed countries shows that clusters are the basis for productive interaction. Clusters as a serious 'practical leverage' only began to be mentioned in the 1990s. To a large extent, it happened due to the papers of Michael E. Porter. Clusters were understood as 'geographic concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries, and associated institutions (e.g., universities, standards agencies, trade associations) in a particular field that compete but also cooperate' (Porter, 2000).

By the beginning of the current decade, more than 100 countries and regions had different variations of the cluster policy. Common to all cluster programmes is their rationale of increasing the competitiveness of the national or regional economy through the facilitation of collaboration between companies and research stakeholders (Meier zu Kocker & Muller, 2015).

Cluster policy in Russia

Regarding concerns that pertain to the Russian Federation's economy. It is necessary to mention that, at the present, some experience of government support for cluster development in Russia has developed.

Known clusters represent an innovation infrastructure that consists of companies, R&D institutions and universities that specialise in a specific industry or knowledge area. The existence of such an infrastructure provides governments with an excellent opportunity to promote economic growth through the support of innovation and R&D activities (Christensen, Lämmer-Gamp & Meier zu Kocker, 2012, Ushakov & Yeh, 2013). In Russia, in the period from 2007 to 2014, more than $22 billion of public money was invested in the development of the innovation infrastructure, including entrepreneurship development programs ($3.4 billion), on the development institutions ($8.8 billion), on the formation of innovation infrastructure in the regions of the country ($2.6 billion) and on state guarantees ($7.2 billion).

Budget financing of the clusters in Russia was carried out for the first time in 2012. In that year, the RF Ministry of Economic Development initiated the innovative territorial clusters support pilot program. According to the results of competitive selection aimed at the detection of pilot clusters, a list of 25 innovative territorial clusters was approved. By February 2016, the list had been completed by two more clusters. Innovative territorial clusters are structured into six branch-wise directions: 'Atom and radiation technologies', 'Production of aircraft and spacecrafts, shipbuilding', 'Pharmaceutics, biotechnologies and medical', 'Modern materials', 'Chemistry and petro chemistry', 'Information technologies and electronics'.

Initially, 94 applications from 49 RF subjects were submitted to the RF Ministry of Economic Development. As was mentioned above, 25 territorial clusters structured in six branch-wise directions were selected. In the process of applications' consideration, indicators such as the scientific and technical and educational potential of cluster, its productive potential, quality of life and infrastructure development and the level of the cluster's organisational development were estimated. Thus, the selected clusters are localised on the territories with deliberately developed productive and scientific and technical potential.

Besides, the RF Ministry of Industry and Commerce currently examines the opportunity support for industrial clusters. According to preliminary estimates of Russian cluster observatory, there were more than 120 such clusters by the end of 2015. At the present moment, the clusters' initiative support has been simultaneously carried out by the RF Ministry of Economic Development, Ministry of Industry and Commerce, authorities of RF subjects and by Centres of Cluster Development. Thereby, the problems of clustering in the native economy are given consideration by government at all levels.

The realization of "The Map of Clusters in Russia" project from September 2015 was made by Russian cluster observatory and merits mention. On March 1, 2016, the map showed pilot innovative clusters and the clusters supported by the Centres of Cluster Development. Clusters' predominance in number in the

European part of the country is visually demonstrated by the map that was prepared by experts.

In the RF Ministry of Economic Development, it was explained that those clusters which have the highest degree of readiness will receive odds in the process of selection. Those clusters which achieved definite organizational progress, developed strategy and worked projects aimed at cluster's advancement before the announcement of the competition.

In the period of 2013–2015, the clusters selected as being territorial innovative had already granted 98 billion rubles from the budgets of different levels and 362 billion rubles in the form of off-budget investment. In accord with the information from the RF Ministry of Economic Development, a considerable part of appropriated funds (27.1 billion rubles or 46% of the total amount of financing) had been planned to use for basic infrastructure: housing, power economy, engineering, transport. It is evidently difficult to expect the advanced innovative development without satisfaction of infrastructure needs, but such problems should be solved at the expense of other programs. Otherwise, appropriated funds are virtually outlaid only on the social-economic growth of the most developed territories.

The features of formation of the innovative-oriented industrial sector of the domestic economy that are described above are able to lead to the development of economic spheres that are defined by priorities of public policy in several regions of the country. But it is necessary to mention that high skewness of regional development and growth of territories divergence is probable. These processes are able to considerably decelerate the realisation of system innovations that are the foundation of progressive and uniform development of the entire national economy.

Cluster policy in Mexico

In Mexico, most of the attempts to improve national productivity are performed by the state. National policies are the main source of stimuli for competitiveness; however, they consist of certain key objectives and actions that are often distanced from the needs and features of regions that lead to an uneven performance across the country (Pietrobelli & Rabelloti, 2004). In comparison with other members of the OECD, Mexico lacks convergence in regional development policies since subnational governments (states and municipalities) align their policies to the national goals to secure maximise their share of the federal funds. Therefore, this issue increases the complexity to create a favourable economic environment for clusters that are needed to foster regional development.

Nevertheless, several clusters that have arisen from different initiatives, due to geographical features and history, have been identified. Half of the clusters are located in the centre of the country, due to the proximity to Mexico City; moreover, the northern states of Nuevo León, Coahuila and Chihuahua, with a history in manufacturing, and the state of Baja California have seized their closeness to the U.S. border that is strategic for companies that export goods to the U.S. The authors identify clusters in activities and industries such as medical, optical and measurement equipment, electronic, computer and

signaling equipment, agricultural and greenhouse products, aerospace technologies, information technologies, footwear, food, nonmetallic and automotive. Also, it must be stressed that some of these clusters have emerged through initiatives, at least in eight states (Nuevo León, Querétaro, Coahuila, Baja California, Aguascalientes, Jalisco, Chihuahua and Guanajuato) that share the common feature of a regional policy developed by the state in cooperation with other institutions to foster their respective industries.

Moreover, these actions have responded to the pressure imposed by the international trade liberalisation in order to improve the access to foreign markets. However, in Latin America, aiming to consolidate a competitive exporting sector does not guarantee an equal and sustained development, especially if the number of firms that participate in the global markets is small, whereas the remaining firms are less productive and obsolete (ECLAC, 2013). The public investment in R&D in the country is, on average, less than 0.5% of the GDP, which is very low when compared with the rest of the members of the OECD; also, private investment is quite restricted since credits barely represent 0.02% of the GDP (OECD, 2015).

Since most of the firms are small and medium sized (Pymes), some actions have been taken from the national sphere since the year 2000 and currently the programs incorporate four broad categories (OECD, 2009). Since 2005, the Pyme Fund programme, which provides financial support to Pymes, destined a part of its $170.4 million (US) budget to foster the processes of innovation for these firms. Nevertheless, the decision about the grants is centralised and, thus, jeopardises regional development; however, it has fostered, to some extent, the quality of services. In 2007, the Council of National Science and Technology (Conacyt) in cooperation with the Ministry of Economics created the Fund of Technological Innovation destined to promote clusters initiatives or different projects. The budget of the Pyme Fund has been increasing considerably since then and, in 2009, a program of Fiscal Stimulus for Pymes was transformed into direct support with a value of 2,500 million pesos in order to support projects such as the Support for Technological Innovation of High Aggregated Value (Innovapyme), Development and Technological Innovation (Proinnova) and Technological Innovation for the Competitiveness of Firms (Innovatec). Concretely about regional and cluster development, in 2009 Conacyt created the a Mixed Funds (Fomix) programme with the goal to promote scientific development and innovation in states and municipalities and the Institutional Fund for Scientific Development, Technology and Innovation (Fordecyt) with a budget of 500 million pesos in order to complement the Fomix program. However, their effectiveness is questionable since the most prosperous regions are granted most of the resources and, thus, the gap in regional development is likely to increase (OECD, 2015).

The task for states to contribute to the design of a cluster policy is challenging for different types of reasons. In the case of innovation in science and technology of the 32 states, only 9 have a special programme in the subject; moreover, these programmes are more idealistic than pragmatic, which makes their execution difficult; moreover, the plans lack continuity since they are subject to change with each new administration (OECD, 2009). Also, the lack of

specialised institutions in regional development creates a path for states to duplicate the model of other regions that may not be suitable, given the contextual needs. The institutional component will be a key factor to increase the possibility of success of the recently proposed Program of Innovative Development (NDP, 2013), which acknowledges clusters as the main drivers of regional development.

If these issues are not solved, the gap in regional development will continue to increase. Therefore, it is important for states' government to be aware of their needs, resources and capabilities in order to introduce innovation as the base their economies to minimise their vulnerability in the long term.

Conclusions

Econometric analyses of the regions of Russia and in states of Mexico provided evidence to construct a theoretical model of territorial differentiation factors and to ground the necessity to cluster the economy. However, the analysis of the scientific papers and government policy in both countries revealed a number of problems that have a negative impact on the functioning and development of clusters in the both economies. They are the dominance of the state initiatives on the private ones and the dominance of companies with state participation in clustered structures; the dominance of vertical hierarchical relationships between members of cluster systems; the localisation of the state-supported clusters in the regions with deliberately developed productive and scientific and technical potential; a lack of a coordinated approach to regional development policies.

All of those problems complicate the interaction between cluster members and hinder uniform regional development. Such a cluster model is characterised by great dependence of the whole cluster-network system operation from the centre (core) of the formed cluster, as well as the dependence of cluster's participants from priorities of social-economic development determined by government authorities.

In this case, clusters cannot become the factors of growth of the national economy because they are not an effective tool for interaction between the actors of the regional innovative systems. Therefore, the main goal of government is to stimulate interaction between cluster members in order for them to propose regional development initiatives that recognise their contextual strengths to construct a comparative advantage.

These conclusions help to define and rethink the prerequisites for further examination of possibilities of regional innovative cluster-network structures' interaction. This is critical, given that clusters can be a significant tool for narrowing the gap of regional development and a solid base for a sustained innovative development of the national economy.

Disclosure statement

Notes on contributors

René F. Lara Cervantes holds PhD in Political Science at the Faculty of International Relations University of Economics in Prague, Prague, Czech Republic.

Julia V. Dubrovskaya holds PhD in Economic Science at the Faculty of Economics Russian State Pedagogical University named after A. Herzen, Sankt-Petersburg, Russia.

Acknowledgements

References

Aitbayeva, D.G., Zhubanova, K.M., Kulgildinova, A.T., Tusupbekova, M.G. & and Uaisova, I.G. (2016). Formation of education clusters as a way to improve education. *International Journal of Environmental & Science Education, 11* (9), 3053- 3064

Bek, M.A., Bek, N., Sheresheva & M.Y., Johnston, W.J. (2013). Perspectives of SME innovation clusters development in Russia. *The Journal of Business & Industrial Marketing, 28,* 240-259.

CIEP (2016). Participaciones ante la caída del precio del petróleo, Centro de Investigación Económica y Presupuestaria. Retrieved from http://ciep.mx/participaciones-ante-la-caida-del-precio-del-petroleo-2016/

Christensen, T. A., Lämmer-Gamp, T. & Meier zu Kocker, G. (2012). Let's make a perfect cluster policy and cluster programme. Smart recommendations for policy makers, The Danish Ministry of Science Innovation and Higher Education. Retrieved from: http://www.cluster-analysis.org/downloads/Clusters_web_singlepage_06092012.pdf

Doskaliyeva, B.B., Orynbassarova, D.Y., Omarkhanova, M.Z., Karibaev, S.Y. & Baimukhametova, S.A. (2016). Development of the System of Investment Support of Projects in the Industrial - Innovative Development of Kazakhstan. *International Journal of Environmental & Science Education, 11* (12), 5109- 5127.

ECLAC (2013). Crecimiento económico, innovación y desigualdad en América Latina: Avances, retrocesos y pendientes Post-Consenso de Washington, Economic Comission for Latin America and the Caribbean. Retrieved from http://www.cepal.org/es/publicaciones/4929-crecimiento-economico-innovacion-y-desigualdad-en-america-latina-avances trkfc

Evans, P. & Karras, G. (1996). Do economics converge? Evidence from a panel of U.S. states. *Review of Economics and Statistics, 78* (3), 384-388.

FSSS (2015). Socio-Economic Situation In Russia. (2015), Federal State Statistics Service. Retrieved from http://www.gks.ru/bgd/free/B15_00/Main.htm

Freeman, C. (1995). The national system of innovation in historical perspective. *Cambridge Journal of Economics, 19*, 5–24.

Feser, E. J. (1998). Old and new theories of industry clusters. *London Clusters and Regional Specialisation: On Geography, Technology, and Networks, 8*, 18-40.

Gennaioli, N., La Porta, R., Lopez de Silanes, F. & Shleifer, A. (2013). Growth in regions. *National bureau of economic research, 44*, 259-309.

Grossman, G. & Helpman, E. (1994). Endogenous innovation in the theory of growth. *Journal of Economic Perspectives, 8* (1), 23–44.

Hernández-Rodríguez, C. & Montalvo-Corzo, R. F. (2012). Entrepreneurial clusters in China and Mexico –implications for competitiveness. *Globalization, Competitiveness & Governability, 6* (1), 55-90.

Ketels, Ch. (2004). European Clusters. *Structural Change in Europe Innovative City and Business Regions.* Hagbarth Publications. Retrieved from http://abclusters.org/wp-content/uploads/2013/12/Ketels_European_Clusters_2004.pdf

Kotsemir, M., Abroskin, A. (2013). Innovation concepts and typology – an evolutionary discussion. *Series: science, technology and innovation.* Retrieved from: https://www.hse.ru/pubs/share/direct/document/76780100

Krugman, P. (1993). First nature, second nature, and metropolitan location. *Journal of Regional Science, 33(2),* 129–144.

Kutsenko E. (2015) Pilot Innovative Territorial Clusters in Russia: A Sustainable Development Model. Foresight-Russia, vol. 9, no 1, pp. 32–55. DOI: 10.17323/1995-459x.2015.1.32.55

Lindqvist, G., Ketels, C. & Orjan, Solvell O. (2013). The Cluster Initiative Greenbook 2.0., Ivory Tower Publishers, Stockholm, ISBN 978-91-974783-5-9. Retrieved from http://cluster.hse.ru/doc/getpdf.pdf

Meier zu Kocker, G. & Muller, L. (2015). Cluster programmes in Europe, European Comission. Retrieved from http://ec.europa.eu/DocsRoom/documents/12925

Moreno, R., Paci, R. & Usai, S. (2005). Geographical and sectorial clusters of innovation in Europe. *The Annals of Regional Science, 39,* 715-739.

Morgan, K. (1997). The learning region: Institutions, innovation and regional renewal. *Regional Studies, 31* (5), 491–503.

Nahar S. & Inder B. (2002). Testing convergence in economic growth for OECD countries. *Applied Economics, 34* (16), 2011-2022.

NDP (2013). Plan Nacional de Desarrollo (National Development Plan) 2013-2018*, Programa de Desarrollo Innovador.* Retrieved from http://www.economia.gob.mx/files/prodeinn/Programa_de_Desarrollo_I nnovador2013-2018.pdf

OECD (2009). Estudios de la OCDE de innovación regional: 15 estados mexicanos, Organization for Economic Cooperation and Development. Retrieved from http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=38821962

OECD (2015). Estudios económicos de la OCDE México: Visión general. (2015), Organization for Economic Cooperation and Development. Retrieved from http://www.oecd.org/economy/surveys/Mexico-Overview-2015%20Spanish.pdf

Pietrobelli, C. & Rabelloti, R. (2004). Upgrading in clusters and value chains in Latin America. The Role of Policies., Inter-American Development Bank. Retrieved from http://siteresources.worldbank.org/EXTEXPCOMNET/Resources/2463593-1213887855468/23_UpgradinginClustersandValueChainsinLAC.pdf

Porter, M. (2000). Location, competition, and economic development: *Local Clusters in a Global Economy. Economic Development Quarterly, 14* (1), 15-34.

Rey, S.J. (2001). Spatial empirics for economic growth and convergence. *Geographical Analysis, 33* (3), 194–214.

Sang-Chul, P. &Seong-Keun, L. (2004). The regional innovation system in Sweden: a study of regional clusters for the development of high technology. *AI & Society , 18,* 276-292.

Uraev, N.N., Mingaleev, F.G., Kushimov, T.A. & Kolesov, A.N. (2016). Methodological aspects of strategic development of regional socio-economic system (Following the example of Radio-Electronic industry enterprises in the Republic of Tatarstan). *International Journal of Environmental & Science Education, 11* (12), 5094-5108

Ushakov, D.,Yeh, S.P. (2013). Prospects of innovative economies development in the dynamics of globalization and technological progress. *Actual Problems of Economics*, Vol. 2

Ushakov, D., Shieh, C.J. (2013). Modern innovative entrepreneurship: Economic efficiency and organizational structure. *Actual Problems of Economics*, Vol. 2

Varga, S., Vujisic, D. & Zrakovic, M. (2013). State aid for innovation clusters in the Republic of Serbia. *The International Journal of Public Sector Management, 26 (2),* 102-110.

Woodward, Douglas P. (2012). Industry location, economic development incentives, and clusters. *The Review of Regional Studies, 42*, 5–23.