

EXPORT POTENTIAL OF RUSSIAN PHARMACEUTICAL COMPANIES IN THE EMERGING REGIONAL CLUSTERS

The article provides an analysis of comparative importance of the company export potential growth factors in the emerging pharmaceutical clusters of the European part of Russia. The classification and assessment of export potential factors in terms of the elements of such potential (production, financial, labor, marketing potential) allowed identifying a strong link between cluster and regional factor groups and results of export activities. The goal of this paper is to propose to pharmaceutical companies involved in foreign trade activities a set of measures based on the test of a scientific hypothesis to improve their export potential. The authors have proposed and tested the hypothesis that the cumulative effect of these factors leads to increased export opportunities for the pharmaceutical cluster and promotes the effective integration of the region into the global economy. The methodological base of the research was provided by the method of geoeconomic analysis of the regional economy combined with the method of econometric modeling involving the use of mathematical statistics. After studying five Russian pharmaceutical clusters, including Belgorod, Kaluga, Moscow, Oryol, Yaroslavl clusters, the authors identified a causal link between the company export potential growth and the factors of competitiveness and cluster origin (interacting business chains, relationship and interoperability of functions, compact location in the region). The authors elaborated a set of measures to maximize the competitive advantages of cluster organization for export activities of pharmaceutical companies. The conclusions and recommendations of the study are intended for pharmaceutical companies and the authorities of regions that implement the concept of cluster development. To achieve sustainable growth of export potential and development objectives, Russian export-oriented companies should pay more attention to implementing the marketing and organizational innovations, competent optimization of commercial expenses within the cluster, and development of logistics chains for drug deliveries from the laboratory to the final consumers.

Keywords: regional cluster, company export potential, geoeconomics, micro- and mesolevel factors, pharmaceutical industry

Introduction

The active involvement of Russian regions and companies in the foreign economic activities in the last two decades made the problem of export efficiency one of the key issues for ensuring the sustainable progressive development of regional and corporate entities. The objective trends in the global division of labor and the global economic system as a whole strongly dictate the need to integrate the Russian economy into the world economy, and Russian companies, into the global value chains to obtain access to global income and ensure long-term sustainable development and public welfare. In accordance with the State Program Development of Pharmaceutical and Medical Industry in 2013–2020, the priority tasks for the development of Russian economy include the creation of the world-class innovative export-oriented national pharmaceutical and medical industry. The innovative model will allow initiating in Russia the development and production of high-tech pharmaceutical products, improving the Russian pharmaceutical industry to the world-class level, and successfully competing with foreign manufacturers both on the domestic and foreign markets [1, p. 26]. This will provide a new impetus to the development of Russian applied science and engineering.

Innovative clusters of the pharmaceutical industry have been created in a number of Russian regions as entry points into the global economy. These include:

1) The Moscow Region and Biopharmaceutical Cluster Severny created on the basis of the Moscow Institute of Physics and Technology. [2, pp. 92–93].

2) The Kaluga Region and the innovation cluster of pharmaceuticals, biotechnology, and biomedicine established in 2009.

3) The Yaroslavl Region and the cluster of pharmaceutical industry and innovative medicine established in 2011.

4) The Belgorod region and biopharmaceutical cluster operating since 2014.

5) The Orel Region where in 2015 the Russian Government initiated a project to build a pharmaceutical cluster.

In accordance with the State Program, the export capacity of the Russian pharmaceutical industry should be brought to a new level. By 2020, the pharmaceutical exports should reach RUB 38 billion, while the exports of medical equipment and medical supplies should amount to RUB 17.4 billion [3, p. 166]. This, in turn, requires a rapid growth of export opportunities and export potential of the companies in the industry by means of establishing and developing compact clusters.

It can be assumed that export potential decreases or increases under the impact of multilevel factors. What is the effect of micro-, macro, and mesolevel factors on the dynamics of export potential? Perhaps, the cluster-based organizational structure creates additional effects for export potential? If so, how do the components of export potential, such as productive capacity, labor, marketing, financial potential, relate to each other in terms of their contribution to its overall increase? How to identify the impact of a cluster component on the improvement of export efficiency?

Therefore, the study had the objective to identify the main factors facilitating the growth and improvement of efficiency in the realization of company export potential and to model the development of company export potential as the value formed under the impact of these factors.

Theory and Methodology of the Study

The theoretical base of the study was formed by combining the concept of export potential [4, 5] with the theory of regional cluster development [6, 7].

The export potential is a scientific category, which expresses in concentrated form the essence of economic capabilities of an entity to increase its exports and export earnings due to a whole range of specific factors. We can point out a number of theoretical approaches to the concept of export potential, such as resource-based [8]; functional [9], competitive [10], revenue-based [11], and progress-based [12]. We rely on a progress-based approach to the export potential, which in combination with the unique regional characteristics creates foundations for the analysis, calculation, and forecast of the company export potential. The factor of the regional structural organization plays a decisive role in the formation, increase, or decrease of the export potential in such a large and geographically diverse economic system as the Russian economy.

The cluster theory, as a concept for organizing the compact arrangement of economic entities and institutions that are interconnected and deeply integrated into the regional economic system, allows identifying the geoeconomic position of exporters and modeling potential points of their economic growth in the world. The regional cluster is of local nature, but it allows the formation of the global growth points and reproductive systems with access to the world economy that are marked by economic boundaries, which are vastly superior to their administrative boundaries. Basic components of export potential are emerging within the cluster—that is, its production, labor, marketing, and finance components.

This paper studies the factors that are essential for the export potential at the two levels of analysis, including mesolevel (cluster and regional sublevels) and microlevel. The selection of factors that ensure the maximum gain in the company export potential and the formation of points of geoeconomic growth is based on studying a wide range of Russian and foreign sources.

The microlevel factors include the system of strategic and marketing planning of the company, product quality, level of costs and prices, effectiveness of brand management system, financial position of the company [9, p. 93], factors associated with the development of human capital [13, 14], development and breadth of the export–import chain [15, 16, 17], and a number of other factors.

We divided the mesolevel factors into factors of the cluster and regional sublevels. The cluster sublevel includes compact localization of manufacturing and services [18], internationalization of experience and technology, removal of barriers for entry into foreign markets [19, 20], development of interorganizational relationships within the cluster, and special combination of infrastructural conditions [21]. The regional sublevel includes development of commercial, financial, and banking networks [22]; quality of key institutions in the region (namely, the protection of property rights, rule of law, level of business regulation, export policy [23]), urbanization factor, and maturity of urban agglomerations [24, 13, 14].

To ensure correctness of the calculations and comparability of statistical information in this study, the export potential shall mean the actually realized exports measured in terms of export revenues.

In this case, the export potential appears as a dependent (interpretable) variable, while its factors are the interpreting variables. In general, the econometric model of export potential can be expressed as follows:

$$Y = f(X_1, \dots, X_p) + \varepsilon, \quad (1)$$

where Y is the company export potential; $f(X_1, \dots, X_p)$ is the interpreting part dependent on the values of micro- and mesolevel factors; ε is the random component.

Table 1 describes the regression equation coefficients and their statistical significance. The significance of individual parameters in the regression equation is assessed by defining the standard error model for each factor.

Table 1

Assessment of regression equation parameters

	Coefficients	Standard error	t-statistics	P-value	Bottom 95 %	Top 95 %
Y-intersection	RS	P3	RS	RS	RS	RS
X_N	RS	RS	RS	RS	RS	RS

Source: prepared by the authors.

The impact of the micro- and mesolevel factors on the value of the export potential of Russian companies was assessed by using the official statistics and financial statements of pharmaceutical companies for 2010–2014.¹ The main factors affecting the export potential of a pharmaceutical company were aggregated within four types of potentials, including production, marketing, labor, and financial potentials (Table 2).

Table 2

The aggregation of the company export potential growth factors

Type of potential (factors)	Group of factors
Production potential (X_1)	Micro- and mesolevel factors
Investments in R&D, fixed assets, technological capabilities, factor of active implementation of research and innovation activity at the level of company and cluster, level of capacity utilization (possibility of identifying and building reserves), intangible assets	
Marketing potential (X_2)	
Market share, cluster internationalization level, accumulation, mobilization, and sharing of critical and scarce resources (granting interorganizational loans), implementing marketing innovation, implementing organizational innovation, commercial spending within the company and cluster	Microlevel factors
Financial potential (X_3)	
Capability of obtaining export credits, debt to equity ratio	
Labor potential (X_4)	Microlevel factors
Capability of workplace training, high salaries; education level of workers, level of labor productivity	

Source: prepared by the authors.

The sampling was made from the pharmaceutical companies in Central Federal District (CFD), which already form the scientific and industrial core of regional clusters, as well as potential participants in such clusters. The clusters are actively built in five regions of the CFD (the Moscow, Yaroslavl, Belgorod, Kaluga, and Orel Regions).

In the study, the impact of micro- and mesolevel factors (cluster and regional sublevels) on the export revenues of pharmaceutical companies was assessed by building two econometric models and correlation matrices (for mesolevel factors, the regional sublevel). In practice, the factorial assessment of the company export potential was performed by using Microsoft Excel analysis package. Within the models, for each year, we recorded the regression equation, verified the values of model coefficients,

¹ The data was provided at the request of the authors by the Main Interregional Center for Processing and Dissemination of Statistical Information of the Federal State Statistics Service (MIC of Rosstat). The relevant information for 2015 will be available in the second half of 2016.

identified the existence and closeness of the relationship between the micro- and mesolevel factors and export potential of pharmaceutical companies.

The mesolevel factors (regional sublevel) were analyzed by using the official ratings of socioeconomic position of the subjects of the Russian Federation, their investment potential, and the level of innovation development. The rating scales were selected for each of the five regions of the CFD considered in the study (the Yaroslavl, Kaluga, Belgorod, Orel, and Moscow Regions) for the period of 2010–2014. Next, we sampled the indicator of company export revenues in the relevant industry enterprises for each region during the specified period. This data was grouped and analyzed by using the matrix of paired correlation coefficients. The analysis of these coefficients will allow determining how close the trends of changes in the company export potential and regional economic environment are.

Results of the Analysis

Assessment of the Export Potential: Microlevel Factors

After implementing the model for assessing the impact of microlevel factors on the export potential of the pharmaceutical company, we came to the following conclusions.

In the period under review, we identified two factors that have the strongest impact on the export potential of pharmaceutical companies—that is, production potential and marketing potential. These factors have a varying degree of impact, but the dependency is straightforward: when the value of production potential changes by one unit, the export revenue of the company increases in the range of 0.212 to 0.309 at different periods; the change of marketing potential by one unit results in the revenue growth ranging from 0.031 to 0.055. The situation in the Russian pharmaceutical companies was caused by large investments in R&D accompanied by technological modernization and upgrading of production facilities, significant expenses on training and education of personnel, major investments required for the transition to GMP standards.

The development of marketing potential becomes increasingly important for building up the export flows of pharmaceutical companies, as evidenced by a high degree of closeness of the relationship between these variables (ranging from 0.752 to 0.905 at different periods). This is due to the fact that Russian pharmaceutical companies do not pay enough attention to improving logistics chains for delivery of drugs from laboratories to final consumers and to their low patent activity.

Therefore, for building their export strategies in an unstable economic environment in Russia, we can recommend Russian pharmaceutical manufacturers to consider as a priority the factors of production and marketing potentials.

Despite the fact that the factors of labor and financial potentials are not included in the regression models since they are overlapped by prevailing impact of manufacturing and marketing components, they also have a close relationship with the factor of export potential of pharmaceutical companies (for labor potential, in the range from 0.698 to 0.809; for financial potential, in the range from 0.857 to 0.946).

It should be noted that at the pharmaceutical companies in Central Federal District wages of employees range from 35 to 50 thousand rubles. However, in our opinion, the introduction of additional financial incentive systems will only contribute to higher labor productivity, responsible attitude toward the work, which will directly affect the quality and volume of products manufactured by the companies (i.e., will affect the production factor).

Assessment of the Export Potential: Mesolevel Factors (Cluster Sublevel)

Modeling the impact made by the factors of cluster sublevel on export potential, we grouped the data by five regional clusters. Among the four aggregated factors identified in the study of microlevel factors, the most important factors were those of production and marketing potentials. At the same time, the production potential is drawn toward an internal environment of companies and does not allow distinguishing between the impact of microlevel and mesolevel factors. In turn, the marketing potential is aimed at promoting products, including exports, on new markets and opens for the companies the opportunities to develop their interactions with buyers and suppliers within the cluster through optimization of commercial expenses. Based on the above, we assessed the impact of cluster sublevel factors through marketing potential.

For all clusters, the table value of Student t -test, at a significance level of 95 % and the number of degrees of freedom equal to 3, was 3.182. In two of the five clusters, the coefficients for factor X_2 were statistically insignificant (Moscow cluster: $1.692 < 3.182$; Belgorod cluster: $0.149 < 3.182$). Therefore, we will build the regression equation for the remaining three clusters (Yaroslavl, Kaluga, and Orel).

$$Y_{\text{CEP_Yaroslavl_cluster}} = 0.091X_2 + 298719,$$

$$Y_{\text{CEP_Kaluga_cluster}} = 0.050X_2 + 277539,$$

$$Y_{\text{CEP_Orel_cluster}} = 0.099X_2 + 172988.$$

where CEP is company export potential.

The significance of econometric models, as well as the significance of the determination coefficient itself, confirmed the calculated actual values of Fisher F -test, which were higher than corresponding table values at the level of reliability of 95 % (Yaroslavl cluster: $16.991 > 10.13$, Kaluga cluster: $20.178 > 10.13$, Orel cluster: $98.183 > 10.13$).

After studying the impact of mesolevel factors (cluster sublevel) on the dynamics of the export potential, we obtained the following results. Russian pharmaceutical market is focused on the production of generic drugs and aims primarily at continuing to use the economies of scale rather than investing in the development of brand-name drugs. In this regard, it is increasingly important to implement marketing and organizational innovations aimed at obtaining a rapid effect. According to our calculations, this is the operating principle of the companies in Yaroslavl, Kaluga, and Orel pharmaceutical clusters. Unlike these clusters, Moscow and Belgorod clusters are increasingly investing in research and development, thus renewing their product range. Another side of the impact made by marketing potential on increasing the exports of companies is intelligent optimization of commercial expenses within the cluster.

Assessment of Export Potential: – Mesolevel Factors (Regional Sublevel)

The impact of mesolevel factors (regional sublevel) on the export potential of pharmaceutical companies was assessed by building the matrices of paired correlation coefficients (Table 3).

In the Belgorod Region, pharmaceutical companies have the latest equipment, which allows them to automate virtually all stages of the production process. This makes them independent of socioeconomic situation in the region. The innovation and investment ratings reflect their strong connection to the export potential of pharmaceutical companies in the region, which indicates that the research conducted by the companies on new drugs is highly important for the region, and the relevant programs are financed mostly by the funds from the budget of the Belgorod Region.

In 2010–2014, the Kaluga Region received significant amounts of foreign direct investment. For the pharmaceutical industry, this meant large-scale construction of new plants for production of substances and drugs. It also involved the creation of new jobs, the rapid increase of production volumes, including those for exports. The ratings of socioeconomic situation and investment potential of the Kaluga Region generally confirm their strong impact on the export revenue in the reviewed period. As for the rating of innovative development of the Kaluga Region, it should be noted that Nearmedic Plus LLC and NPK Medbiopharm LLC had the indicators of the closeness of the relationship between their export potential, and the rank of the region in the rating had the values of 0.982 and 0.898, respectively. This means that the innovative projects of these companies received support from the regional budget. Apparently, two other companies follow the marketing strategy of economies of scale.

The Moscow Region traditionally ranks high in almost all ratings and their indicators. For example, five pharmaceutical companies in the Moscow Region demonstrate a moderate positive relationship between their export capabilities and the level of socioeconomic position of the subject of the Russian Federation. The negative dependence in other companies reflects a high degree of automation of production process and, therefore, the independence of these companies from the socioeconomic environment in the region. Virtually, all companies, with the exception of PO Altonika LLC and Medical Technologies LTD CJSC, have a negative or near-zero ratio of exports to innovative development rating of the Moscow Region. This can be explained by the fact that the innovative projects of these companies are financed either by their own funds or by private foreign investors. Table 3 also shows that the Moscow Region supports the investment projects of companies included in the Biopharmaceutical

Cluster Severny. However, these investments are directed not to the development of new drugs but to the expansion of production capacities.

Table 3

The matrix of paired correlation coefficients to assess the mesolevel factors in compared regions of Russia

	Rating of socioeconomic position	Rating of innovative development	Rating of investment potential
<i>The Belgorod Region</i>			
Veropharm JSC	-0.292	0.057	0.406
Belpharmacom LLC	-0.203	0.926	0.873
Polisintez LLC	-0.428	0.797	0.296
<i>The Kaluga Region</i>			
Chemopharm LLC	0.793	-0.209	-0.053
Nearmedic Plus LLC	0.128	0.982	0.858
Obninsk Chemical and Pharmaceutical Company CJSC	-0.515	-0.252	0.050
NPK Medbiopharm LLC	0.397	0.898	0.851
<i>Moscow and the Moscow Region</i>			
KRKA Pharma LLC	0.825	-0.836	0.332
Servier CJSC	0.410	-0.688	0.138
NPO Petrovax Pharm	0.634	-0.453	0.419
Akrikhin OJSC	-0.329	0.023	-0.952
PO Altonika LLC	-0.837	0.817	-0.245
Geropharm-Bio OJSC	0.595	0.097	0.423
Medical Technologies LTD CJSC	0.129	0.502	0.696
Sotex Pharmfirm CJSC	0.625	-0.823	-0.128
<i>The Orel Region</i>			
Sanofi Russia JSC	0.354	-0.499	-0.087
Sanofi-Aventis Vostok CJSC	0.493	-0.775	-0.206
<i>The Yaroslavl Region</i>			
R-Pharm CJSC	0.973	-0.786	-0.225
Vitapharma CJSC	0.929	-0.882	-0.740
TEVA LLC	0.973	-0.873	-0.312

Source: prepared by the authors with the data provided by MIC of Rosstat (<http://www.gmcgks.ru/index.php?id=2303>).

Orel Pharmaceutical Cluster is currently under development; therefore, the socioeconomic sphere of the region makes a moderately positive impact on the export potential of pharmaceutical companies. The regional budget is increasingly used to finance large engineering and instrument-making enterprises rather than pharmaceutical companies. Pharmaceutical companies are supported by foreign investors who are investing heavily in the innovative development of pharmaceutical manufacturers of the Orel Region.

The analysis of data revealed direct dependency and strong relationship between the socioeconomic position of the Yaroslavl Region and export potential of regional pharmaceutical companies. This suggests that the consolidated budget surplus of the region, high level of per capita investments in fixed capital, and low unemployment contribute to increase in subsidies for export-oriented enterprises, modernization of production facilities, and higher output of export-oriented products. Negative dependency and low level of closeness of the relationship between the investment rating of the Yaroslavl Region and export revenues of R-Pharm CJSC and TEVA LLC can be explained by the fact that these companies are supported with the funds from the federal budget. As for Vitapharma CJSC, this company uses its own funds as well as funds coming from private investors but not from the region.

Conclusion

Let us summarize the findings of this study in Table 4 and then formulate the conclusions.

Table 4

The summarized assessment of correlation between the factors and the export potential growth of pharmaceutical companies

Company export potential	Factors			
	Production potential	Marketing potential	Labor potential	Financial potential
Yaroslavl cluster	VH	H	H	H
Kaluga cluster	VH	VH	H	H
Belgorod cluster	VH	H	H	H
Moscow cluster	H	H	N	H
Orel cluster	VH	VH	H	H

The rest of the Table 4

Company export potential	Rating of socioeconomic position	Rating of innovative development	Rating of investment potential
The Yaroslavl Region	VH	H	M
The Kaluga Region	W	M	M
The Belgorod Region	M	N	N
The Moscow Region	W	W	W
The Orel Region	M	N	W

VH = very high; H = high; N = noticeable; M = moderate; W = weak relationship.

Source: prepared by the authors with the data provided by MIC of Rosstat (<http://www.gmcgks.ru/index.php?id=2303>).

1. When assessing the impact of microlevel factors on the export potential of pharmaceutical companies, we identified two key factors that have the greatest impact on export capabilities of pharmaceutical companies and are enjoyed by the Russian companies to a sufficiently high degree: these are the production and marketing potentials. Therefore, as a priority for building the export strategies, we recommend the Russian pharmaceutical manufacturers intensify their R&D in the development and promotion of brand-name medicinal substances and elaborate a system of logistics chains for delivery of drugs from laboratories to final consumers.

2. When assessing the impact of mesolevel factors (cluster sublevel) on the export potential of Russian pharmaceutical companies, we found that—with its focus on the production of generic drugs—the Russian pharmaceutical market aims primarily to benefit from the trivial use of economies of scale rather than investing in the development of brand-name drugs demanded in export markets. In this regard, it is particularly important to implement marketing and organizational innovations aimed at obtaining the desired effect and optimize in a competent way commercial expenses within the cluster by outsourcing nonproductive functions to specialized cluster participants.

3. When assessing the impact of mesolevel factors (regional sublevel), we found the direct dependency and strong relationship between the socioeconomic position of the region and export potential of pharmaceutical companies located in its territory. At the same time, the analysis of factors affecting the export potential of Yaroslavl pharmaceutical cluster gave mixed results. Along with the increase in general rating of innovative development, the Yaroslavl Region experiences a decline in the export revenues of pharmaceutical companies. This indicates the existence of divergent trends and can be explained by the fact that most of the companies in the region selected the strategy of mass market promotion of drugs capable of providing the momentary return to the detriment of investments in the medium- and long-term projects for developing brand-name drugs.

Therefore, the findings of the study revealed an objective causal link between the growth of company export potential and the following competitiveness factors of cluster origin (interacting business chains, relationship and interoperability of functions, compact location in the region) as well as proved the need to take the following measures to maximize the competitive advantages of cluster organization in export activities:

— To become competitive on the global market, regional pharmaceutical companies should be established within the cluster frameworks defined for the subjects of the Russian Federation.

— Organization of an effective system for state support of innovation and investment (especially with regard to foreign direct investment) and export activities at the regional level becomes an important aspect in the development of the export potential of Russian pharmaceutical industry.

— Each cluster should establish an office responsible for continuous monitoring of environment on the global market for a particular product and capable to elaborate regularly strategic recommendations in response to the changing demands of global competitive environment.

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