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Strategic Framework for Implementing the Potential of Import Substitution on the Example of Railway Engineering*

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Abstract. At present, Russia's economy is dependent on import in some of its strategically important sectors. The recent economic and political developments such as the aggravation of geopolitical situation and termination of economic partnership between Russia and a number of countries and entities, and also the Government's policy that aims to reduce import dependence determine the need to expand the interaction between domestic producers and the need to use domestic resources, materials and equipment in economic activities. Import substitution in Russia can become a driving force of its industrial growth. The paper presents different interpretations of the term "import substitution" contained in several publications of recent years; it also reveals a common approach of the authors to this problem. The article summarizes existing proposals on priority areas of import substitution such as the shift towards import-substituting production and technology in strategically important industries. Mechanical engineering is seen as a most

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important industry in this respect. Russia's machine-building complex is a highly diversified industry, therefore the policy of import substitution implies that it will be implemented efficiently in various sectors of mechanical engineering on the basis of the differentiated approach, with regard to industry and sectoral specifics. The article considers a strategic framework for the implementation of the import substitution potential on the example of railway engineering. The authors reveal trends in the development of the internal market of railway engineering products; they determine the degree of import dependence for individual sectors of the industry on the basis of statistical data. The article substantiates priorities and possibilities of import substitution in different sectors, and in high-tech sectors of railway engineering. The authors point out a goal of import substitution in these sectors, the goal is to create qualitatively new types of products that provide technological parity between Russia and developed countries in the development of transport, and active influence on the development of the world market of technologies and science-intensive products. Effective implementation of import substitution policy is possible only on the basis of interaction of all the participants of technological chain, including designers of products and technologies, suppliers, and customers. The best way to organize such interaction is to form cluster associations. The article shows the role of clusters in the implementation of import substitution policy at the regional level on the example of the railway engineering cluster in the Sverdlovsk Oblast.

Key words: dependence on import, import substitution, high-tech products, production localization, cluster associations.

In the modern geopolitical environment characterized by aggravation of the external political and economic situation, import substitution is viewed as one of the priority directions of state economic policy in Russia. Speaking at the plenary session of the Saint Petersburg International Economic Forum on May 23, 2014 Russian President Vladimir Putin pointed out: "I'm confident that by upgrading industry, building new enterprises and localizing competitive production in Russia we'll be able to considerably reduce imports of many goods and return our market to our national producers. I believe it's necessary to promptly analyze opportunities for competitive import substitution in industry" [15].

Currently, the subject of import substitution and dependence on import is being more and more widely discussed both in the public and political periodicals and scientific journals [1, 2, 3, 4; 6, 9, 10, 16, 18, etc.]. Despite the differences in approaches, the general conclusion is as follows: public policy, including industrial policy, should take into account specific historical conditions and meet the global challenges of our time [1], when under the foreign economic and military-political pressure on Russia there is no effective alternative to development without the use of this mechanism. Thus, as O.A. Frolova notes, in modern Russia there emerged a necessity of import substitution, which is a new "shock" factor that promotes industrial development [19].

At the same time, the term "substitution" has no clear definition, which creates contradictions in the development of sectoral and regional strategies and programs for import substitution. For instance, V.V. Ivanov formulates the goal

of import substitution as "creation of own industry that makes it possible to ensure the country's technological independence from external suppliers with regard to the products that are necessary for ensuring a minimum level of life and safety". However, as the author notes, such a solution to the problem of import substitution will ensure minimal technological security and independence, but will not lead to technological parity between Russia and developed countries. The problem is that according to this scheme the substitution is implemented according to the pattern of catch-up development, i.e. the products and technologies will basically repeat those already existing, although some of them can be better than the known analogues [5]. In our view, this interpretation of the problem of import substitution preserves the existing state of domestic economy, because it does not imply accelerated innovation development. The analysis of trends in the development of modern economic systems shows that the main trend is the transition to innovation economy, which is a new model of economic development, and we believe that the problem of import substitution should be considered with regard to this trend; and in this respect we agree with the position of V.K. Fal'tsman: "Innovation economy is formed through the import substitution of innovative products in the domestic market and focus on its exports at the foreign market" [17, 18]. This position is shared by V.A. Plotnikov and Yu.A. Vertakova, who formulate the goal of the import substitution strategy as a policy of modernization of domestic production, which contributes to the development of industrial sector, its technological re-equipment, improvement of the quality of manufactured goods, and development of innovation activity. The viewpoint of these authors is of interest, they propose to interpret import substitution, on the one hand, as an opportunity, and on the other hand, as practical activity of substitution of foreign goods in the domestic market. In our view, this definition is sufficiently comprehensive, as this term simultaneously denotes the potential of development of national production, and the process of displacement of foreign goods from the market [3].

When substantiating the priority directions of import substitution, the authors have the following opinion.

In the context of globalization Russia will not be able to avoid completely its dependence on import of many types of innovation products and components for their production. In the framework of the national strategy for economic and military security, the key sectors of economy should be self-sufficient and independent from the external environment. That is why today a strategy aimed at restructuring the economic development model by shifting to import-substituting production and technology in strategic sectors is crucial for Russia [3, 5, 17]. These industries include, first of all, mechanical engineering. The analysis of statistical data presented in the works of the above authors has demonstrated that mechanical engineering should be a priority area for the implementation of import substitution policy.

Machine-building complex in Russia is a highly diversified industry, therefore the policy of import substitution assumes its effective and economically efficient implementation in various sectors of mechanical engineering on the basis of the differentiated approach, when branch-wise and sectoral specifics are taken into consideration.

Import substitution in the mechanical engineering complex also concerns those economic segments, which ensure the stability of Russia's socio-economic system. One of these segments is *railway transport,* which forms the infrastructure basis of dynamic development of national economy, improvement of the quality of life and economic activity of the population. Railway transport provides over 40% of passenger traffic, more than 80% of cargo transportation (excluding pipeline transport), about 98% of military and special transportation[1]; in emergency situations it is most suited for mass transportation of goods and passengers; for certain regions and a significant portion of the population it is the only form of passenger transport in interregional traffic.

In recent years, there emerged an urgent need to find a quick solution to many problems of the railway transport development and its transition to innovation development[2], including, in particular, the replacement of worn and outdated rolling stock, as well as the creation of new progressive machines to organize high-speed traffic. In these conditions the importance of railway engineering has significantly increased.

The policy of import substitution for railway engineering is defined by two components, which form the main objectives of import substitution for the industry:

- import substitution in the production of rolling stock, similar to imported products in quality and price;
- import substitution in related industries to provide the railway industry with the necessary resources (components, materials, modern technology).

The internal market of railway rolling stock in Russia is characterized by the dominance of domestic manufacturers and by a significant share of import. The proportion of import of railway equipment in the Russian market amounted to 30.8% in 2012, 26.0% in 2013, and 22.5% for 7 months of 2014. Until recently, Ukraine was the main importer of railway engineering products (freight cars and locomotives)[3], but the supply from this country declined sharply in the last three years. If in 2012 the share of Ukrainian producers in the total import volume amounted to 80.4%, then in 2013 it was 64.2%; and for 7 months of 2014 it has dropped to 50%. The share of imports from foreign countries, excluding former Soviet republics, (high-speed rolling stock) has increased over the same period

[1] Strategy for Development of Transport Engineering in the Russian Federation in 2007–2010 and for the Period up to 2015.

[2] Innovation development of the transport system is defined as a priority area in the main current strategic policy documents on the development of the industry: Transport Strategy of the Russian Federation for the Period up to 2030; Strategy for Development of Railway Transport of the Russian Federation for the Period up to 2030.

[3] Ukrainian products meet Russian products in terms of quality; competitive advantage of Ukrainian products on the Russian market is provides by their low, dumping prices.

from 20 to 50%, the share of products from the CIS countries (freight cars) remains at a low level (1–1.5% of total imports). To date, the situation on the domestic market of rolling stock has changed significantly with regard to freight cars. In this segment the share of imported products was 30.4% in 2012 (including 29.3% from Ukraine), in 2013 it was 23.3% (including 22% from Ukraine); according to the results for seven months of 2014, it amounted to only 7.9% (including 6.9% from Ukraine) [11, 12, 14].

Significant decline in import was accompanied by decrease in the supply of domestic freight cars. These changes are associated primarily with the slowdown of growth rate of Russia's economy which has led to a reduction in demand for freight cars. In addition, in the conditions of reduced demand and a surplus of existing facilities[4], freight car-building enterprises also faced the need to change their model line-up, expanding the range of manufactured products, and in some cases – converting production. The change of the market structure is due to the change in consumer demand, the decline in the volume of cargo intended for carriage in the universal rolling stock, and the growing need for specialized cars, formerly supplied by Ukraine.

Thus, the overall reduction in the demand for wagons, accompanied by the change in the structure of the car fleet, shifts the priorities in the import substitution of Ukrainian wagons: it is necessary to reorient Russian car-builders on the construction of new models, including the models that were previously imported.

Starting conditions of import substitution of modern transport vehicles from foreign countries excluding former Soviet republics was determined on the basis of specifics of Russian railway transport and, accordingly, on specifics of the Russian market of railway equipment with its pronounced limited competition. The Russian market of railway machinery is somewhat isolated from the world market because of the differences in track gauge in Russia (1,520 mm) and most European countries[5] (1,435 mm). The difference in track gauge, the fact that Russia has a developed service infrastructure (repair depots) oriented maintain and service the stock produced in the factories of the former USSR republics, low prices and a complex system of certification under the complete control of Russian Railways and the Government of the Russian Federation – these are the factors that hamper the access of products from foreign countries to Russian market. Western manufacturers have occupied a certain position in the segments of the delivery of rolling stock and locomotives for high-speed traffic, where Russian technology lags behind them for decades, and also the delivery of some components.

Experts note that despite the fact that in many cases domestic technology lags behind the best foreign analogues, the

[4] In 2012–2013, due to the influence of several factors, there was a reduction in demand for rolling stock, which reduced production volumes. As a result, rail car production (about 80 thousand pieces per year) exceeds the needs of the market, and the demand in the amount of 40–50 thousand pieces will remain for the near future.

[5] The railways of the CIS countries and a number of neighboring countries, such as Mongolia, Afghanistan and, partly, China have the track gauge of 1,520 mm.

technological level of some big companies in the industry in general is high, allowing to produce the rolling stock of any level of complexity [12].

Locomotive engineering. In the recent years, in Russia there emerged several new series of traction rolling stock: locomotives, electric locomotives and electric trains. The production of new innovation products in the domestic locomotive engineering was carried out largely within the framework of joint ventures with foreign manufacturers, with the use of diesel engines and some other components of foreign production. Domestic locomotives were equipped with foreign diesel engines of different companies; several locomotives were constructed with the diesels produced by Wartsila, Caterpillar, General Electric, and MTU Friedrichshafen. Thus, customers could choose from a fairly large number of series of locomotives, equipped with engines of various manufacturers with different characteristics.

Electric trains. In recent years types there emerged new types of these products in Russia's domestic market, in particular high-speed train "Lastochka" on the platform of Desiro train, which by its technical characteristics (including its design speed of 160 km/h) can compete with products of leading manufacturers. The production of this type of rolling stock was launched in 2013 at the facilities of LLC Ural Locomotives, joint venture ZAO Sinara Group and German company Siemens; beginning from 2014, "Lastochka" trains are used on the route Sochi – Krasnaya Polyana. Siemens, ZAO Sinara Group and Russian Railways signed an agreement on the main conditions of cars supply and localization of their production. Under this agreement the level of localization by 2017 will have reached 80%.

The Velaro high-speed rolling stock produced by Siemens AG was purchased for *high-speed* railway traffic between Moscow and Saint Petersburg, and Moscow and Nizhny Novgorod. But in the near future Russia plans to launch production of its own high-speed train at the Tver Carriage Works according to Western technology with the localization of production in Russia.

Thus, the technical and technological level of a significant part of the production equipment at railway engineering enterprises, in particular, the production of locomotives and electric trains, corresponds to promising quality requirements of Russian consumers[6] to the rolling stock; the existing facilities are able to meet the needs of Russian consumers to update and expand the rolling stock. At that, it should be noted that the production of new innovation products in domestic transport engineering was carried out largely within the framework of joint ventures with foreign manufacturers with the use of foreign technology and localization of production in Russia. On this basis, ***the main goal of import substitution in this sector of railway engineering for the near future consists in the further localization of production of rolling stock at joint ventures and organization of production of domestic components instead of imported ones.***

[6] The track gauge of 1,520 mm limits the expansion of major manufacturers of railway equipment from abroad to the Russian market.

Organization of production of domestic components is the most important task of import substitution for the production of innovative rolling stock, because the creation of competitive products is possible only with the development of new materials and their coatings, modern engines, high-performance control systems for rolling stock and other innovative technological solutions. The increased importance of components is determined by industry-related specifics of railway engineering – technological complexity of products (for example, the cost of purchased materials and products accounts for about 70% in the self-cost of traction units) and significant metal consumption[7]. Import substitution in the production of components will make it possible to solve current serious problems related to the localization of production of high-tech products at the domestic industrial railway facilities. Currently, more than two-thirds of high-tech components for new products come from abroad, because Russia does not produce a significant number of components, without which it is impossible to create machinery that meets world standards. Besides, in Russia there is no serial production of the following units:

• diesel engines of new generation that meet prospective standards on emissions, consumption of fuel and oil, and other characteristics, and their components;

• traction converters for brushless traction drives of electric rolling stock;

• modern brake systems for railway rolling stock;

• hydrodynamic and hydromechanical transmissions for diesel rolling stock with a yield up to one million kilometers;

• diagnostics and control systems for rolling stock, which interact as a single entity in the overall system of traffic control of railway transport.

Serial production of these components in Russia cannot be established due to the absence of appropriate technology, including the technology for the production of asynchronous traction equipment on IGBT-transistors, aluminum car bodies for passenger rolling stock, bogies for high-speed (over 200 km/h) passenger cars and locomotives *(tab. 1)*.

Due to the fact that certain types of components are not produced in Russia, companies have to import necessary parts; due to this fact, the cost of production increases, and the main advantage of localization – the reduction of production costs – is reduced to nothing. As a result, the domestic market becomes less attractive for foreign companies, and access to modern technology for the needs of domestic companies is limited.

Technological complexity in the manufacture of rolling stock determines the high level of cooperation both within the industry and with companies in other industries; this raises issues of *quality*

[7] Thus, in 2011 the share of transport engineering in the total consumption of metal amounted to 2.75%, or 1.62 million tons, while in 2009 it was 1.25%, or 0.66 million tons (Source: *Strategiya razvitiya transportnogo mashinostroeniya Rossiiskoi Federatsii na period do 2030 goda. Proekt. 2013 god* [The Strategy for Development of Transport Engineering until 2030. Draft. 2013]. Institut problem estestvennykh monopolii [Institute of Natural Monopolies Research]).

Table 1. Foreign technology for production of components, which are not applied in Russia

Components	Technical parameters	Advantages
Aluminum body of the car	• Length – 24.175m • Width – 3,265 mm • Height above railhead – 3,990 mm • Floor height – 1,360 mm	• Extended service life • Light weight • Smooth surface • Modern method of painting • High degree of corrosion resistance
Truck V_{max} = 300 km/h	• Space between axes of the wheelset – 2,600 mm • Wheel rim diameter – 920/860 mm • Rail gauge – 1,520 mm	• Comfortable primary and secondary level of spring suspension • High driving stability due to the rods of the wheelset and vibration dampers • High pulling power • High braking power
Traction converter (TC)	• Pulling power output, max – about 2,100 kW • Output voltage (linear), max – about 2,800 V • Output frequency, max – 210 Hz • Weight – about 3.4 t (double-system)	• Water cooling • Connection directly to the overhead system • Use of IGBT technology

of domestic components produced in the line of intra-industry cooperation and at enterprises of other industries. The quality of components has an impact on the quality of the final product and, consequently, on the reliability and durability of vehicles. More than 85% of equipment failures are caused by the low quality of domestic components.

Despite the difficulties, Russia has a certain potential for import substitution in the production of modern rolling stock components; this potential is implemented in a number of areas:

1. There are the developments of domestic *trucks* for freight cars. They include model 18-194-1 truck produced by OJSC RPC Uralvagonzavod, model 18-9836 truck manufactured by JSC Promtractor Wagon with the participation of Amstead Rail (USA), and model 18-9855 truck developed by JSC Innovation and Research Center "Wagons" with the participation of Standard Car Truck Company (USA) and manufactured by Tikhvin Freight Car Building Plant JSC.

2. In February 2013 JSC Federal Freight and Knorr-Bremse (Germany) signed constituent documents on the creation of an enterprise for manufacturing of *modern brake equipment* for rolling stock in the Tver Oblast.

3. It is expected to launch production at the joint Russian-Finnish enterprise Wartsila TMH Diesel Engine Company LLC organized on the basis of OJSC Penzadieselmash. The creation of a modern production of diesel engines is carried out in the framework of realization of the subprogram "Transportation engineering" of

the state program of the Russian Federation "Development of industry and enhancement of its competitiveness". The structure of this sub-program includes the event "Creation and organization of production of diesel engines and new generation components in the Russian Federation"; to date, the following results have been achieved:

- twenty technologies were developed and put into production in the framework of the sub-program;
- three technologies were developed and put into production in the framework of exploratory and fundamental research;
- seven basic modifications of diesel engines were developed and put into production.

However, despite certain success in the establishment of domestic production of components for high-tech railway engineering, the problem of import substitution of components remains relevant, because the productions listed above are organized on the basis of joint ventures through the transfer of foreign advanced technology.

One of the efficient tools to solve the problem of import substitution in high-tech sectors of the railway industry is the *use of the cluster approach*. The effectiveness of the cluster approach is due to the specifics of the industry:

– considerable dependence on foreign technology transfer in the development of innovative rolling stock requires close interaction with science;

– *science intensity* of many types of rolling stock requires high-tech component base and qualified personnel;

– *technological complexity* in the manufacture of rolling stock determines the high level of cooperation both within the industry and with companies in other industries;

– state interest in import substitution *ensures active participation of state structures* in the formation of the cluster.

The cluster approach provides the integral effect of cooperative interaction between the participants, allows the country's industry to develop rapidly, taking into account the specifics of relevant goals and objectives of strategic development of industrial sector.

The cluster approach has shown its effectiveness in the railway engineering cluster in the Sverdlovsk Oblast, which was highlighted, among others, as a functioning cluster in the draft Concept of Cluster Policy of the Sverdlovsk Oblast until 2020. A prerequisite for the formation of this cluster was the cooperation that has developed in the Sverdlovsk Oblast industrial complex on the basis of development of modern electric locomotive engineering, the use of the capabilities of regional military-industrial complex, considerable innovative, scientific and personnel potential of the Middle Urals area.

The core of the cluster is LLC Ural Locomotives, which is part of the holding company SINARA Group. Partners of the parent company are the suppliers of

components (65 Russian companies, including 20 from the Ural region); industrial science of the Sverdlovsk Oblast (JSC VNIKTI (Scientific-Research and Design-Technological Institute of Rolling Stock), JSC VNIIZhT (All-Russian Research Institute of Railway Transport), university science (URGUPS (Ural State University of Railway Transport). The innovative structure of the cluster is represented by an engineering center for development of electric trains of Lastochka type (Deziro-RUS), created on the basis of an agreement between JSC Russian Railways and German company Siemens AG. In addition, agreements were concluded between Siemens AG and the Ural State University of Railway Transport on joint research on energy saving systems and automation for Railways and on training personnel for the engineering center. Participation in the development and implementation of projects of a large number of high-tech industrial enterprises, including enterprises of defense industry, scientific and design organizations ensures the competitiveness of the cluster. The level of localization will be increased from 35% at the beginning of implementation to 80% by 2017, which proves the effectiveness of the cluster approach in the implementation of the policy of import substitution in this sector of railway engineering.

The activity of the Ural cluster of railway engineering is an example of successful implementation of import substitution of the type of "catching up" with the attraction of foreign technology for the organization of production of Western machinery in Russia; initially it was an assembly production, but it was gradually localized on the basis of Russian materials, components, raw materials, energy and labor resources. However, it is necessary to remember that, although this form of import substitution is successful at this stage, it has no resources for transition to the creation of high-tech products on the basis of domestic technology. The solution to the problem of import substitution through the transfer of foreign technology with the further localization will ensure a minimum technological independence of the country from external providers, but will not lead to a technological parity between Russia and developed countries with regard to the production of high-tech products. In this case, import substitution involves the implementation of *the policy of a catching-up national development, rather than advanced development*: foreign experience is borrowed, and foreign goods and technologies that already exist (that were developed and brought to the market) are substituted. At that, domestic industry will be lagging behind, and this time the lag will not allow it to compete efficiently with imported analogues [8]. *Thus, the effective substitution should be focused not so much on copying foreign analogues, but, rather, on the development of domestic technologies, which will ultimately provide the technological modernization of the economy based on its own technological developments* [3].

On this basis, the strategic goal of import substitution in high-tech sectors of railway engineering can be formulated as the creation of qualitatively new types of products that provide technological parity between Russia and developed countries in the development of transport, and active influence on the development of the world market of technologies and science-intensive products. The difficulty of achieving the goal arises out of the fact that the requirements to modern machine-building production in developed countries are becoming increasingly complex: the number of components of the production process increases, the nature of their interaction is becoming more dynamic and diverse. World practice shows that in the past 25–30 years the complexity of the machine as an object of production increased in 4–6 times, and the requirements to accuracy of manufacturing of parts and assemblies increased by about an order of magnitude. Besides, product range expanded significantly, while the duration of release of products in one item group decreased. In these circumstances, in order to ensure the competitiveness of products it is necessary to shift to an innovative scenario of development based on the accelerated development of basic technologies of the latest technological mode, informatics and electronics, and the application of new advanced materials.

There are various mechanisms for the implementation of innovation breakthrough tasks. One of them is technology platforms (TP), when the cluster approach is linked to the formation of technological platforms in various industries that contains innovative technology. The Decision of the Commission on High Technology and Innovation under the Government of the Russian Federation of April 1, 2011 approved the list of technological platforms, which included the TP "High-Speed Smart Railway Transport". Russian Railways was the initiator of this **technology platform** that was organized with the aim of strengthening and integrating scientific research, development and commercial production of new vehicles and technologies. The main objectives of the technology platform include the development and production of a new generation of technical equipment for high-speed railways, including infrastructure and rolling stock. To solve this problem it is proposed to develop the technology of creation of new transport systems and their management. These technologies not only provide a scientific breakthrough in a particular field of knowledge, but also affect a number of different economic sectors; therefore, the organization of high-speed railway traffic will give a further impetus to scientific and technological development and improvement of technologies practically in all related industries from engineering to intelligent computing systems, providing further stimulation of scientific-technological and intellectual potential of the country primarily by

Table 2. Development projects for high-speed traffic in the countries of the "Space 1520"

County	Organization	Investment project
Azerbaijan	CJSC Azerbaijani Railways	State program on development of railways in Azerbaijan
Belarus	Belarusian Raliways	Development of high-speed interregional passenger traffic
Georgia	Georgian Railway	Construction of Tbilisi–Batumi high-speed railway
Kazakhstan	JSC "NC" Kazakhstan Temir Zholy	Development of high-speed passenger traffic
Ukraine	Ukrzaliznytsia (State Administration of Railway Transport of Ukraine)	Introduction of high-speed traffic of passenger trains on the railways of Ukraine
Latvia	SJSC Latvijas Dzelzcels	Construction of Rail Baltica international high-speed railway

Source: Otraslevoe issledovanie "Rynok lokomotivov Rossii i prostranstva 1520. Itogi 2011 g. Prognoz do 2015 goda" [Sectoral study "Locomotive Market of Russia and the Space 1520. The Results of 2011. The Forecast up to 2015]. *Informatsionnoe agentstvo "INFOLine"* [News Agency "INFOLine"]. Available at: http:infoline.spb.ru

making orders to domestic enterprises for the creation of new equipment of the world level. The organization of the domestic production of rolling stock for high-speed traffic with the increase of its production output opens up the possibility for future import substitution in the implementation of Russian infrastructure projects and for the development of export of rolling stock within the framework of realization of projects of high-speed traffic, scheduled for implementation in the countries of the "Space 1520" *(tab. 2)*.

Thus, the development of production of competitive domestic modern rolling stock will significantly strengthen the leading position of Russia in the markets of the countries of the " Space 1520" and increase the innovative element in Russia's economy.

References

1. Aleksandrov P. Vozmozhnosti malykh i srednikh obrabatyvayushchikh predpriyatii v proizvodstve importozameshchayushchei produktsii v Rossiiskoi Federatsii [Possibilities of Small and Medium Processing Enterprises in the Production of Import-Substituting Products in the Russian Federation]. *Obshchestvo i ekonomika* [Society and Economics], 2014, no. 12, pp. 48-56.
2. Bochko V.S. Importozameshchenie: ekonomicheskoe soderzhanie i metody osushchestvleniya [Import Substitution: Economic Content and Methods of Implementation]. *Problemy regional'noi ekonomiki* [Problems of Regional Economics], 2015, no. 1-2, pp. 15-26.
3. Vertakova Yu.V., Plotnikov V.A. Importozameshchenie: teoreticheskie osnovy i perspektivy realizatsii v Rossii [Import Substitution: Theoretical Foundations and Prospects of Implementation in Russia]. *Ekonomika i upravlenie* [Economics and Management], 2014, no. 11, pp. 11-47.

4. Vinokurov M.A. Ekonomicheskie sanktsii Zapada protiv Rossii i puti likvidatsii ikh posledstvii [Economic Sanctions of the West against Russia and the Ways to Eliminate Their Consequences]. *Ekonomika i upravlenie* [Economics and Management], 2014, no. 11, pp. 75-79.

5. Ivanov V.V. Kontseptual'nye osnovy natsional'noi tekhnologicheskoi initsiativy [Conceptual Framework of the National Technology Initiative]. *Innovatsii* [Innovations], 2015, no. 1, pp. 8-14.

6. Kryukov Ya.V. Importozameshchenie tekhnologii i oborudovaniya v rossiiskoi energetike [Import Substitution in Technologies and Equipment in Russia's Energy Sector]. *EKO*, 2015, no. 3, pp. 30-45.

7. Lavrikova Yu.G., Kotlyarova S.N., Suvorova A.V. Importozameshchenie i tekhnologicheskaya modernizatsiya predpriyatii stroitel'nogo kompleksa na osnove klasternogo vzaimodeistviya [Import Substitution and Technological Modernization of the enterprises of a building complex on the basis of cluster interaction]. *Vektor nauki Tol'yattinskogo gosudarstvennogo universiteta* [Vector of Science of Togliatti State University], 2015, no. 1, pp. 163-168.

8. Mardanov R. Importozameshchenie, konserviruyushchee otstavanie [Import Substitution that Preserves the Gap]. *Remedium,* 2012, no. 8, pp. 52-60.

9. Mezhevich N.M. Vneshnie ekonomicheskie aspekty rossiiskoi promyshlennoi modernizatsii [External Economic Aspects of Russian Industrial Modernization]. *Ekonomicheskoe vozrozhdenie Rossii* [Economic Revival of Russia], 2014, no. 4, pp. 128-134.

10. Ovcharenko N.A., Luchinina L.B., Rybal'chenko R.V. Osobennosti konkurentosposobnosti produktsii rossiiskoi promyshlennosti i ee potentsial importozameshcheniya na vnutrennem rynke [Specifics of Competitiveness of Products of Russian Industry and Its Potential for Import Substitution in the Domestic Market]. *Voprosy ekonomiki i prava* [Issues of Economics and Law], 2014, no. 4, pp. 75-79.

11. Rossiiskii statisticheskii ezhegodnik. 2014: stat. sb. [Russian Statistical Yearbook. 2014: Statistics Collection]. *Rosstat* [Federal State Statistics Service]. Moscow, 2014.

12. Saakyan Yu.Z. Gruzovoe vagonostroenie v Strategii razvitiya transportnogo mashinostroeniya do 2030 goda. Sostoyanie i perspektivy [Freight Car Building in the Strategy for Development of Transport Engineering until 2030. Status and Prospects]. *Materialy konferentsii "Podvizhnoi sostav KhKhI veka: innovatsii v gruzovom vagonostroenii", g. Sankt-Peterburg, 25-26 iyunya 2014 g.* [Proceedings of the Conference "Rolling Stock of the 21st Century: Innovations in Freight Car Building", Saint Petersburg, June 25–26, 2014]. Available at: https:// docviewer.yandex.ru.

13. Saakyan Yu.Z. *Perspektivy realizatsii Strategii razvitiya transportnogo mashinostroeniya Rossiiskoi Federatsii do 2030 goda* [Prospects of Implementation of the Strategy for Development of Transport Engineering in the Russian Federation until 2030]. Available at: https: // www. ipem.ru.

14. Statistika zheleznodorozhnogo mashinostroeniya [Statistics of Railway Engineering]. *Tekhnika zheleznykh dorog* [Railways Engineering], 2015, no. 1; 2014, no. 2; 2014, no. 3.

15. *Stenograficheskii otchet o plenarnom zasedanii Sankt-Peterburgskogo mezhdunarodnogo ekonomicheskogo foruma* [Verbatim Report on the Plenary Session of the Saint Petersburg International Economic Forum]. Available at: http://www.kremlin.ru/news/21080

16. Sukharev O.S. Ekonomicheskaya politika i usloviya razvitiya tekhnologicheskoi bazy Rossii [Economic Policy and Terms of Development of Russia's Technological Base]. *Ekonomicheskoe vozrozhdenie Rossii* [Economic Revival of Russia], 2014, no. 4, pp. 32-45.

17. Fal'tsman V.K. Prioritety strukturnoi politiki: importozavisimost', importozameshchenie, vozmozhnosti eksporta innovatsionnoi produktsii promyshlennosti [Priorities of Structural Policy: Import Dependence, Import Substitution and Export Opportunities for Innovative Industry Products]. *EKO,* 2014, no. 5, pp. 162-180.

18. Fal'tsman V.K. Forsirovanie importozameshcheniya v novoi geopoliticheskoi obstanovke [Acceleration of Import Substitution in the New Geopolitical Environment]. *Problemy prognozirovaniya* [Studies on Russian Economic Development], 2015, no. 1, pp. 22-32.

19. Frolova O.A. Importozameshchenie v proizvodstvennykh tsepyakh postavok produktsii rossiiskogo mashinostroeniya: strategiya i urovni [Import Substitution in the Manufacturing Supply Chains of the Russian Engineering Products: Strategy and Levels]. *RISK: Resursy, informatsiya, snabzhenie, konkurentsiya* [RISC: Resources, Information, Supply, Competition], 2012, no. 4, pp. 53-58.

20. Tsai B.-H., Li Y. Cluster Evolution of IC industry from Taiwan to China. *Technological Forecasting and Social Change*, 2009, no. 76 (8), pp. 1092-1104.

21. Suire R. Vicente J. Clusters for Life or Life Cycles of Clusters: in Search of the Critical Factors of Clusters' Resilience. *Entrepreneurship and Regional Development*, 2014, no. 26 (1-2), pp. 142-164.

Cited Works

1. Aleksandrov P. Possibilities of Small and Medium Processing Enterprises in the Production of Import-Substituting Products in the Russian Federation. *Society and Economics*, 2014, no. 12, pp. 48-56.

2. Bochko V.S. Import Substitution: Economic Content and Methods of Implementation. *Problems of Regional Economics,* 2015, no. 1-2, pp. 15-26.

3. Vertakova Yu.V., Plotnikov V.A. Import Substitution: Theoretical Foundations and Prospects of Implementation in Russia. *Economics and Management*, 2014, no. 11, pp. 11-47.

4. Vinokurov M.A. Economic Sanctions of the West against Russia and the Ways to Eliminate Their Consequences. *Economics and Management,* 2014, no. 11, pp. 75-79.

5. Ivanov V.V. Conceptual Framework of the National Technology Initiative. *Innovations*, 2015, no. 1, pp. 8-14.

6. Kryukov Ya.V. Import Substitution in Technologies and Equipment in Russia's Energy Sector. *EKO*, 2015, no. 3, pp. 30-45.

7. Lavrikova Yu.G., Kotlyarova S.N., Suvorova A.V. Import Substitution and Technological Modernization of the enterprises of a building complex on the basis of cluster interaction. *Vector of Science of Togliatti State University,* 2015, no. 1, pp. 163-168.

8. Mardanov R. Import Substitution that Preserves the Gap. *Remedium,* 2012, no. 8, pp. 52-60.

9. Mezhevich N.M. External Economic Aspects of Russian Industrial Modernization. *Economic Revival of Russia*, 2014, no. 4, pp. 128-134.

10. Ovcharenko N.A., Luchinina L.B., Rybal'chenko R.V. Specifics of Competitiveness of Products of Russian Industry and Its Potential for Import Substitution in the Domestic Market. *Issues of Economics and Law*, 2014, no. 4, pp. 75-79.

11. Russian Statistical Yearbook. 2014: Statistics Collection. *Federal State Statistics Service*. Moscow, 2014.

12. Saakyan Yu.Z. Freight Car Building in the Strategy for Development of Transport Engineering until 2030. Status and Prospects. *Proceedings of the Conference "Rolling Stock of the 21st Century: Innovations in Freight Car Building", Saint Petersburg, June 25–26, 2014.* Available at: https:// docviewer.yandex.ru.

13. Saakyan Yu.Z. *Prospects of Implementation of the Strategy for Development of Transport Engineering in the Russian Federation until 2030*. Available at: https: // www. ipem.ru.

14. Statistics of Railway Engineering. *Railways Engineering*, 2015, no. 1; 2014, no. 2; 2014, no. 3.

15. *Verbatim Report on the Plenary Session of the Saint Petersburg International Economic Forum*. Available at: http://www.kremlin.ru/news/21080

16. Sukharev O.S. Economic Policy and Terms of Development of Russia's Technological Base. *Economic Revival of Russia,* 2014, no. 4, pp. 32-45.

17. Fal'tsman V.K. Priorities of Structural Policy: Import Dependence, Import Substitution and Export Opportunities for Innovative Industry Products. *EKO,* 2014, no. 5, pp. 162-180.

18. Fal'tsman V.K. Acceleration of Import Substitution in the New Geopolitical Environment. *Studies on Russian Economic Development,* 2015, no. 1, pp. 22-32.

19. Frolova O.A. Import Substitution in the Manufacturing Supply Chains of the Russian Engineering Products: Strategy and Levels. *RISC: Resources, Information, Supply, Competition*, 2012, no. 4, pp. 53-58.

20. Tsai B.-H., Li Y. Cluster Evolution of IC industry from Taiwan to China. *Technological Forecasting and Social Change*, 2009, no. 76 (8), pp. 1092-1104.

21. Suire R. Vicente J. Clusters for Life or Life Cycles of Clusters: in Search of the Critical Factors of Clusters' Resilience. *Entrepreneurship and Regional Development*, 2014, no. 26 (1-2), pp. 142-164.

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