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The Western Space Policies under the Influence of International Factors: Mutuality of Russia's Case

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Abstract

The research is dedicated to the problem of mutual dependence in space policies between the West, represented by great spacefaring actors the US and the EU, and Russia. In the study the correlation analysis, content analysis, and scenario-building methods were used. The conclusion of the analysis comprises consideration on the need to invest in their independence by Western countries in order to avoid unnecessary extra dependence on uncertain and unreliable regimes that supply substantial components for their space technology.

Keywords: correlation, interdependence, Russia, space policy.

Introduction

Mutual dependence is a highly inevitable phenomenon in the human community. In many cases this dependence is truly mutual, despite the apparent superiority of one over the other cooperating. Political science no less than other social sciences raises the key question in this regard: is interdependence a recipe for peace or a source of conflict? The question is reasonable in relation to space policy also. Although the state's space policy is part of the government's public administration, in a globalized world methods, resources and the governance style are also influenced by the climate of international relations. Major changes in the balance of power in the world or in a particular region entail adjusting the individual policy of any country, which is an inevitable part of the global network of interdependence.

The outstanding players of the world space industry have their own strategic goals and policies to achieve them. The great space faring trio - the US, the EU on the one hand, which represent the Western liberal democracy, and Russia, which stands aloof political with self-proclaimed sovereign democracy – are mutually interdependent to reach their appropriate goals in an affordable and profitable way. At the time when mutual political relations reach the downward phase the development of mutual economy also follows this direction. What happens to the overlapping space programs and space policy of these actors?

Relations between the West and Russia before the global financial crisis of 2008 could be taken as positive. The first actual signal of the deterioration of their relations came with the aggression of Russia against Georgia at the end of 2008 with a minimum after the occupation of the Crimea in 2014. These events outline the review period of the economic and political attitudes of the West towards Russia, and the sanctions that are to take effect at the end of this span give the opportunity to consider the past 7 years of the logical integrity.

As the author has paid some attention to the analysis of *dependence of the Western* (the US and the EU) space policy *on Russia* (Balcers, 2015), in this study greater attention is paid to the Russian component of the dyad. Eventually, one should see the idea of the reverse effect of the sanctions policy, which the West adheres towards Russia.

The purpose of the research is to find out:

1) the extent to which the space policies of the West and Russia depend on each other, in this paper – the question especially to Russia's dependence;
2) the features of and differences between the governance of the space industry in Russia and the West with relevance to sensitivity of the system to foreign dependencies;
3) to take a look at the quantitative indicators which determine mutual dependence, in this paper – the question especially to Russia's dependence;
4) whether there is a secondary impact on the Western space policy due to the deterioration of the relations with Russia.

To achieve the research objectives the theory of economic and, consequently, political interdependence was used (Keohane and Nye, 1989). This theory reveals the relationship between the political actors as the integral part of economic convergence between them as mutual investments, establishment of mutual supply chains and other factors bring together.

Quantitative methodology is based on correlation analysis of time series with few samples (Courgeau, 2012). By comparing various financial data and taking into account the time shift or lag of different series, correlation was sought between them. To verify the reliability of obtained results they were compared with the critical values of correlation coefficients.

Content analysis of documents and opinions expressed by officials and experts on the space policy serves as a qualitative tool for identification of the properties of the relationship between the space policies of the countries in interest (Krippendorff, 2004).

To find out a possible secondary impact on the Western space policies due to the use of political and economic sanctions against Russia, the method of scenario building was applied (Lindgren and Bandhold, 2003).

The research paper starts with a short overview of the causes of political interdependence. Further the factors of dependence of the Russian space policy on the Western counterparts are being investigated. It follows by outlining the features of the mechanism of decision-making in the Russian space industry and cultural characteristics that influence the effectiveness of governance. Prior to the correlation analysis of the financial indicators, it sets out methodological considerations of these calculations. After the correlation analysis, general consequences for the space policies of interdependence between the West and Russia are considered. It is supplemented by schematic construction of possible scenarios, where political relations between the relevant actors can develop and what they, in qualitative terms, can cost to the Western space policies. At the end the conclusions and a list of references is provided.

Linkage between the international economy, politics and space policy: from theory to practice

In the globalized world, economic interdependence is well observable, carefully investigated and an obvious unequivocally established fact. Economic linkage and the scale of interdependence are clearly characterized by a pair of numbers. It forecasted that in 2015 the global trade volume will exceed USD 20 trillion (Modest trade growth…, 2014). The total amount of foreign direct investments in 2013 was USD 16.4 trillion and it rapidly grew (The World Fact Book, 2015). Foreign investment and the movement of labour each following year find a new direction, changing supply and demand unto the global scale. Supply chains connect countries with different, sometimes hardly compatible, political and social systems. Inevitably, such penetration of global economic relations into any peculiar society leads to new effects in its political pattern, a pack of policies, and brings changes in hitherto used policy tools.

However, a clear impact of globalization on the political interaction among societies is less obvious. Yet this does not change the position where states have less ability to choose freely from the pool of political strategies as they become more dependent on one another for economic benefits. Each new commitment in the economic sphere, in a sense, binds the country to the political conditions of the counterparty (Keohane and Nye, 1989). In a inhomogeneous international environment where different actors sometimes are characterized by very different approaches to such a concept as value and the hierarchy of values, it should not be a surprise that interdependence potentially may be a cause for misunderstandings or even conflicts (see Fig. 1).

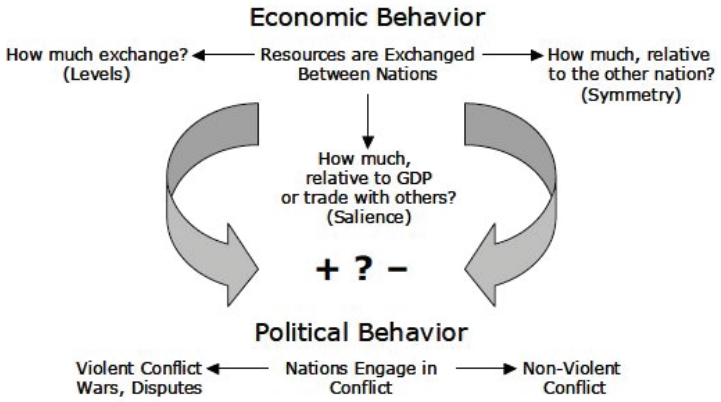

Fig. 1. Basic relationships between the economic and political behaviour
Source: Crescenzi, 2002, p. 272

The Russian and Western economic partnership extended to Russia's occupation of Crimea. The values of the EU import of goods from Russia dropped from EUR 215.1 billion in 2012 to EUR 181.8 billion in 2014, like as the values of export from the EU to Russia: EUR 123.4 billion in 2012 against EUR 103.3 billion in 2014 (Trade, 2015). The figures for the dyad, the USA and Russia, show a similar trend to drop: USD 29.4 billion in 2012 and USD 23.7 billion in 2014 for the US import and USD 10.7 billon for both 2012 and 2014 for the US export (Trade in Goods with Russia, 2015). In 2014 the share of the whole Russian international trade with the EU was of 48.2%, with the US – 3.7%, i.e. the combined figure provides more than half of the total turnover (Внешняя торговля Российской Федерации, 2015).

Apart from the fact that in 2008 the EU was Russia's largest trading partner, 75% of foreign direct investment stocks also came from the EU (Trade, 2015). The EU direct investments in Russia after the crisis constantly increased and reached EUR 189.5 billion in 2012 (Foreign direct investment, 2015). As the result of Russia's aggression against Ukraine in 2014, the EU direct investments in Russia shrank as the EU total foreign investment increased (estimated) (Russian FDI to Fall…, 2014). The direct investments made by the US in Russia after the crisis reached maximum in 2012 (USD 13.4 billion) and experienced a dramatic drop in 2014 to USD 9.3 billion by 31% (or 15.5% per year), while the US total direct investments abroad grew from USD 4.41 trillion (2012) to USD 4.92 trillion (2014). It gives a reduction of the US investments in Russia 35% by the span (Direct investment position…, 2015). The economic interdependence between Russia and the EU is more pronounced than between Russia and the US. That is important to further understand the relationship between the actors in their space policies.

Russia's dependence on the West in the space industry and feedback: qualitative outlook

Russia strongly depends on Western technological components, especially in the high tech segment. Russian defence industry is dependent on 640 products supplied from NATO states and the European Union. Many of them are for missiles or space. However, Russia hopes to save its industry, there is possible import substitution. Roscosmos expressed its confidence that about 80% of positions, that came due to the sanctions of the EU and NATO, will be completed by the method in 2018 (Рогозин назвал степень…, 2015).

The Western partners have different positions regarding the critical dependence of Russian space sector components. The US has a strong influence on the space policy by delivering rocket engines, while the EU (through ESA) has dependence on launchers. The all counterparts are significant contributors and beneficiaries of the historically largest joint project in space exploration, the International Space Station. The parties united to a global positioning system collaboration to support the customers' convenience: Russia's GLONAS, the EU's GNSS and the US's GPS, all of them are supported on each of the actor's land. Russia provides the ESA with middle class *Soyuz* launchers, while Roscosmos provides astronauts of the both, the ESA and the NASA, with the space craft *Soyuz* to the ISS. Besides, Russia supplies US launchers with the rocket engines *RD-180*, as well it found the US as the consumer of plutonium-238, which is used as an energy source in deep space exploration missions. These examples illustrate the supplier and customer relations between Russia and the West (Balcers, 2015).

At the same time Russia has serious intentions to assert itself as an independent form of the Western space power. It is not least necessary to favourably position itself among the BRICS countries. The motivator is competition with China and India, Russia's other members of the BRICS, which have an ability and desire to advance into the lead in the space industry. The replacement of the main functioning *Baikonur* cosmodrome in Kazakhstan by the eastern launch site *Vostochny* is one of important steps in providing Russia with independent tools to reach space. The middle and heavy class launcher project *Angara* is one more step into this direction. The intention to develop or return to the reusable space launcher system (in Russian *MRKS*) will start in 2020. This shows Russia's resolve toward: 1) to solidify its ability to reach orbit in independent and efficient manner, 2) to demonstrate domestic and international society Russia's ability to engage in skilful, high-tech projects to become or at least return its glory of the leader in a non-original way. Practical aims and propaganda are engaged in this heralded effort. While the practical side of the development and exploitation of such reusable system is still doubtful as it was demonstrated by the US's analogue *Space Shuttle* and the Soviet *Buran/Energia* due to a lack of major and heavy payloads to orbit, and hence there is a strong dependence on the existence of such flagship projects as exploration of the Moon and beyond, the propaganda side is more apparent. Propaganda includes two sets of components: for the domestic policy and for the international environment, which splits over potential customers and potential competitors.

In the EU the space policy and the programs of the ESA, such activities of Russia do not bring any noticeable changes. The European space policy has established the concept of self-contained space exploration. However, international cooperation plays a significant, but not decisive, role. The situation is like in the EU foreign policy, where *The Eastern Partnership* program is more about the development of the partners than the EU itself.

The US holds a different position. During the last decades it has held the key positions in the dependence on international cooperation in the space field in certain. Especially it happens in cooperation with Russia. With Russia, demonstrating its intention to gain more independence in the spheres where the US is not such, the asymmetry of mutual dependence has become more noticeable here. Interpretation of Russia's steps towards reaching independence from international deliveries of the key technological components could be diametrically different from appropriate conclusions. The optimistic one (from the viewpoint of the US) asserts that Russia is a good international partner in the space industry after it will reach the threshold of independence and the US should not doubt about further fair cooperation. The pessimistic one allows for the scenario where Russia begins manipulating and exercising unilateral influence (pressure) on the cooperation partner with the aim to gain a certain political benefit which could harm the political interests of their partner, in this case of the US. This last standpoint is shared by some US politicians (Senator John McCain, etc.) and they are looking for changes in the present US space policy so as to reach a more stable and independent (as a minimum for Russia) position in the key questions.

Decision making mechanisms in the Russian space policy

Unlike Western democracies, Russia has its own interpretation of democracy, where its existence *per se* is questioned[1]. The principles of decision making in public administration under such a socio-political system is significantly different from those in the public policy of the West.

The key figure in the Russian Government regarding its space policy is Dmitry Rogozin (The Russian Government. Structure. Responsibilities, 2015). He is one of eight deputy Prime Ministers and, among other matters, he is responsible for the implementation of the government policy in the development of the rocket/spacecraft industry both in the civil and military sectors. Rogozin is a spectacular spokesman, he expresses the opinions of the Kremlin in the phrasing which is not allowed in announcing an official point of view. Soon after the deterioration of the West-Russia relations, which followed Russia's occupation of Crimea, he suggested NASA to use a trampoline rather than Russian spacecrafts. This ironic proposal illustrates Moscow's position that the US sanctions will boomerang America's space efforts (Russian official: NASA can use…, 2014). Ragozin's style is akin to bravado of another brilliant representative of the Russian policy, State Duma deputy Vladimir Zhirinovsky. It is possible to identify the style characteristic of Putin's policy heralds. While Zhirinovsky serves as a harsh critic of the President's allegedly lax leadership for home use, Rogozin plays the same role for international consumption and thus they allow Putin to position himself as a moderate ruler.

The Prime Minister has the highest executive power in the space sector, however, according to the Constitution of Russian Federation (The Constitution of the Russian Federation, 1993), the State President has real power in the state, including the space sector. In Russia, the space sector as such is rather nominally divided into the civilian and military sectors. *Dauria Aerospace,* the only private company in the Russian space industry, is the new provider of *nano*- and small-class satellites (Dauria Aerospace, 2015). After Russia's occupation of Crimea and a MH-17 crash in 2014, the company got into a difficult situation with financing because most of the funds come from foreign venture capital funds (Михаил Кокорич, 2015).

The government's space policy is implemented by the Federal Space Agency (Roscosmos), which is an authorized federal executive agency (see Fig. 2). The functions of the Agency include, pursuant to the state policy and legal regulation, to provide services and administer the state's space assets, to manage international cooperation in joint space projects and programs as well as "the activities of the rocket and space industry entities related to *military* space technologies, *strategic missiles*" (Russian Federal Space Agency. What Roscosmos Does, 2015). The Agency is also responsible for overall coordination of the activities of the functioning *Baikonur* and under construction *Vostochny* cosmodromes.

[1] Taking into account the centralization of the political and economic power in the executive branch, the emasculation of parliamentary politics, control over the media, a return to great nationalism interfering in the affairs of neighbouring states, the mix of these and other factors, many scholars do not agree to use of the term "democracy" in the designation of the socio-political system in Russia after 2000. For example, see studies (Aaron, 2008; Carnaghan, 2007; Cassiday and Johnson, 2010; Evans, 2011).

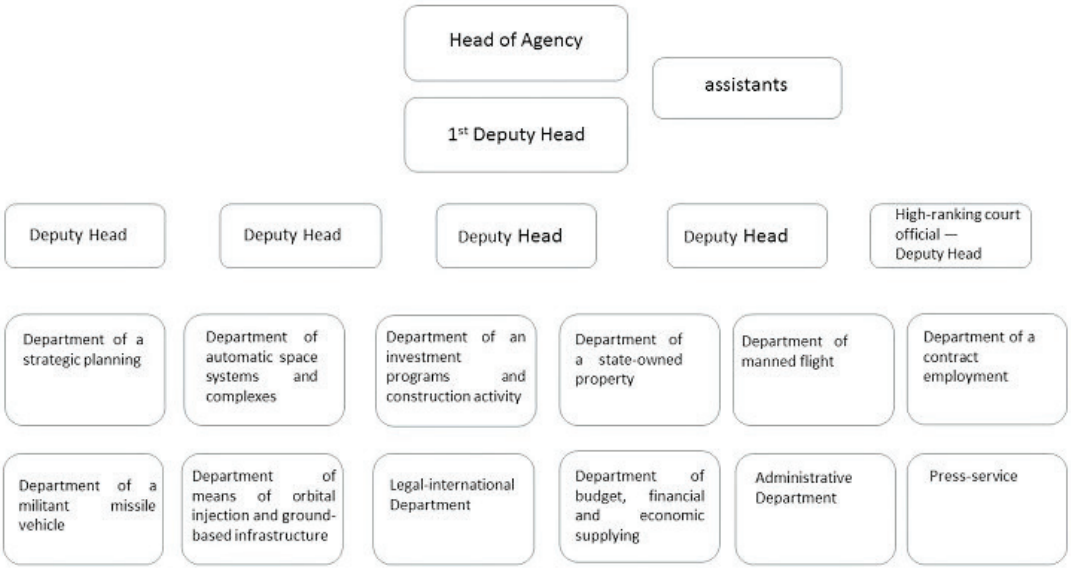

Fig. 2. Management scheme of Roscosmos
Source: Russian Federal Space Agency. About Roscosmos, 2015

After the reorganization of Roscosmos into a state corporation, Rogozin became the leader of its supervisory board. The head of the Agency is Igor Komarov, former director of the car manufacturer company *AvtoVAZ,* part of the state company *Rosteh* (Руководство Роскосмоса, 2015).

Decision making in the Russian space policy, as throughout public administration in Russia, is strictly centralized. Each subordinate is functionary accountable to a hierarchically higher standing functionary for the implementation of the directives of the superior. The State President is allowed to demand accountability from any manager at any management level (Levitsky and Way, 2010).

At the same time the Russian space industry is seriously suffering from corruption and squandering of appropriations. Corruption is widespread in Russia, this is partly a legacy of the socialist era. No post-communist countries have avoided corruption in the 1990s but the situation is not improving in those countries where the Western model of governance has not been adopted (Krastev, 2001). The Corruption Perceptions Index for Russia in 2014 was 27 (166th out of 175 countries) and slightly dropped compared to the previous years (Corruption Perceptions Index, 2014). The trend is understandable as recently, on Tuesday, the Court of Vladimir Region passed a verdict to parole the former head of the Property Relations Department under the Ministry of Defence Evgenia Vasilyeva. She was the main person involved in a corruption scandal in the Ministry of Defence of the Russian Federation. A series of publications and reports on the findings of the investigation into the Ministry of Defence of the Russian Federation and related commercial entities (as *Oboronservis*) regarding a multi-million dollar embezzlement appeared in the media. The scandal led to removal from office of Anatoly Serdyukov, the Minister of Defence, on November 2012 (Хищения в Минобороны, 2015). Dmitry Rogozin spoke to the media about the situation in his subordinate space industry sphere: "We uncovered actions of fraud, abuse of authority, (and) document forgery" (Рогозин рассказал о вскрывшейся коррупции, 2014). The total corruption costs in Roscosmos are estimated at USD 1.8 billion (Corruption Costs Russian Space Agency, 2015).

Corruption, uncontrolled spending of budgetary funds, a lack of transparency at the trials of senior executives and bureaucrats, all that differentiates the principles of the governance of the space industry in Russia and in the West. At a lower accountability level, the systems and their environments in Russia may be more viable than those in the West.

Methodological background

Before going further, it should be made clear that the civil space budget of Russia, its total volume and by particular items, is difficult to be determined exactly for several reasons. Firstly, the comparability of the budget on year by year basis suffers from severe euro / rouble or US dollar / rouble exchange rates fluctuations. During the period of 2008-2015 the value of rouble to euro decreased by 43%, with many ups and downs (as of 30 June 2015). Secondly,

information about the total budget or in details, by items, is unavailable in any official publications of the Russian Government or the Agency. A special "access level"[2] is needed to obtain such information. Thirdly, appropriate information, scattered over different handbooks, reports and research papers, mostly lacks a clear description of the methodology how the figures have been obtained. There is a concern that, in some cases, the budgets of civil and military items are not separated.

In this paper, the figures of the budget are in the current value of the currency. Such an approach is necessary to make the specific data comparable. In the research, if it is not fixed otherwise, the values of differences in the intended budget are required. The "intended budget" refers to the overall volume of the budget at the moment it was drawn up to reach certain goals. This approach provides an understanding about the government's intention to increase or decrease spending on a particular activity. Expressing figures at fixed prices the ability to identify this trend is lost.

Historically the most expressive *correlation with a time shift* in the space industry is knowns as giving preference to reusable space systems as compared to expendable ones. The US reusable space transportation system *Space Shuttle* was developed in the 1970s, and the space shuttle *Columbia* was launched into its first space mission in 1981 (Hepplewhite, 1999). As a response to the US, the Soviet space program was started in 1976 and the space ship *Buran* was launched into space only once in 1988 (Buran: The Soviet Space Shuttle, 2015). The time shift of the budgetary allocations for the programs in this case was four years and the lag in timing of the first launches was seven years.

It is necessary to find quantitative and qualitative marks in comparable examples so as to find significant correlations in policies. One of important indicators is *an amount of budget* appropriations allocated to a particular industry. According to the classical definition of business cycle synchronization (Burns and Mitchell, 1946), it occurs when "a cycle consists of expansions occurring at about the same time in many economic activities, followed by similarly general recessions, contractions and revivals which merge into the expansion phase of the next cycle". Business cycles are usually measured by GDP growth rate, domestic consumption growth rate, domestic investment growth rate, employment rate and inflation.

One of the most widely used measurements in recent interdependence or contagion literature is correlation or *comovement* analysis (Li, Zhang and Willett, 2011). To apply the method to the amounts of budgets during a certain time spread (the pairs of the series), the Pearson correlation coefficients for the pairs of the series were found (Cohen J., Cohen P., West and Aiken, 2003). Policy lags, as understood in monetary policy (Selby, 1982) or macroeconomics (Policy Lags, 2008), is a time shift from the moment when an arbitrary parameter starts changing until the moment when it is perceived by a policy maker and he is able to begin consciously respond to changes. Comparing the economics or policies of different countries, the time lag effect is ubiquitous inherent. For example, in the political science it is defined as policy transfer, diffusion or convergence – migration of certain policy from the donor actor to the recipient actor. In the process of policy takeover, the time shift of lag is inherent. The following in the well approved policy of other countries with a certain shift in time is a possible and, perhaps, favouring behaviour in such complex industries as the space sector. The Russian space policy shows a trend to copying particular features of the Western space policies. The Shuttle/Buran example is the best known one.

Further the macroeconomic indicator projections for the period from 2009 to 2015 and its derivatives relevant to the research will be considered:

- The Gross Domestic Product (GDP) in Russia and in the greatest Western economies, the US and the EU (28 countries);
- The growth rate of the GDP for the actors under consideration;
- Special governmental budget for the civil space area: in Russia for Roscosmos, in the US for NASA, in the EU for the ESA;
- The growth rate of the governmental space budget for the actors under consideration.

Since the sample size in correlation calculations is small, it is especially important to ensure reliability of the significance of correlation results. To do this one must use the calculation of the corresponding critical value of the Pearson correlation coefficient. The two-tailed Pearson correlation coefficient critical values can be found exactly by the following algorithm using MS Excel:

$$r_{cr} = \sqrt{\frac{t^2}{t^2 + (n-2)}},$$

where r_{cr} is the critical value of the Pearson correlation coefficient; t is the inverse of the Student's

[2] For example, on the official web site of Roscosmos, http://www.roscosmos.ru/248/, to the query on statistical data "Information is restricted" pops up (in Russian „Информация ограниченного доступа"), its statistics or budget is available only on the site in Russian, not in English.

t-distribution, the value of which is returned by the *Microsoft Excel 2010* standard built-in function T.INV (*probability*, *deg freedom*) where *probability* is the established minimum value of the degree of reliability for measuring and *deg_freedom* is degrees of freedom equal to the number *n* of samples reduced by two (*n*-2). To get the reliability of result or quantile of the normal distribution no less than established (i.e. = or > 95%) for a certain number of samples (i.e. four pairs, n=4), it is necessary that the critical value is not less than r_{cr} (after calculation r_{cr} = or > 0.9) (Courgeau, 2012).

Correlations of GDPs and the civil space budgets

At first, it is useful to find out whether there is a possible correlation between GDPs in the each dyad of the actors under consideration as well as the world data (see Table 1). The period under review coincides with the post-crisis years which came after the global financial crisis and the Great Recession of 2008 (World Economic Situation, 2015). Empirical findings show that real economic interdependence increased significantly during the post-crisis period, indicating "re-coupling" rather than decoupling of economies (Kim, Lee and Park, 2009).

Table1

GDP and growth of GDP
(GDP, in trillions of national currency, current prices; growth in %. Forecast for 2015)

Year	GDP				Growth of GDP		
	Russia	The US	The EU	World	Russia	The US	The EU
2009	38.8	14.4	12.2				
2010	46.3	14.7	12.8	4.30	19.33	1.91	4.44
2011	56.0	15.5	13.2	3.00	20.86	5.60	3.00
2012	62.2	16.2	13.4	2.40	11.17	4.16	1.87
2013	66.8	16.8	13.5	2.50	7.29	3.74	0.75
2014	71.0	17.4	13.9	2.60	6.32	3.88	2.95
2015*	66.3	18.1	14.2	3.10	-6.65	4.05	1.90

Source: World Economic Situation…, 2015; Национальные счета, 2015; Росстат: ВВП России…, 2015; Росстат: ВВП РФ за 1-й квартал…, 2015

Considering the GDP growth rates for the period 2010-2015, it should be noted the impact of economic recession forecast in Russia for 2015 was the result of the Western economic and political sanctions (Росстат: ВВП РФ за 1-й квартал…, 2015). Russia is the only actor under consideration with a negative growth rate for 2015 and that is the only case in any year in the scope.

For sake of visibility, the correlation coefficients in the figures are given as the difference between the Pearson correlation coefficient and the critical value of the Pearson correlation coefficient corresponding to the number of samples at reliability of 95% or $\sigma \approx 1.96$ (Searls, 2013). The 95% level of reliability is a standard level used across most social sciences (Young and Bolton, 2009) and it should be acceptable for this study. Only positive values of difference relate to significant correlation and should be explained.

To find the correlations between two time series is useful considered possible lagging effects or impact of time shift in policy/economy transfer. The lagging is considered as smaller economy lags behind larger economy, i.e. ranking from smaller to larger as follows: Russia, the EU, the US, World[3]. It further relates also to the space budgets, and ranking of them is as follows: Roscosmos (for Russia), the ESA (for the EU), NASA (for the US).

Glancing at the data showing the correlation coefficients between the growth rates of GDPs (see Table 2), one can see that significant correlation for not shifted data was observed only for the dyad of World / the EU, however a weaker correlation for the dyad World / the US also viewed. The explanation of the existing linkage between these figures is regular and the nature of it is casual because both, the US and the EU, are the largest Western economies with a significant share of GDP (46% in 2014) in global GDP (World Bank, 2015; IMF, 2015). The strong correlation between the growth of GDP shifted by a year is observable in the dyad World / the US and on the threshold of reliability is for the dyad World / Russia, what could be explained by bigger capacity to absorb the first wave of economic shock for the

[3] Although, according to the World Bank or the IMF, formally the EU economy is estimated slightly bigger than of the US, the latter is more consolidated and advanced, especially in high tech and the space industry, that is the subject of this study (Knox, Agnew and McCarthy, 2014; Weisbrot, 2014).

US and by less involvement in Western financial markets for Russia. Correlation with lag of three years, observable for the dyad the US / the EU could be overlapping with other short periodic business cycle.

Table 2

Growth of GDP correlation by lag during 2010-2015* as difference between the actual and corresponding critical values of the correlation coefficient (W - World, R - Russia, U - the US, E - the EU (28))

Lag	W/R	W/U	W/E	U/R	E/R	U/E
no shift	-0,373	-0,093	**0,064**	-0,699	-0,166	-0,329
by 1 year	-0,039	**0,185**	-0,244	-0,425	-0,377	-0,263
by 2 years	-0,252	-0,362	-0,620	-0,723	-0,008	-0,500
by 3 years	-0,204	-0,023	-0,300	-0,802	-0,126	**0,007**

For control of regularity in the pattern and for the elimination of a possible impact of the Western sanctions on the growth of Russia's economy, the same dyads for the period without 2015 (see Table 3) were considered. The correlations observed before remain in force and there four new dyads with considerable correlations in lagged data appear, three of them consist of Russia. Further the existence of a certain propagation velocity of the global and Western economic / financial effects onto Russia could be considered.

Table 3

Growth of GDP correlation by lag during 2010-2014 as difference between actual and corresponding critical values of the correlation coefficient (W - World, R - Russia, U - the US, E - the EU (28))

Lag	W/R	W/U	W/E	U/R	E/R	U/E
no shift	-0,103	-0,160	**0,031**	-0,767	-0,153	-0,409
by 1 year	**0,094**	**0,094**	-0,346	-0,258	**0,045**	-0,355
by 2 years	**0,005**	-0,191	-0,690	-0,156	-0,022	-0,588

Approaching the subject of this study, it is of interest to consider the possible correlation between the governmental civil space budgets and corresponding GDP, as well as its growth rates. The lag effect must also be analysed. In Table 4 the relevant data for governmental civil space budgets are provided. Following the growth of the global economy after the 2008 crisis, the civil space budgets grow every year.

Table 4

Governmental civil space budget and its growth (Budget in billions of national currency, current prices; growth in %)

Year	Budget			Growth of budget		
	Russia	NASA	ESA	Russia	NASA	ESA
2009	75,9	18,23	3,59			
2010	84,6	18,72	3,74	11,35	2,70	4,26
2011	112,0	18,45	3,99	32,42	-1,48	6,65
2012	160,9	17,77	4,02	43,68	-3,68	0,66
2013	199,3	16,87	4,28	23,86	-5,09	6,52
2014	242,9	17,65	4,10	21,86	4,63	-4,21
2015	257,0	18,01	4,43	5,82	2,06	8,07

Source: Balcers, 2015; Russian Space Budget, 2013; Russian Space Program…, 2014; Russia Space Crisis, 2015; The Space Economy at a Glance 2011; The Space Economy at a Glance 2014; Yearbook on Space Policy 2009/2010, 2011; Yearbook on Space Policy 2011/2012, 2014; Government Space Programmes, 2013

Table 5 shows a deep dependence of the Russian civil space budget on the corresponding GDP, and the ESA budget - on the EU (28) GDP, while NASA funding shows no correlation with the US GDP.

Table 5

Budget (columns 2-4) and growth of the budget (columns 5-7) correlation with the corresponding GDP and growth of GDP by lag during 2010-2015 as difference between actual and corresponding critical values of the correlation coefficient

Lag	Budget			Growth of Budget		
	Russia	NASA	ESA	Russia	NASA	ESA
no shift	**0,247**	-0,101	**0,260**	-0,287	-0,387	-0,503
by 1 year	**0,262**	-0,169	**0,208**	**0,100**	-0,543	-0,165
by 2 years	**0,190**	-0,575	-0,054	-0,132	-0,872	-0,633
by 3 years	**0,091**	-0,351	-0,186	-0,018	**0,002**	-0,942

Relatively to policy transfer interest it is a question to trace evidence in the behaviour of appropriations. The states which adopt part or the whole policy of another country may show the similar dynamics of financing of its programs. As Gilardi (Gilardi, 2012) mentioned, similar patterns of political behaviour as financing of programs, prioritization, distribution of macroeconomic indicators and others may indicate interdependence of these policies. The lag in correlation may indicate the direction from the donor to the recipient of policy.

Many factors should be analysed – quantitatively as data triangulation and qualitatively as content analysis partially provided in this research – for a more thorough interpretation of statistic results obtained working with a small amount of data. However, those results for themselves (see Fig. 3) can also help formulate justification for directing further research.

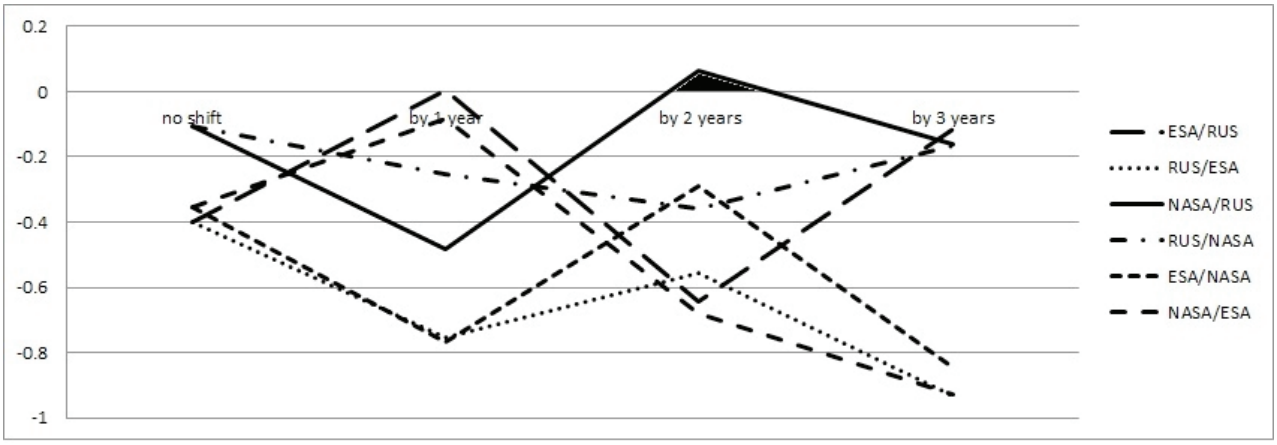

Fig. 3. Growth of the civil space budget correlation between Roscosmos (RUS), ESA and NASA by lag during 2010-2015 as difference between actual and corresponding critical values of the correlation coefficient

The study of the inter-budget correlations provides data on the two observed significant correlations. The first one with confidence level of 1,97σ and corresponding reliability of 95.1% relates to Roscosmos funding with a lag of one year from ESA budgeting (in Fig. 3 peak value of 0.004). The second one with confidence level of 2,36σ and corresponding reliability of 98.1% indicates for similarity in nature of Roscosmos funding in comparison with NASA one, but with a lag of two years (in Fig. 3 peak value of 0.062).

The similarity, shifted in time, that is discernible in the pattern of funding the Russian civil space program with respect to the Western space policies may indicate presence of a dependence element. These correlations are possible to explain by similarities in the actor's economies only partially. As has been shown, the funding of the civil space program does not correlate with the state's GDP in the US, while in the EU (28) certain linkage between GDP and the character of ESA funding are observed. The obtained result for NASA / Roscosmos funding correlation (with lag) requires further study and explanations.

General consequences for the space policies of interdependence between the West and Russia

As it was shown in the previous research paper of the author (Balcers, 2015), the dependence of the Western space policies on Russian deliverables is the factor that makes impossible efforts of the West to realize the unaffected long-term projects in the area. In the case of Russia's presumable dependence on the West interest is in two questions: is there a dependence fact? and if yes, then is it insuperable for Russia? As a result of the answers to these questions, there arises the central question of this research and important one for Western policies: how Western economic and policy sanctions against Russia can affect back to the Western space programs?

In the chapter on the correlations between the governmental civil space budgets of the discussed actors, there are indications that such dependence may be a fact. Such assumption has been enhanced by the historical evidences. To accelerate catching up with the Western counterparty which has been the long enemy and threat (during the Cold War) in the highly military loaded high tech area as the space industry is, the historical forerunner of Russia, the Soviet Union, often used technological transfer. The operations which provide this technological transfer were classified and often were there acts of industrial espionage. There are a lot of sources by both, the Western researchers (Siddiqi, 2000; Jacobsen, 2014) and direct participants or witnesses of the events on the Russian side (Chertok, 2015; Каманин, 1995-97), where many examples of taking over the Western technologies, in particular space ones, in this way are given.

The fact of cooperation with the Western partners in the construction, maintenance and exploitation of the International Space Station (ISS), the profitable selling of seats on the spacecraft Soyuz to deliver astronauts to the ISS, many applied scientific satellite programs with the Western counterparts confirm an interest of Russia to take on reciprocal obligations here (International Cooperation. Roscosmos…, 2015).

So far the question about the fact of the dependence of the Russian space policy on the Western space policies is answered positively. The second question is about a vital need for cooperation with the West to implement its own effective space policy.

After military actions in Eastern Ukraine and the strict position of the West, blaming Russia in fuelling and supporting the conflict, Russia faced problems of supplying component parts for its own space technology. The first problem was directly with Ukraine. Roscosmos has to solve the problem of replacement components delivered by Ukraine for rocket and space technology, including control systems for the *Soyuz* rockets. As per Andrey Tyulin, the head of *the Russian Space Systems*[4], this and other problem with *import substitution* in the space as well as military sector will be solved in a certain period of time (Роскосмос работает над замещением…, 2014). For example, Russia as part of reducing dependence on imports intends in 2016 to abandon the use of the light rocket *Rokot*, the guidance avionics of which have been developed in Ukraine.

The second problem – more severe – is disruption of supplies of high-tech components for space applications from the West due of embargo and mentioned sanctions. Russian domestic producers are ready to start production of electronics for the Russian army and space over one year. However, the industries high-level management has an opinion that the problem of *import substitution* can not be solved by directly copying import. Again, Deputy Prime Minister Dmitry Rogozin, who oversees the defence and space industry, claimed that foreign components will be replaced over three years. As the alternative to *import substitution* some experts in Russia see import of technology from friendly countries, primarily Russia's partners in the BRICS group, which quickly develop their own R & D, as well as the organization of joint import-substituting production with companies from these countries (Украинский кризис и…, 2015). An important role in stimulating the development of national technology innovation should play the New Development Bank with the capital of USD 100 billion, which is scheduled to start operations in 2016. Russia should obviously raise the question of financing innovative projects from the domestic funds of the bank (New BRICS Bank…, 2014). And Moscow sees China the first partner in cooperation in high technologies.

The active development of the new launcher family *Angara* which, along with *Soyuz-2* variants, will replace several existing launch vehicles (О планах запусков…, 2015) and the construction of the *cosmodrome Vostochny* (Завершается монтаж оборудования…, 2015) are the evidence of the ability and intention of Russia to get rid of Western dependence in the space sector.

[4] In Russian: Открытое акционерное общество *«Российская корпорация ракетно-космического приборостроения и информационных систем»*. It is established on the basis of the federal state unitary enterprise. It is part of the Joint Rocket and Space Corporation, which is a Russian joint-stock corporation formed by the Russian government in 2013 to renationalize the Russian space sector.

Generally, Russia's position is that its cooperation with the West on the use of outer space is not vital. The analysis how much it is possible with the limited objective information on the potential of the Russian economy in times of tougher sanctions gives a result which, in principle, does not contradict these reasons. The conclusion is that Russia does not insuperable dependent on the West to reach its aims in the space policy, established in the Russian Governmental Space Strategy until 2030, the main long-term space policy document of Russia (Стратегия развития космической деятельности…, 2015).

Possible scenarios: costs for the Western space policies

The consequences of maintaining the political and economic sanctions against Russia on the Western space policy are not clear. Further six scenarios will be discussed. They are calculated on the assumption that the West has the initiative. This is justified by the logic "first in – first out", known in computing and accounting, confirmed by the historical data in the relations between the West and Russia (Lukyanoc, 2010). It does not consider the option of regime change in Russia.

1. The pressure of the Western sanctions remains at the existing level or it will be even strengthened.
   - The position of Russia begins to soften. Third party mediation as an option. Although Roscosmos could implement the space policy without any cooperation with the Western partners, they do not seek to stop or substitute the existing cooperation. The cooperation in the space sector between the counterparts returns to the pre-crisis (pre-sanction) level of activities and confidence. The Western space policy does not suffer from the necessity to invest in the space industry to substitute Russian deliveries. The expected outcome: détente.
   - Kremlin's position remains unchanged, political and economic relations between the West and Russia in a deadlock. No progress in space cooperation, no new common projects. Traditionally, the attitude of the EU to Russia is more lenient than the one of the US, however, the all sides have to take into account additional costs in the space industry due to the necessity to develop and introduce their own technological solutions instead of imported ones from the counterparts. The expected outcome: stable deadlock.
   - The situation is escalating to a greater extent. Return to the Cold War relations between the counterparts is likely. Rising expenses for the military sector, the civil space programs are cut. Initiative of the non-military exploration of space migrates to the private sector, the companies like SpaceX, Orbital Sciences, Virgin Galactic, Blue Origin, etc. However, the political tension between the blocks – the West and the BRICS – could force to close any significant non-military activities in the Near Earth space. The expected outcome: escalation.
2. The Western sanctions are removed.
   - The West come to conclude that the sanctions against Russia are no more effective or practical, and the West initiate the easing of the sanctions to normalize the relations with Russia in a certain future. Third party mediation as an option. Space cooperation is restored. However, it is not clear how long and how well the civil space cooperation could develop under the conditions of a specific democracy in Russia. There is probability that the authoritarian regime in Kremlin at a certain moment would escalate the situation to realize its ambitions with the aim to get more power in the international environment and this scenario transfers to the sub-scenario *2b* or *2c*. From the most logical point of view of the West, the case of consistent softening of the Russian position, the sub-scenario *1a* is activated. The expected outcome: détente.
   - Kremlin's position remains unchanged, political and economic relations between the West and Russia are in a deadlock. Space cooperation remains at the existing level but new joint projects are doubtful. The West are looking for new solutions. Very unstable and ambiguous situation. It could develop in any other scenario, which is considered. The expected outcome: unstable deadlock.
   - After easing the sanctions, Russia is acting in a bad way so the West are forced to resume sanctions. After that the distribution of power between the West and Russia changes. The amplitude of mutual political accusations are raised. Cooperation in civil space stagnates. The development of the scenario can lead to the realization of any other scenario considered above. The expected outcome: escalation.

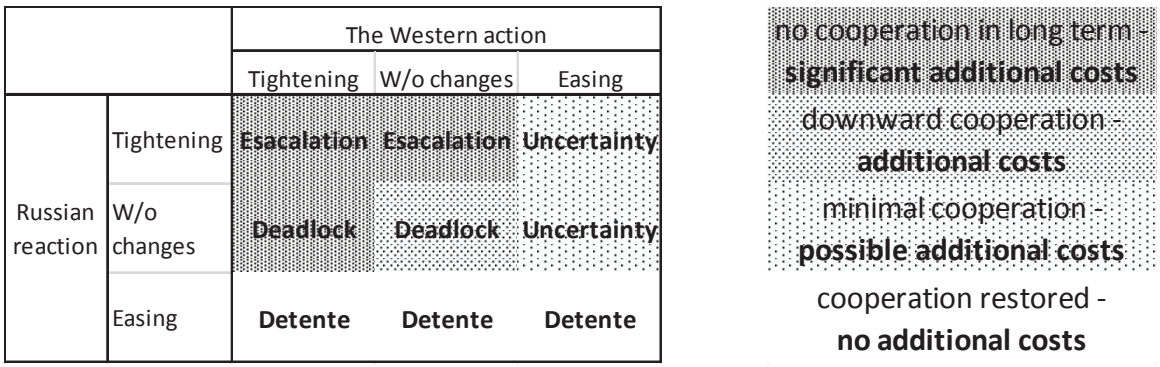

Fig. 4. The matrix of outcomes for the relations between the West and Russia, and for the Western space policies, depending on the scenario (on the left side). On the right side – decoding of pattern designation in the matrix in respect of the Western space policies

In conclusion of all possible scenarios, it seems that interdependence in the space industry between the liberal democratic West and the sovereign democratic (Krastev, 2006) Russia, which is perceived in the West as an authoritarian state, is not economically beneficial for either party. In Fig. 4 possible outcomes for the Western space policies have been highlighted depending on the materialization of the respective scenario. It is not possible to determine the weight of probability of each scenario so they all are accepted as equal. The Western space policy in 67% of the considered scenarios suffers or may suffer from dependence on Russian deliveries. The main outcome of the analysis could be that the Western countries have to invest more in independence from uncertain and unreliable regimes that supply substantial components for space technology.

The disappointing results for the US and the EU stem from at least three sources. Firstly, a high degree of self-sufficiency of the Kremlin regime allows it to implement a strategy that would have been unthinkable in liberal democratic systems. Secondly, a certain economic dependence of the large Western partner, namely the EU, on Russia is the major factor at decision-making in the leading EU countries. Thirdly, public administration, with the help of which the EU policies are implemented, suffers from excessive bureaucratization and is unable to independently adopt flexible decisions. Instead of finding promising home-grown solutions cheaper imported products are being sought.

An additional uncertain factor in the bilateral the Western and Russian international interdependence field is other engaged actors as emerging spacefaring nations with the potent of superpowers, China and India, and the emerging private space companies as SpaceX, Blue Origin, Sierra Nevada Corporation and others. To a large extent these American companies are involved in private public partnership with NASA. At the same time Western companies in the North America and Europe are seeking to create separate large space projects and penetrate into the global space transport market. On the one hand, competition enlargement reduces the importance of the dyadic dependence. On the other hand, opportunities for the creation of the new dependency chains are created. The question asked at the beginning of the paper - is interdependence a recipe for peace or a source of conflict? - continues to wait for deepening in it.

Conclusion

The main outcomes of the research on the interdependence of the space policies are as follows:

1. The Russian space policy evinces a greater autonomy than the Western ones. The question of a degree of dependence still remains open because of the fact that Russian officials, who are mainly referred to when determining dependence, are subject to a certain ideological pressure. This is one of the features of the authoritarian regimes. Yet, the robustness of the management system in Russia gives grounds to believe that the Russian space policy is qualitatively more independent from the West than vice versa.
2. The main difference between the Russian space policy and industry and the Western one is alike as for other industries and government policies in Russia and in the West respectively. Corruption and embezzlement of public funds leave a strong negative effect on the efforts of the Government to implement a consistent and timely course of the planned objectives. The strictly centralized management scheme is not able to save the industry from non-compliance with deadlines and also often does not perform its tasks completely. Unlike the Western space policy, the Russian civil program is run in

conjunction with the military one and essentially is subordinate to the military command.

3. The correlative analysis shows that, within the margin of error (with confidence above 98%), the similarity in the nature of Roscosmos funding with a lag of two years in comparison with NASA funding exists. This correlation is not possible to explain by similarities in the actor's economics or economic cycles. The detected result for NASA and Roscosmos funding correlation, shifted in time, requires additional study.
4. The Western space policies face additional costs due to their dependence on supplies from Russia in 67% of the possible scenarios of the development of international relations between the West and Russia. Such poor results for the US and the EU stem from a high degree of self-sufficiency of the Kremlin regime and a certain economic dependence of large Western partners on Russia, namely the EU. The alternative to avoid unexpected costs is to invest in their own development.

The analysis of interdependence in the space policies has revealed the issues that should be addressed in the future. For the Western space policies it is important to know how the impact of China and India will develop in the global space sector. These two states have well-delivered space policies and are positioned as the most important competitors in the West in space launches and other space services. Russia actively cooperates with these Asian spacefaring countries and thus makes for the West the competition even stronger. Can the existing Western space policies deal with the problems arising in this situation? And what should be changed in these policies and put forward so that the strategic objectives of the West in the space industry have been achieved? Successful planning of policies in the dynamically developing political and economic environment requires specific answers and solutions.

References[5]

1. Balcers, V. (2015). Alignments in the Western Space Policies under the Influence of International Factors: Case of Russia 2008 – 2014. *Working paper presented on International Scientific Conference European Integration and Baltic Sea Region: Diversity and Perspectives – 2015.* Riga, June 11-13, 2015; Vladimir Putin announces big new budget for Russian space agency. 12.04.2013.
2. Aaron, L. (2008). *Putinism.* Available at: http://www.aei.org/publication/putinism/.
3. *Buran*: The Soviet Space Shuttle. Retrieved 21 April 2015 from http://www.space.com/29159-buran-soviet-shuttle.html.
4. Burns, A. F., Mitchell, W.C. (1946). Measuring business cycles. *NY, National Bureau of Economic Research*, p. 560.
5. Carnaghan, E. (2007). Do Russians Dislike Democracy? *Political Science and Politics*, Vol. 40, No. 1 (Jan 2007): pp. 61-66.
6. Cassiday, J. A., Johnson, E. D. (2010). Putin, Putiniana and the question of a post-Soviet cult of personality. *Slavonic and East European Review*, Vol. 88, No. 4 (October 2010): pp. 681-707.
7. Chertok, B. (2005). *Rockets and People*, volume 1-4. NASA.
8. Cohen, J., Cohen, P., West, S.G., Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral science.* London: Lawrence Erlbaum Associates.
9. *Corruption Costs Russian Space Agency $ 1.8 Billion.* Retrieved 26 May 2015 from http://www.breitbart.com/national-security/2015/05/26/corruption-costs-russian-space-agency-1-8-billion/
10. *Corruption Perceptions Index 2014: Results.* Available at: http://www.transparency.org/cpi2014/results/.
11. Courgeau, D. (2012). *Probability and Social Science.* NY: Springer. P. 308.
12. Crescenzi M. J.C. (2002). *Economic Interdependence and Conflict in World Politics.* University of North Carolina, Chapel Hill. P. 272.
13. *Dauria Aerospace.* Available at: http://eng.dauria.ru/
14. *Direct investment position of the United States*. Available at: http://www.statista.com/statistics/188571/united-states-direct-investments-abroad-since-2000/.
15. *Eurostat*. Available at: http://ec.europa.eu/eurostat.
16. Evans, A. B. (2011). The failure of democratization in Russia: A comparative perspective. *Journal of Eurasian Studies*, Vol. 2, Issue 1 (Jan 2011): pp. 40-51.
17. *Foreign direct investment between the European Union and BRIC.* Available at: http://ec.europa.eu/eurostat/statistics-explained/index.php/Foreign_direct_investment_between_the_European_Union_and_BRIC.
18. Gilardi, F. (2012). Methods for the analysis of policy interdependence. Chapter prepared for Engeli, Isabelle and Christine Rothmayr (eds), *Comparative Policy Studies. Conceptual and Methodological Challenges*, Palgrave Macmillan. P. 20.
19. *Government Space Programmes*. Available at: 2013 https://www.pinterest.com/pin/181692166190959996/.
20. Hepplewhite, T. A. (1999). *The Space Shuttle Decision: NASA's Search for a Reusable Space Vehicle.* Washington, DC: National Aeronautics and Space Administration. P. 470.
21. *International cooperation.* Roscosmos official http://www.roscosmos.ru/114/.
22. Keohane, R., Nye, J. (1989). *Power and Interdependence.* Glenview, Illinois: Scott, Foresman & Company. P. 368.
23. Kim, S., Lee, J. W., Park, C. Y. (2009). Emerging

[5] All data from the websites retrieved on 03.09.2015

Asia: decoupling or recoupling. *Working paper, Asian Development Bank Working Paper Series on Regional Economic Integration.*
24. Krastev, I. (2001). A Moral Economy of Anti-Corruption Sentiments in Transition. Working Paper. *The view Balkan Observatory.* P. 19. Available at: http://www.wiiw.ac.at/a-moral-economy-of-anti-corruption-sentiments-in-transition-dlp-3347.pdf.
25. Krastev, I. (2006).'*Sovereign democracy', Russian-style.* Available at: https://www.opendemocracy.net/globalization-institutions_government/sovereign_democracy_4104.jsp.
26. Krippendorff, K.H. (2004). *Content Analysis. An Introduction to Its Methodology.* Thousand Oaks: SAGE Publication. P. 412.
27. Levitsky, S., Way, L. A. (2010). *Competitive Authoritarianism. Hybrid Regimes After the Cold War.* Cambridge University Press. P. 517.
28. Li, L., Zhang, N., Willett, T. D. (2011). *A Survey of Measurements of Interdependence. Claremont Institute for Economic Policy Studies.* P. 39. Available at: http://www.cgu.edu/PDFFiles/SPE/Willett/Papers/A%20Survey%20of%20Measurements%20of%20Interdependence.pdf.
29. Lindgren, M., Bandhold, H. (2003). *Scenario Planning: The Link Between Future and Strategy.* NY: Palgrave MacMillan. P. 180.
30. Lukyanoc, F. (2010). *Top 10 Events Shaping Russia's Foreign Policy.* Available at: http://www.eurodialogue.eu/Top-10-Events-Shaping-Russia-Foreign-Policy.
31. *Microsoft Excel 2010 Help*.
32. Modest trade growth anticipated for 2014 and 2015 following two year slump. Retrieved 14 April 2014 from https://www.wto.org/english/news_e/pres14_e/pr721_e.htm.
33. New BRICS Bank a Building Block of Alternative World Order. Retrieved 18 June 2014 from http://www.huffingtonpost.com/parag-khanna/new-brics-bank_b_5600027.html.
34. Retrieved 30 June 2015 from https://www.ecb.europa.eu/stats/exchange/eurofxref/html/eurofxref-graph-rub.en.html.
35. Policy Lags (2008) Economist's View. Available at: http://economistsview.typepad.com/economists-view/2008/12/policy-lags.html.
36. Roscosmos. Available at: http://www.roscosmos.ru/248/.
37. Russia Space Crisis. Retrieved 22 April 2015 from http://www.reuters.com/article/2015/04/22/russia-crisis-space-idUSL5N0XJ3E220150422.
38. Russian FDI to Fall 50% in 2014 on Risk, Institute Says. Retrieved 05 June 2014 from http://www.bloomberg.com/news/articles/2014-06-05/russian-fdi-to-fall-50-in-2014-on-risk-institute-says.
39. Russian Federal Space Agency. About Roscosmos. Available at: http://en.federalspace.ru/119/.
40. Russian Federal Space Agency. What Roscosmos Does. Available at: http://en.federalspace.ru/20268/
41. Russian official: NASA can use a trampoline to get to space. Retrieved 30 April 2014 from http://www.upi.com/Top_News/World-News/2014/04/30/Russian-official-NASA-can-use-a-trampoline-to-get-to-space/1701398883539/.
42. Russian Space Program Gets $52Bln Boost. Retrieved 14 April 2014 from http://www.themoscowtimes.com/business/article/russian-space-program-gets-52bln-boost/500157.html.
43. Searls D. E. (2013). Central Limit Theorem and Inferential Statistics. Wilmore, Asbury University Available at: http://dsearls.org/courses/M120Concepts/ClassNotes/Statistics/530_inferential_stats.htm.
44. Selby, Jr. E. B. (1982). Monetary Policy Lags: Review and Analysis // Nebraska Journal of Economics and Business. Vol. 21, No. 1 (Winter, 1982), pp. 57-62.
45. Siddiqi, A.A. (2000). Challenge to Apollo: The Soviet Union and the space race, 1945-1974. NASA history series. P. 1034; Jacobsen, Annie (2014) Operation Paperclip. NY: Little, Brown and Company. P. 592.
46. Spatial Outcomes of Economic integration. In Knox, P., Agnew, J., McCarthy L. (2014). The Geography of the World Economy. NY: Routledge. pp. 362-377.
47. The Constitution of the Russian Federation (1993), Chapters 4 and 6. Available at: http://www.constitution.ru/en/10003000-01.htm.
48. The Russian Government. Structure. Responsibilities. Available at: http://government.ru/en/gov/responsibilities/.
49. The Space Economy at a Glance 2011. OECD.
50. The Space Economy at a Glance 2014. OECD.
51. The World Fact Book. Available at: https://www.cia.gov/library/publications/the-world-factbook/rankorder/2198rank.html
52. Trade in Goods with Russia. Available at: http://www.census.gov/foreign-trade/balance/c4621.html.
53. Trade. Available at: http://ec.europa.eu/trade/policy/countries-and-regions/countries/russia/.
54. Vladimir Putin announces big new budget for Russian space agency. Retrieved 12 April 2013 from http://www.wired.co.uk/news/archive/2013-04/12/russian-space-budget.
55. Weisbrot, M. (2014). Why has Europe's economy done worse than the US?// The Guardian, 16.01.2014
56. World Bank. Available at: http://data.worldbank.org/indicator/NY.GDP.MKTP.CD?page=1.
57. World Economic Situation and Prospects 2015. Development Policy and Analysis Division of the UN secretariat. Available at: http://www.un.org/en/development/desa/policy/wesp/wesp_archive/2015wesp_full_en.pdf.
58. Yearbook on Space Policy 2009/2010 (2011). Wien, NY: ESPI, Springer. P. 357.
59. Yearbook on Space Policy 2011/2012 (2014). Wien: ESPI, Springer. P. 298.
60. Young, R. & Bolton, P. (2009). Statistical literacy guide. Confidence intervals and statistical significance. House of Commons Library. P. 3.
61. Внешняя торговля Российской Федерации по основным странам за январь-декабрь 2014 г. Avail-

able at: http://www.customs.ru/index2.php?option=-com_content&view=article&id=20494&Itemid=1976.
62. Завершается монтаж оборудования на стартовом сооружении Восточного. Retrieved 1 August 2015 from http://novosti-kosmonavtiki.ru/news/.
63. Каманин, Н.П. Скрытый космос (в 4-х кн.). М.: Инфортекст-ИФ, 1995-97 (in English Kamanin Diaries). Available at: http://www.astronautix.com/articles/kamaries.htm.
64. Михаил Кокорич. Retrieved 17 April 2015 from https://slon.ru/posts/50595.
65. Национальные счета. Available at: http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/accounts/#.
66. О планах запусков «Ангары». Retrieved 28 June 2015 from http://novosti-kosmonavtiki.ru/news/.
67. Рогозин назвал степень зависимости оборонки от поставок с Запада. Retrieved 3 June 2015 from http://lenta.ru/news/2015/06/03/bestenemy/.
68. Рогозин рассказал о вскрывшейся коррупции в космической отрасли: «У нас волосы шевелятся». Retrieved 4 December 2014 from http://www.newsru.com/russia/04dec2014/rogozin.html.
69. Роскосмос работает над замещением украинских комплектующих для ракетно-космической техники. Retrieved 12 November 2014 from http://tass.ru/politika/1566625.
70. Росстат: ВВП России увеличился в 2014 г. на 0,6%. Retrieved 2 February 2015 from http://www.vestifinance.ru/articles/52741.
71. Росстат: ВВП РФ за 1-й квартал снизился [...]. Retrieved 1 June 2015 from http://quote.rbc.ru/news/fond/2015/07/01/34393078.html.
72. Руководство Роскосмоса. Available at: http://www.roscosmos.ru/120/
73. Стратегия развития космической деятельности России до 2030 года и на дальнейшую перспективу. Kremlin, P. 16.
74. Украинский кризис и технологическая независимость России. Retrieved 17 March 2015 from http://riss.ru/analitycs/11072/ .
75. Хищения в Минобороны. Available at: http://www.rg.ru/sujet/4794/.

Balcers, V.

Западная космическая политика под влиянием международных факторов: взаимозависимость между Западом и Россией

Резюме

Взаимозависимость неизбежна в человеческом сообществе. В связи с этим в социальных науках ведутся поиски ответа на ключевой вопрос, является ли она панацеей для установления мира или источником конфликта. Высокотехнологичный мир, в том числе космическая отрасль, предоставляет много возможностей для возникновения взаимозависимости между странами. Международные отношения в глобализированном мире влияют на внешнюю политику государств. Так, отношения между Западом и Россией претерпели негативные изменения после агрессии последней в отношении соседнего государства Грузии в 2008 году, и это событие отразилось на политике сопричастных стран. Ситуация усугубилась в 2014 году, когда Россия аннексировала Крым и вступили в силу политико-экономические санкции Запада. Данное исследование посвящено проблеме взаимозависимости между космической политикой Запада, в лице ведущих космических держав США и ЕС, и Россией. В данном научном труде данная взаимозависимость обосновывается экономической и политической теорией взаимозависимости Р. Кохейна и Д. Ная (Keohane and Nye). Решаются четыре исследовательские задачи; определяется степень российско-западной взаимозависимости в области космической политики, в особенности зависимости России от Запада; дифференцируются характеристики и специфические особенности управления космической отраслью в России по сравнению с Западом, что позволяет определить характер этой взаимосвязи. В названных целях применялся метод качественного контент-анализа документов и публичных высказываний (Krippendorff). Анализируются количественные показатели: корреляции между временными сериями, содержащими релевантные макроэкономические и финансовые данные государственного масштаба, способные предопределять взаимозависимость политики. Эти количественные исследования основываются на корреляционном анализе временных рядов с выполнением, согласно методике Курже (Courgeau), небольшого количества наблюдений. Для проверки надёжности результатов сравниваются полученные корреляционные коэффициенты с их критическими значениями. Далее для оценки последствий санкционной политики западных стран в отношении России для западной космической политики рассматриваются возможные сценарии реакции России, по Линдгрену и Бэндхольду (Lindgren and Bandhold). В результате проведённого всестороннего анализа сделаны следующие выводы:

1. Российская космическая политика характеризуется большей самодостаточностью, чем изученные западные аналоги. Остаётся открытым вопрос о степени данной самодостаточности, поскольку настоящее заключение отчасти базируется на высказываниях чиновников, потенциально испытывающих идеологическое давление, характерное для авторитарных режимов. Именно робастность системы государственного управления в России даёт основание пола-

гать, что российская космическая политика является качественно более независимой, чем западная космическая политика.

2. Коррупция и хищения государственных средств оказывают негативное влияние на усилия правительства по осуществлению последовательной и бесперебойной космической политики в России. В этом заключается главное отличие российской космической политики и управления в целом от западной модели. Строго централизованная схема управления не в состоянии гарантировать выполнение поставленных задач в установленные сроки. К тому же, в отличие от западной космической политики, в России гражданские программы реализуются вместе с военными и, по сути, находятся в военном ведомстве.

3. Корреляционный анализ показал, что в пределах погрешности (с вероятностью более 98 %) наличествует сходство в природе финансирования при отставании Роскосмоса на два года по сравнению с НАСА, что не представляется возможным объяснить аналогией экономических систем или циклов. Выявленный факт трансформированной во временном аспекте корреляции финансирования НАСА и Роскосмоса заслуживает дополнительного изучения.

4. Вследствие зависимости от российских поставок западная космическая политика потребует дополнительных расходов в 67 % из рассмотренных возможных сценариев дальнейшего развития международных отношений между Западом и Россией, что детерминировано высокой степенью самодостаточности кремлёвского режима и определённой экономической зависимостью ЕС от России. Альтернативой непредвиденных расходов является инвестирование в развитие национальной космической техники.

В заключение акцентируются актуальность изученной проблемы для постоянно развивающейся космической отрасли, появление новых фигурантов в лице Китая и Индии.

Ключевые слова: взаимозависимость, корреляция, космическая политика, Россия.