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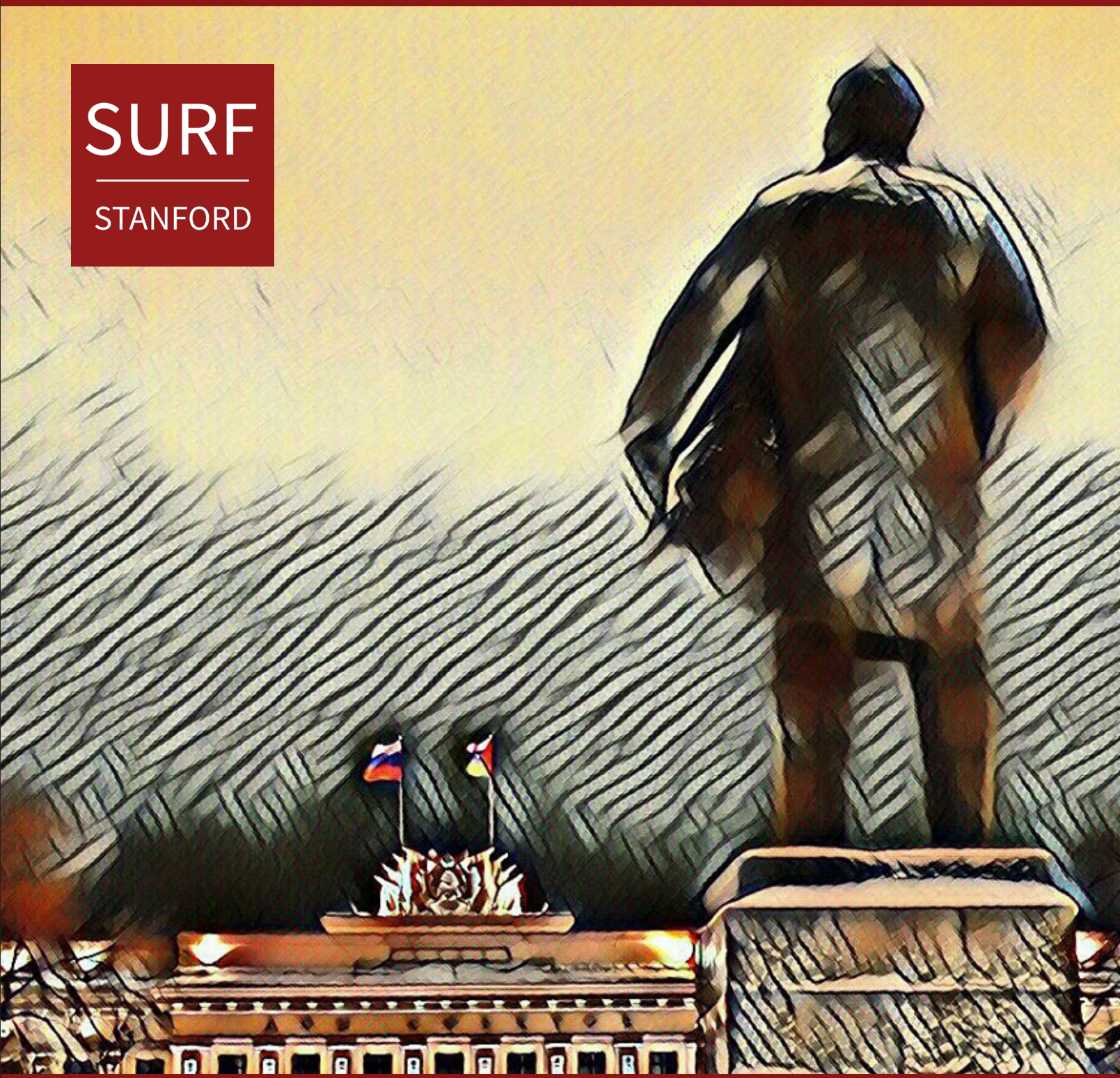

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VOL. VIII, APRIL 2017

Edited by Alexis Lerner

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THE STANFORD US-RUSSIA FORUM
A PREVENTIVE DEFENSE PROJECT INITIATIVE
Stanford, California

ARTICLES:

CONTENT

Preface: From the Editor

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Director of Research

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Alexis Lerner
Director of Research

1

The Hidden Potential of University-Level Science and Technology Collaborations Between the US and Russia

I. Science, Technology, and Engineering Working Group

Tanveer Karim, Ekaterina Paramonova, and Daria Stepanova

Abstract

Science and Technology (S&T) research has become increasingly global in the twentieth and twenty-first centuries. However, the United States (US) and Russia, traditionally strong in the hard sciences, demonstrate less collaboration than expected in these areas. Blending interviews and data from the Thomson Reuters Incites Database, we conduct an analysis into primary stakeholders and cooperation among various parties, identifying gaps in collaboration that could lead to new and complementary partnerships. We also examine the correlation between external factors such as public perception and co-publication in order to determine the role of these factors in scientific collaborations. Results suggest fertile conditions for collaboration in the area of clinical medicine and between mid-tier universities. Seed grants are recommended as an effective mechanism for stimulating such collaborations.

1. INTRODUCTION

Developments in Science and Technology (S&T) and increasing globalization have unlocked many opportunities for tackling increasingly complex challenges, such as genomic sequencing and Mars space missions. It is often advantageous for countries that are strong in S&T to collaborate in finding solutions as the overall payout remains high for all actors involved. Many stakeholders are involved in S&T collaboration, including local and national governments, high-tech companies, universities, and individual researchers. Unfortunately, a disconnect between one type of stakeholders can cause issues among another type. This dynamic is especially evident between the United States (US) and Russia, two countries for whom national differences sometimes create individual-level barriers. During periods of political turmoil, such as the period since Russia's Annexation of Crimea in 2014—which led to increased tensions between the US and Russia—, federal cooperation on S&T appears strained. Negative outcomes include the US suspending the Bilateral Presidential Commission S&T Working Group in March 2014 and Russia's cancellation of plutonium utilization deals in October 2016. S&T cooperation is thus subject to political temperaments and utilized as a tool of influence, wielded varyingly as an incentive or punishment for geopolitical action. Similarly, international sanctions suppress investor confidence in a foreign business climate and discourage private sector collaboration. Through these times of crisis, universities and individuals involved in S&T—including professors, students, and researchers—strive to maintain relatively apolitical positions and play a niche role during such times of crisis, similar to the role that weapons scientists played on both sides during the Cold War (Hecker 2011). This begs the question:

What are the characteristics of successful US-Russia S&T collaborations at the university level and how can these best practices be applied to other US and Russian universities that have potential for collaboration?

This central question can be broken down into four subquestions on which we focus our analysis. We include our hypotheses following each question in italics:

1. What role do universities and their constituents (faculty, students, administrators, and donors) play in international S&T collaborations?

Tanveer Karim, University of Rochester Department of Physics & Astronomy.

Ekaterina Paramonova, École polytechnique fédérale de Lausanne (EPFL) Energy Management Masters

Daria Stepanova, Skolkovo Institute of Science & Technology, Space Systems Management

H1*: Our initial hypothesis is that individuals at universities—namely students, faculty, and researchers—do not operate under a political agenda and therefore are free to work with counterparts whom they find intellectually engaging and complementary to the work which they are doing (QL[1])*

2. Which (a) fields and (b) stakeholders have seen more collaboration, measured by co-publications listed in Web of Science (WoS) among university-level players in Russia and the US?

H2: *(a) We hypothesize that space, nuclear, and the theoretical sciences, which are traditional fields of US - Russia/USSR collaboration, have exhibited the most S&T collaboration in the past; (b) Individuals from top universities (according to ARWU, QS and Times ranking systems[2]) have exhibited the greatest co-publication collaboration (QN[3]).*

3. (a) Where can we see potential for new partnerships, both in which fields and between which new stakeholders?; (b) where do we currently see little collaboration?

H3: *(a) Our initial guess is that there is opportunity for collaboration in the fields of Information Technology (IT) and biomedicine; (b) We believe that there is opportunity for new collaboration in existing fields among second-tier universities in either country, which are atypical candidates for collaboration (QL).*

4. What individual or university-level actions are required to stimulate new collaborations?

H4: *At this point, we hypothesize that introducing new seed-grants to create opportunities for individuals to meet each other at conferences and events could prompt co-publications (QL).*

Section 2 explains the scope of our research and the reasoning behind it, and Section 3 summarizes the anticipated contribution of this study. Section 4 covers the literature review on relevant topics, including: collaboration formats, role of politics in S&T collaborations, and the methodology for measuring collaboration via citations. Section 5 contains the initial quantitative results of measuring co-publication activity while Section 6 contains qualitative results obtained through interviews. We conclude the paper in Section 7 and provide suggestions for future work.

2. SCOPE AND ANTICIPATED CONTRIBUTION

Co-publications are often chosen as measures of S&T collaboration because they serve as documented indication that a collaborative project that has taken place (Katz and Martin 1995, 7). For the scope of this paper, we used the publication database Web of Science (WoS) to determine the number and quality of co-publications among US and Russian top-collaborating universities and research organizations. We look at same-country co-publications as well as multi-country co-publications in order to best evaluate the magnitude of these cross-border collaborations. We acknowledge that there are criticisms of this approach, for example that it does not account for publications in non-WoS journals or that co-publication is not indicative of the quality of the collaborations (Schmoch and Ulrich 2007, 362). Nonetheless, for the purposes of this study, measuring collaboration solely by co-publications is reasonable because WoS has indexed almost all the major journals around the world since the 1990s. Furthermore, programs such as Russia's '5 into 100 Project' use WoS and Scopus databases to obtain bibliometric measures to gauge improvements among university participants, thereby granting additional validation to this database as a quality-indicator of collaboration.

In this paper, we utilize interviews and quantitative analysis to provide a new perspective and impactful output. By filtering university-level collaborations according to research areas and organizations, we identify network gaps that could be targeted to spur on new partnerships. Interviews give insights about the motivations of successful and unsuccessful collaborations, such that we can provide practical recommendations for the stakeholders

3. LITERATURE REVIEW

3.1 What are S&T Collaborations?

To best answer research subquestion one about the roles that different stakeholders play in collaboration, we first need to define Scientific and Technological collaboration. The initial meaning of the phrase "Science and Technology collaboration" was "a laboratory without walls that allows scientists to conduct research across geographic distances" (Wulf, National Research Council, 1993). We expand on this understanding in defining S&T collaboration as a positive connection among two or more scientists, engineers, or researchers that facilitate problem solving or task completion. Collaborating scientists exhibit the following characteristics:

- work for an extended period of time on a significant portion of a project and provide a contribution to the outcome;
- are responsible for the research element, such as experiment execution, design, or analysis; and
- produce results (e.g. publications) that are co-owned and distributed among researchers (Hoekman 2010, 662-673).

International scientific collaboration refers to collaboration that occurs when participants work with or represent the interests of different countries. Scientific and technological collaboration can take the following forms (Katz and Martin 1997):

- co-financing of basic research and research on pre-competitive stages;
- joint identification of future development priorities;
- internships for researchers and students;
- joint training;
- technology transfers;
- the development of technological standards;
- financing of joint research programs;
- establishment of joint laboratories;
- co-financing of postdoctoral positions; and
- co-publications.

1 Qualitative methods, primarily interviews

2 Read more about the methodologies in the University of West Indies Review of World Methodologies Report here

3 Quantitative methods, primarily data analysis of co-publication trends

3.2 Interplay between S&T and Politics

The US and Russia appeared to be entering a period of enhanced cooperation in the decade after the Cold War. However, with recent geopolitical turmoil, state relations have reached a new low. Despite this, between 1990 and 2000, the two governments paid the greatest attention to S&T cooperation. The size of US government funding for scientific and technical collaboration was high and exceeded the funding from other countries (Oznobischev 2007, 379). Gradually, however, US support for collaborative science programs with Russia declined, and since the mid-2000s, the emphasis has shifted to technological cooperation and innovation. On July 6, 2009, the US and Russia pushed for innovation and technological collaboration with the formation of a bilateral commission headed by the presidents of the two countries. One of the goals of the commission was to coordinate joint works in research areas that were priorities for both sides. However, since the aforementioned Ukraine crisis, many joint programs have been terminated. From the US side, the Foundation for Civil Research and Development lowered its funding for projects in Russia, despite the promising growth of Russia's participation in these programs. The Pentagon reduced support for activities to combat the spread of biologically hazardous materials in Russia, while developing their programs with other countries. Collaboration between the US Department of Energy and the Russian Academy of Sciences (RAS) has been frozen since 2000. The Russian side also enacted detrimental policies aimed at lowering collaborations; for example, a presidential decree declared the suspension of the cooperation in plutonium waste disposal in October 2016, after 16 years of operation.

There are several factors that promote a tight linkage between US-Russia scientific collaboration and government. The first is structural: in Russia, most Research and Development (R&D) organizations are state-funded, and most decision-making processes are controlled by governmental organizations (e.g. the Ministry of Education and Science). More than 70 percent of available funding for R&D comes from the state budget (Dezhina 2006, 79). Although US organizations are more flexible, big projects and agreements also depend on decisions made at the governmental level, as it provides 40 percent of R&D support (Razumova 2016). The second factor is that policymakers usually consider the economic and strategic interests of their countries when making partnership agreements abroad. Thus, matching interests are likely to facilitate agreements in particular fields. For example, nuclear terrorism poses a mutual threat to both the US and Russia; therefore, these two states share a joint interest in dismantling nuclear warheads (NAP 2005). Finally, governments play a significant role in funding and regulating heavy, complex, and expensive multilateral projects (e.g. the International Space Station). Thus, when analyzing the collaboration between these two countries, it is important to take into account their political relations.

3.3 S&T as a Political Stabilizer

Today, policymakers are predominantly pessimistic about the nature and the future of US-Russia relations. The Ukraine crisis unleashed hawkish policies on both sides, reducing the space for cooperation. However, in complicated political relations, science can act as a stabilizing factor. For instance, the International Space Station has been able to circumvent geopolitical tensions due to its ability to bring NASA and Roscosmos together to establish bilateral contracts, regardless of the political situation on Earth. Also, collaboration in physics remains strong due to multilateral projects and the need for scientific talents, such as at the European Organization for Nuclear Research (CERN). Environmental research is likely to unite different stakeholders, such as scientists and policymakers, around issues of global environmental challenges, such as with projects in the Arctic. Contemporary global questions such as energy shortage, the protection of human health, environmental pollution, the threat of nuclear proliferation, and terrorism bring politicians and scientists to the same conclusion: certain fields demand collaborative efforts.

3.4 S&T Funding

To test whether the US and Russia collaborate successfully in fields where both share significant investments, we first look at the overall funding trends in the US and Russia.[4] R&D funding comes from a variety of actors and sources: the private sector, the federal government, other governmental (non-federal) organizations, universities and colleges, outside funding, and nonprofit organizations. In total, the US is one of the world's leading spenders on R&D (National Science Board 2002), whereas Russia takes 17th place at one percent of its GDP (Razumova 2016). Total US R&D funding over the last five-year period grew by 2.3 percent (or 0.8 percent, when adjusted for inflation), while in Russia the comparable figure is 4.8 percent (or a decrease of 13 percent when adjusted for inflation) (Sadykova 2016). Figure 1

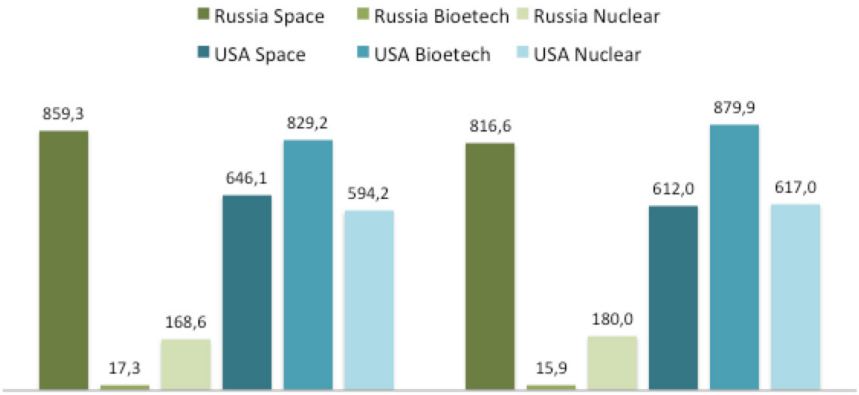


Figure 1: *US and Russian R&D expenditures, million USD ($) (Gorodnikova 2016, American Association for the Advancement of Science 2016)*

4 The datasets with particular universities' spending or funding of particular research areas are not publicly available.

represents Russian and US R&D expenditures in three fields: space, biotechnology, and nuclear science. Russian and US expenditures in space in 2013 and 2014 were almost on the same level in terms of government spending on R&D. Both NASA and Roscosmos are the most funded agencies in their respective countries; they share a long story of successful relations and, today, they continue to carry out multilateral space projects. In terms of nuclear research, the US spends 3.5 times more on R&D than Russia. However, even if Russian spending is lower, this field is still important for Russia, as is demonstrated by the state's generous funding of the Kurchatov Nuclear Research Institute. In the field of biotechnology, the US sector is much stronger than Russia on R&D, even if we only take government spending into account, perhaps explaining limited bilateral collaboration in this sector.

3.5 How to Measure S&T Collaborations Based on Publications

Bibliometric measures such as publications are frequently used by scholars and policymakers to study the nature of institutional collaborations (Zitt, Bassecoulard, and Okubo 2000; Picard-Aitken, Campbell, and Côté 2010). Policymakers often use bibliometric measures to understand the impact of S&T, to keep track of performance over time, and to identify and prioritize strategic collaborations (Picard-Aitken, Campbell, and Côté 2010). Collaboration in these cases is defined as publications that are written by co-authors of different institutions and countries. For example, if a paper has two authors—one with a US address and the other with a Russian address—that paper is considered a collaboration between the US and Russia. Apart from co-authorship, other factors such as the size of a country, geographical proximity, and cultural affinity (for example, historical or linguistic) also play an important role in creating and sustaining successful collaborations.

4. RESULTS OF QUANTITATIVE ANALYSIS

4.1 InCites™ Publication Terminology

InCites™ (2016) is a web-platform of Clarivate Analytics (formerly the IP & Science business of Thomson Reuters) that has access to databases such as Web of Science (WoS) and the Organization for Economic Cooperation and Development (OECD), and can generate data on citation metrics as required by the user.[5] We used InCites™ because of its increase versatility and accessibility of data. In this section, we discuss the metrics used and how they are defined by InCites™. All of the plots generated hereafter are produced from InCites™data. Within the InCites™platform, we primarily looked at data on the basis of *Organizations* and *Research Areas* by using the platform's *Metrics* feature.

a) Organizations: We consider four types of organizations: academic, research institutes, research councils, and national academies, as outlined in Table 1.

b) Research Areas: We use one of the InCites™ subject schemas, *Essential Science Indicators* (ESI), to define research areas. The ESI schema comprises 22 subject areas in the hard sciences and social sciences and is based on self-designated journal assignments. There is no overlap between the subject areas.

c) Metrics: We use two different metrics to measure collaboration—one for measure of the quantity of publications and the other one for the measure of the quality of publications.

Table 1: *Definition of Organizations*

Organization	Description
Academic	Universities and other institutions that focus on a combination of education and research
Research Institute	Organizations that are primarily focused on research
Research Council	Primarily research funding organizations (may also do research)
National Academy	An organizational body, usually operating with state financial support and approval, that coordinates scholarly research activities and standards for academic disciplines, most frequently in the sciences, but also in the humanities in some cases

Table 2: *Description of Metrics*[6]

Metric	Measure
Number of Documents	Quantity
Total number of abstracts available on WoS	
Normalized Citation Impact (NCI)	Quality
The NCI of a single publication is calculated by dividing the actual count of citing items by the expected citation rate (baseline) for publications with the same document type, year of publication, and subject area. When a document is assigned to more than one subject area, an average of the ratios of the actual to expected citations is used.	

4.2 DEFINING TIMELINE SCOPE

For this paper, we consider data from 1997 through 2015. While we mentioned previously that the pinnacle of US-Russia S&T collaboration took place in the 1990s, more data on the number of co-publications became available post-

5 WoS contains data on over 12,000 journals, 12,000 annual conferences, and 53,000 scholarly books (Thomson Reuters 2014, 2016) with a database that is updated every two months.

6 Issues with NCI: It does not perform well when dealing with a relatively small number of publications. However, as we are dealing with 22 broad subject areas, this issue can be circumvented because the number of papers and journals assigned to each of these subject areas is sufficiently large for statistical purposes. Furthermore, we used the filter that, on average, at least one paper should be published annually for an institution to be considered for our analysis. An NCI value of one represents performance at par with world average, values above one are considered above average and values below one are considered below average. An NCI value of two is considered twice the world average .

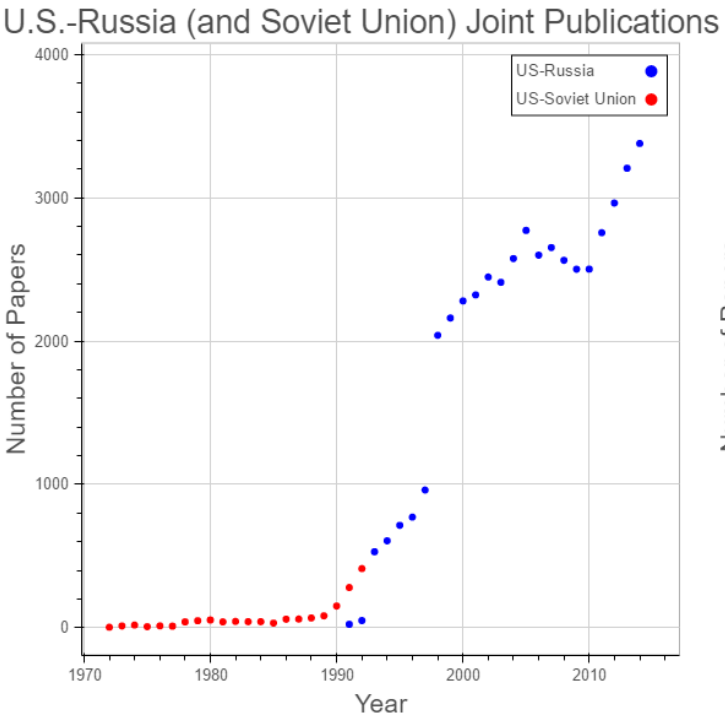


Figure 2a: *US-Russia (and Soviet Union) Joint Publications 1970 - 2015*

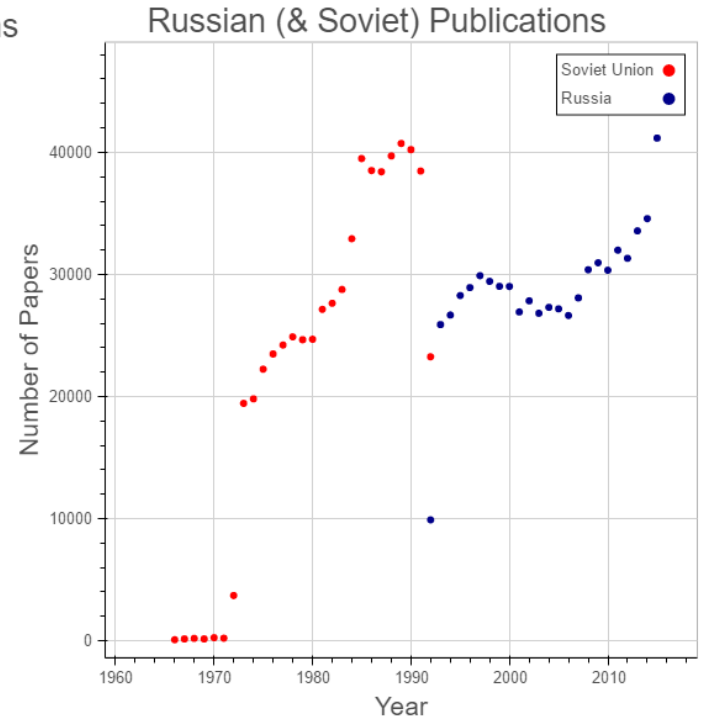


Figure 2b: *Russian (and Soviet Union) Publications 1970 - 2015*

1997, as seen in Figures 2a and 2b. We suspect that the jump around 1997 is due to internet access becoming more widely available. Thus, in order to do a robust study, we restrict our time domain to post-1997 era.

4.3 QUALITY AND QUANTITY OF CO-PUBLICATIONS BY FIELD

In order to address research subquestion 2a regarding the top fields of co-publications, we chose to assess co-publications on the basis of both quantity (e.g. number of publications) and quality (e.g. citation impact) for several reasons. First, the number of publications inform us about a given country's power and capability to conduct research in a given field, suggesting things such as the availability of infrastructure. Publication quantity also sheds light on why certain countries are believed to be more powerful than others in certain subject areas. For example, Figure 3a is a bar chart of the top ten research areas by number of joint documents (at least one US author and at least one Russian author). As expected, fields such as physics and chemistry lead the way in Russia, because there is a large number of institutions specializing in the physical sciences with long-standing reputations dating back to the USSR. In Figure 3, we observe that almost all joint US-Russia publications are in the physical sciences.

Second, a qualitative measurement, such as citation impact factor, tells us whether a given country is as good as they are perceived to be in a given field. The goal of this metric is to identify fields that may not have received attention because of their relatively small size. One compelling example is shown in Figure 3b. In this illustration, we include a bar chart of the top ten research areas by the Normalized Citation Impact (NCI). Here it is seen that clinical medicine leads the way, beating all other fields by a significant margin. An NCI of 6.85 means that US-Russia joint publications in the field of clinical medicine are cited almost seven times more than the world average in clinical medicine, in comparison to physics (1.88) and chemistry (1.00). The quality of clinical medicine research has been roughly the same over the last decade. Figure 4 shows the dominating trend of clinical medicine co-publications over the years. Given the per capita publication measure, the normalized citation rate is high for clinical medicine. In other words, the scholarly return on investment in clinical medicine is positive.

4.4 TOP STAKEHOLDERS BY CO-PUBLICATIONS

In this section, we present findings based on stakeholder analysis in order to answer research subquestion 2b regarding top collaborating stakeholders. Tables 3 and 4 list the top five stakeholders from the US and Russia in order of number of publications and NCI, respectively. When we consider the number of publications, expected names such as the Massachusetts Institute of Technology (MIT) and the University of Chicago from the US and the Russian Academy of Sciences (RAS) and Lomonosov Moscow State University from Russia appear more frequently than other institutions.[7]

In contrast, when one considers the NCI of publications, institutions such as Haverford College and North-Eastern Federal University in Yakutsk enter the top five. This suggests possible answers for research subquestion 3 (new potential collaborators). While institutions such as the University of Chicago and Lomonosov Moscow State University have been

7 It should be noted that the RAS is a network of scientific institutions situated all over Russia and consists of multiple scientific divisions and regional centers. Since InCites™ considers RAS as a single entity, we were unable to get information regarding which RAS centers were involved in collaborative publications. Moreover, since a large fraction of publications from Russia originate from one of these centers, we see a skew toward the RAS in our analysis.

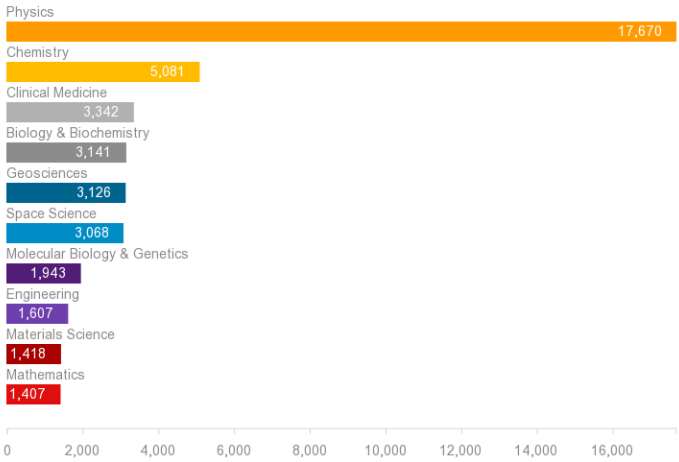


Figure 3a: *Bar Chart of top 10 research areas by number of documents*

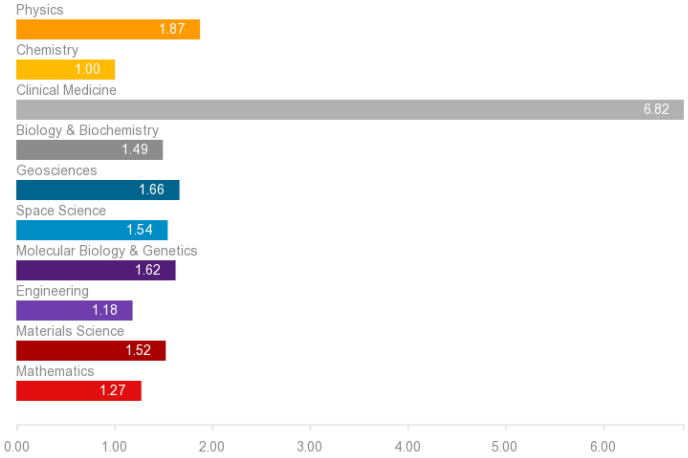


Figure 3b: *Bar Chart of top 10 research areas by NCI*

Table 3: *List of top five US and Russian organizations by number of WoS co-publications*

US Organizations	# of Documents	Russian Organizations	# of Documents
University of Chicago (UChicago)	3938	Russian Academy of Sciences (RAS)	26211
Massachusetts Institute of Technology (MIT)	3827	Lomonosov Moscow State University (MGU)	7157
Harvard University (Harvard)	3197	Joint Institute for Nuclear Research - Russia (JointInstituteNuclearResearch)	4424
University of California Berkeley (UBerkeley)	3117	National Research Centre - Kurchatov Institute (NRCKurchatov)	3946
Ohio State University (OhioStateU)	2989	Alikhanov Institute for Theoretical & Experimental Physics (Alikhanov)	3923

Table 4: *List of top five US and Russian organizations by NCI (at least 100 publications)*

US Organizations	NCI	Russian Organizations	NCI
Johns Hopkins Oncology Center	43.53	North-Western State Medical University named after I.I. Mechnikov	5.38
Haverford College	37.02	Special Astrophysics Observatory of the Russian Academy of Sciences	5.29
University of Texas at San Antonio	36.23	National Research University - Higher School of Economics	4.64
Buck Institute for Research on Aging	35.00	Ufa State Aviation Technical University	4.29
H Lee Moffitt Cancer Center & Research Institute	26.93	North-Eastern Federal University in Yakutsk	3.89

productive and are well known, specialized and smaller institutions can also become part of the collaboration dialogue as new stakeholders producing impactful publications.

In order to illustrate the strength and relative scale of cooperation among the top five collaborating US and Russian organizations indicated in Table 3, we used the open-source network visualization tool Gephi. We plotted the quantity of WoS co-publications from 1997-2015 of each organization pair from Table 3 (Figure 5a), as well as the quality of these co-publications, as measured by NCI (Figure 5b). In order to have a better context of the US-Russia collaborations, it is important to understand how US-Russia collaborations look as compared to US-US or Russia-Russia collaborations. A key observation is that the pairs of collaborators that co-publish the most are Harvard-MIT and MSU-RAS (Figure 5a); however, the MGU-RAS collaboration is the only pair that has a NCI impact of less than one, which indicates a high quantity but low quality. More broadly, co-publications among Russian organizations are weaker in quality than they are among US organizations; this variation was expected, given the lead of US universities in world rankings, many of which depend highly on their faculty's publications in premier journals (Huang 2011, 3). Another surprising observation is that both the US and Russia have two giants (Harvard University and MIT for the US, and Moscow State University and the Russian Academy of Sciences for Russia) whose scholars co-publish more than any of the other same-country or different-country pairings. Although the relative sizes of the University of Chicago and Ohio State University are significantly greater than the secondary co-publishers on the Russian side, there is not as big of a gap as was expected.

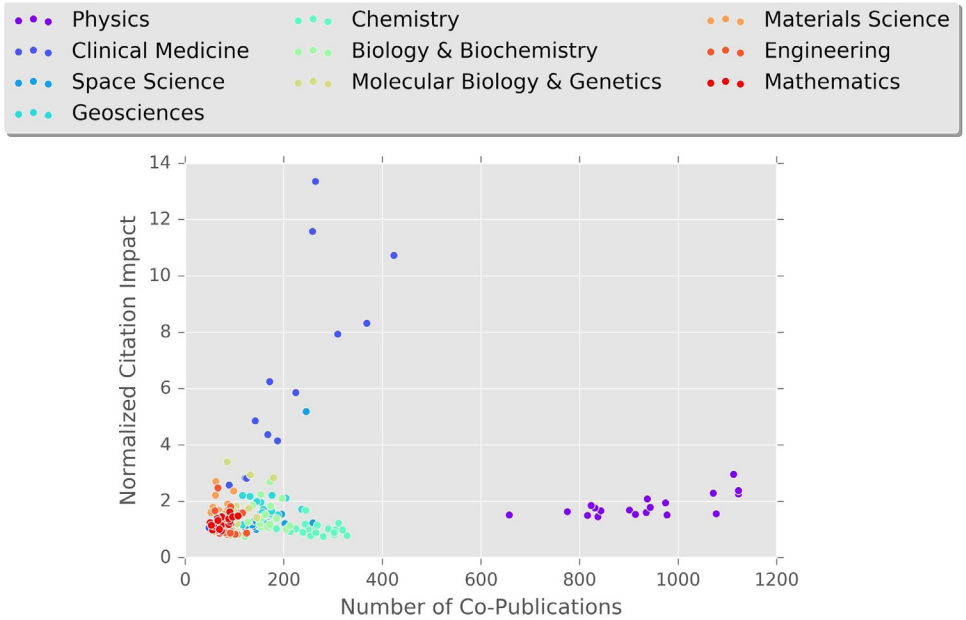


Figure 4: *Plot of Normalized Citation Impact versus Number of Co-Publications by research areas*

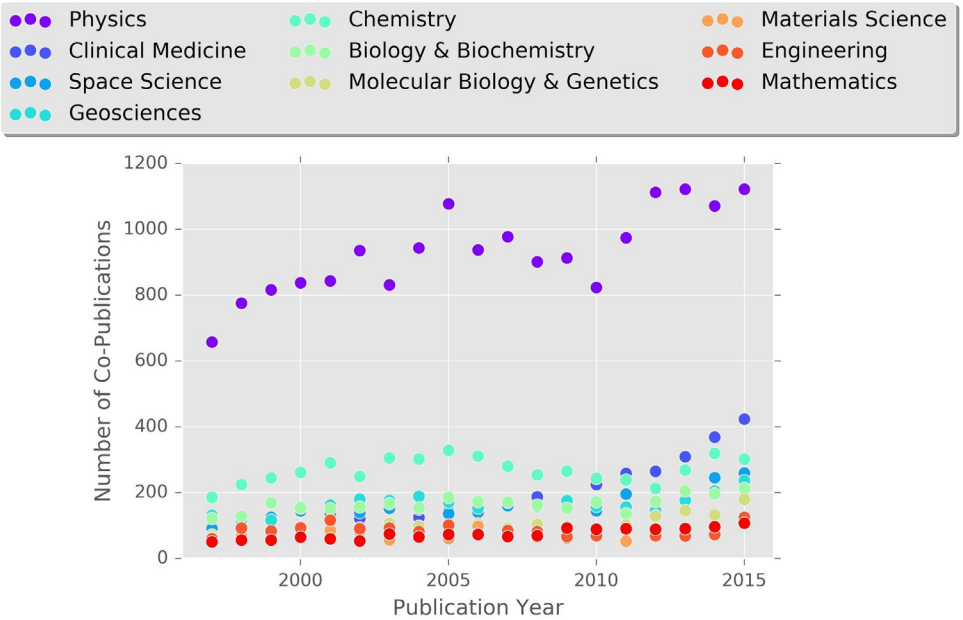


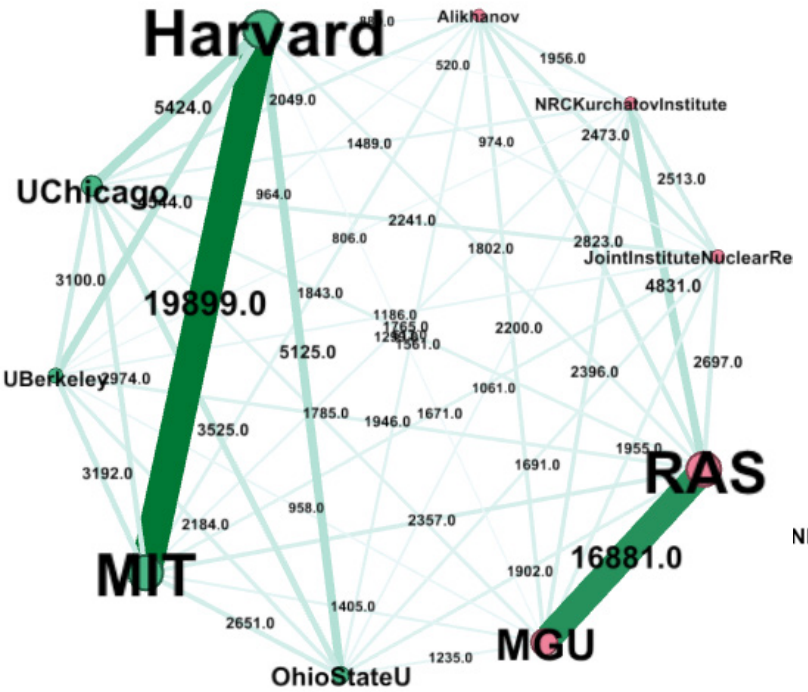
Figure 6: *Plot of Number of Co-Publications versus Publication Year by research areas.*

4.5 IDENTIFICATION OF EXTERNAL FACTORS THAT INFLUENCE S&T COLLABORATION

In order to see whether different research areas are influenced by similar factors, we calculate the Pearson product-moment correlation coefficients (Pearson 1895) of the top ten ESI research areas, for example, the correlation between Physics and Clinical Medicine. After observing the trend lines regarding the number of publications (Figure 6), we note that fields such as Space Science, Physics, and Molecular Biology and Genetics correlate with each other. If most or all research areas have strong correlations, it may support our hypothesis that similar factors may influence multiple research areas. This is important because identifying such factors could help accelerate collaboration. In Table 5, we show the correlation coefficients of Physics and Engineering with other research areas.

Six out of ten research areas exhibit correlation at 99 percent significance with each other, as is the case with Physics (in Table 5).[8] In contrast, three fields—Chemistry, Materials Science, and Engineering—stand out, with a par-

8 The significance is calculated by comparing the correlation coefficient values with the Pearson critical value table (http://researchbasics.education.uconn.edu/r_critical_value_table). Note that our data set has 17 degrees of freedom because we are using data from 19 years, and for the Pearson correlation test, degree of freedom = number of pairs - two.



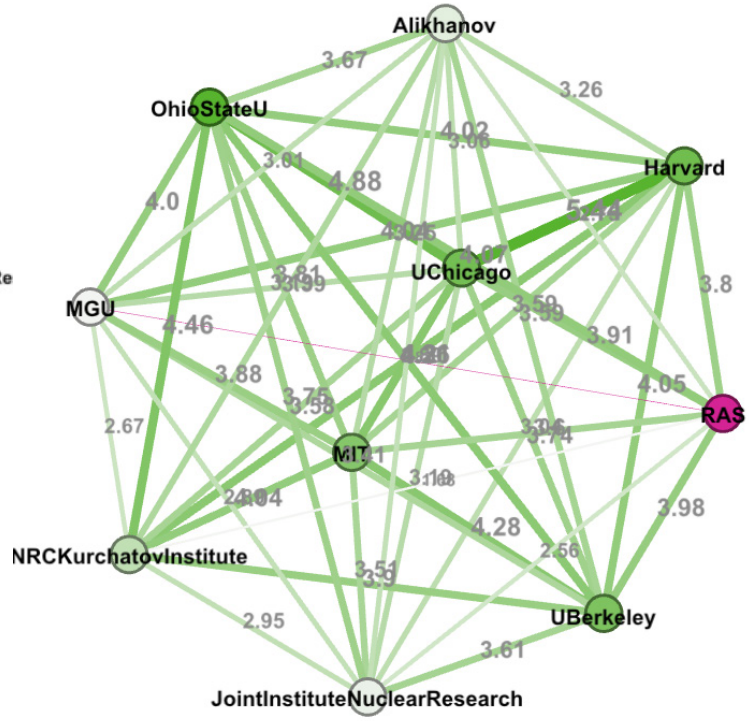


Figure 5a: *Quantity of WoS co-publications from 1998-2015 among the top 5 collaborating US and Russian organizations. Thicker, darker edges and larger nodes signify more co-publication. The numbers on the edges indicate the total number of WoS documents co-published by those organizations. The thicker and darker the edge, the higher the number of co-publications is of the two nodes it connects.*

Figure 5b: *Quality of WoS co-publications from 1998-2015 among the top five collaborating US and Russian organizations, as measured by NCI. Red edges or nodes indicate an average NCI value below 1, which is below the world average. The darker the green, the greater the citation impact, i.e. the higher quality the publication. Note: the sizes of the nodes do not have a meaning - they are all equal. The numbers on the edges indicate the NCI.*

Table 5: *Correlation of number of publications by years between Physics and Top 10 research areas*

Areas	Correlation Coefficients	Statistically Significant at 95%?	Statistically Significant at 99%?
Clinical Medicine	0.79	Yes	Yes
Space Science	0.81	Yes	Yes
Geosciences	0.63	Yes	Yes
Chemistry	0.47	Yes	No
Biology & Biochemistry	0.78	Yes	Yes
Molecular Biology & Genetics	0.75	Yes	Yes
Materials Science	0.37	No	No
Engineering	0.16	No	No
Mathematics	0.70	Yes	Yes

Table 6: *Correlation of number of publications by years between Physics and Top 10 research areas*

Areas	Correlation Coefficients	Statistically Significant at 95%?	Statistically Significant at 99%?
Physics	0.16	No	No
Clinical Medicine	0.05	No	No
Space Science	0.17	No	No
Geosciences	0.35	No	No
Chemistry	0.42	No	No
Biology & Biochemistry	0.16	No	No
Molecular Biology & Genetics	0.19	No	No
Materials Science	0.25	No	No
Mathematics	-0.01	No	No

ticular emphasis on the third field. Engineering publications show no statistically significant correlation (See Table 6) with other fields indicating that such factors may not influence Engineering as much. This leads us to a question for further research: what are the factors that influence publications in major research areas, and why are fields such as Engineering and Chemistry immune to such factors? We hypothesize that one of these factors could be public perception. This hypothesis stems from the fact that public perception is quite often influenced by how one's government views the other country. In order to test our hypothesis, we used data from the Pew Research Center (2016) and Gallup (2016) for the US, and the Levada Center (2014) and the Foundation of Public Opinion (2014) for Russia. If public opinion in both countries is a contributing factor, we would expect to see almost all of the data points in Figure 7 to be in the upper-right quadrant. However, the scattering of data points indicates that public opinion may not be one of the factors that influences S&T collaboration.

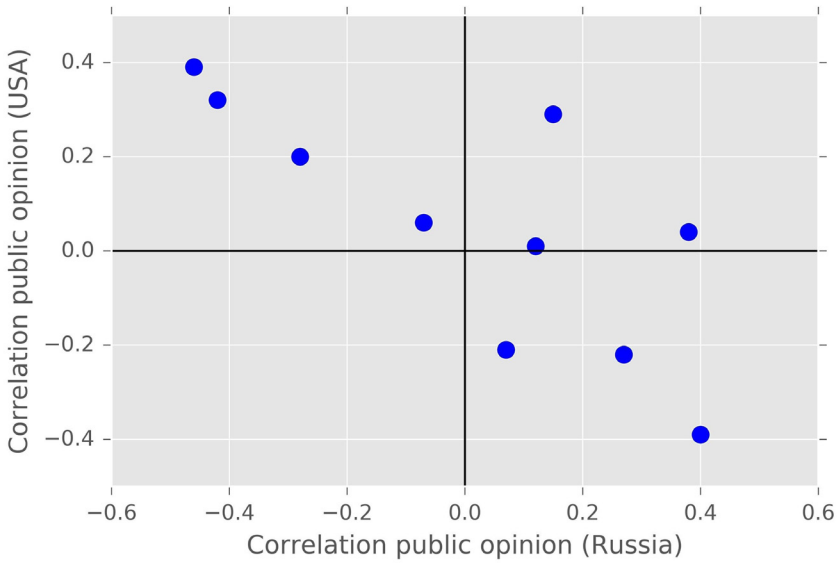


Figure 7: *Correlation between the number of publications and favorable public opinions between the US (y-axis) and Russia (x-axis).*

5. RESULTS OF QUALITATIVE ANALYSIS

For the qualitative analysis, we interviewed two dozen individuals who have worked at the intersection of US and Russian S&T collaboration. Half of our interviewees are American and half are Russian (by nationality), with two thirds living in their own country and one third currently living in the other country. We did the interviews in two rounds. The first interviews helped to steer our understanding of the subject, refine our topic, and define factors that affect collaboration as well as ideate ways for how to spur on new collaborations, as per research subquestion 4. These first-round interviewees included professors, scientists, technology entrepreneurs, non-profit representatives, and policymakers from both the US and Russia. We incorporated our quantitative results into our second round of interviews with researchers from the top-five collaborating Russian universities who had more than 4,000 personal co-publications with a US colleague, overall. This round was only done with Russian scholars and will be done with US scholars in the future.

In the first round of exploratory interviews, both Russian and US interviewees emphasized the value of interpersonal trust in collaboration, as compared to supportive policies or economic advantage, especially at times of political turmoil. This early realization in the project greatly steered our scope of analysis toward university researchers, as opposed to companies or policymakers.[9] Interviewees also highlighted that different fields have different funding standards. For

9 At the beginning of the study, we conducted a stakeholder analysis (Appendix A) to identify three key levels of stakeholders involved in S&T collaborations: governmental, organizational, and individual. However, in the initial research, it was evident that procuring information about collaboration at the national governmental and organizational level would be challenging, given the limited amount of publicly available information that can be procured in a reasonable period of time via our contact networks. Also, many interviewees pointed out the unique role of universities and individual researchers, so we decided to focus on this level for our analysis and use number and quality of co-publications as measures.

example, funding in Information Technology (IT) is lower than funding in space exploration. Technological readiness is also an important factor: both countries must have adequate people and equipment in order to conduct particular research.

When asked about challenges, Russian scientists spoke about cross-cultural and language barriers—apart from the US and EU sanctions—as the main challenges that prevent individuals from forming strong partnerships across borders. However, scholars have mitigated this problem in the past by having quality translators who can successfully facilitate cross-cultural interactions. Although this additional service entails some cost, these services unlocked opportunities that compensated for the costs. Structural misalignments in the US and Russian S&T systems also negatively influence collaboration. As an example, most Russian universities are state-funded; as a result, the government has a partial role in setting the university's strategy. This is in contrast to US universities, which are frequently self-financed, in part if not entirely. Border requirements also present a potential barrier to international research as the process of exchanging laboratory materials and equipment across the border can introduce heavy bureaucratic hurdles and take time away from the research, itself. Finally, governments have the authority to prohibit individuals or equipment from crossing borders. This may, in turn, discourage scientists from participating in bilateral projects.

When asked about the motivations for collaboration, interviewees often listed working with an old colleague or friend. Most interviewed scientists pointed out the importance of participating in international projects to meet other scholars and to boost their reputation. Russian scientists also mentioned that extensive research funding and a strong technical base in the US are two of the leading factors in choosing Americans as partners. From the US perspective, Russian human capital and robust scientific training render these researchers attractive.

As for the second round of interviewees, almost all of the researchers were physicists and worked in multilateral projects with more than 20 countries involved. Therefore, the large number (4,000+) of co-publications was not necessarily indicative of a large number of intentional, bilateral collaboration.[10] Positive aspects of collaboration mentioned by these top-publishing scholars included the excitement of making grand discoveries, such as obtaining new fundamental knowledge of the neutrino and the properties of matter, and the satisfaction of getting a large number of publications from the partnership. As for negatives, these researchers saw that a limited availability of funding can prevent scientists from launching a collaboration. Interviewees also pointed out that bilateral US-Russia collaborations are not central, as projects included people from many countries.

6. CONCLUSION

Our hypothesis about research subquestion 1 was that individuals at universities—namely students, faculty, and researchers—do not operate under a political agenda and, therefore, are free to work with counterparts. The hypothesis seems to be true, as per the interviews that we conducted. Our second hypothesis that space, nuclear, and theoretical sciences are the leading collaboration fields was only correct with respect to theoretical sciences. We missed some fields, namely clinical medicine, which has the highest quality of publications by a large margin. As for the top collaborating stakeholders, on the Russian side, the Russian Academy of Sciences had three times as many publications as the second-highest stakeholder, Moscow State University, which is the top-ranked Russian university.[11] The remaining stakeholders on the Russian side were mostly research centers, followed by a few mid-tier universities. On the US side, there were several top-tier institutions, namely MIT and Harvard, as well as some mid-tier universities and research institutions. In regard to these mid-tier universities, our initial hypothesis was incorrectly biased toward top universities leading collaborations. For the third hypothesis that IT and biomedicine present potential collaboration areas, it seems that IT is not feasible in the short-term, as there is very little history of co-publication, while biomedicine—namely clinical medicine—has a history of high-quality publications and may hold substantial, untapped potential for collaboration. As for stakeholders, we identified an opening for top- and mid-tier universities to increase their collaboration. As for our final hypothesis we reiterate the utility of seed grants in stimulating binational research cooperation.

For future work, we would like to perform further statistical and network analysis related to the quantitative parameters defined in Section 4, focusing on two 'high-potential' universities in Russia (see Table 4) as cases. We are curious to see their recent historical trends in co-publication with specific universities and in a specific field to understand in which areas they would be interested in having more growth. In addition, it would be worthwhile to identify academics at these universities who have recently exhibited upward growth in the number and quality of publications and to reach out to them to understand how we can better help them to connect with new collaborators. Also, we would like to continue interviewing individuals who have worked in fields or universities with high shares of US-Russia collaborative projects to identify best practices. We would also like to interview scholars in sectors that we identified as having potential for collaboration to better understand their needs and interests.

10 Unfortunately, Incites™ does not have the functionality to separate bi- and multilateral publications, so there may be a slight bias in our quantitative analysis.

11 RAS is not a university, but rather it is an umbrella organization of research institutes across Russia.

Acknowledgements

We would like to thank our mentor, Dr. Rachel Salzman, the SURF team, peer-reviewers, and our interviewees for their valuable feedback. We acknowledge that we obtained our data from Incites™. Tanveer Karim acknowledges travel grants awarded by the University of Rochester to attend SURF conferences.

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2

Born Globals in Russia: Factors and Incentives for Startups to Internationalize

II. Entrepreneurship & Innovation Working Group

Andrei Bakalenko and Katarina Sabova

Abstract

The purpose of this study is to understand why ties between Russian startups and the United States (US) market are thriving, despite worsening diplomatic relations between the two countries. Our research focuses primarily on the sub-group of Russian startups expanding their operations abroad. By combining the input from conducted interviews with insights from existing research, we identify five exogenous incentives for Russian startups to internationalize: the size of the US market, the size and level of development of the US venture capital industry, the unsatisfying environment for entrepreneurs in Russia, the strong brand of Silicon Valley, and the technological maturity of the US market. This observation is surprising, given that most research suggests that the motivation to internationalize is driven by a company's internal factors such as the previous international experience. We conclude that internationally-active entrepreneurs are more focused on external, rather than on internal factors. To demonstrate this theory, we analyze a new generation of companies that rely on crowdsourcing as an alternative way to attract resources and to internationalize. We believe that these insights will help Russian and American startups thrive internationally.

1. INTRODUCTION

One might assume that the recent downturn in United States (US)-Russia relations has had a correspondingly negative effect on transnational business; not only have sanctions and the economic recession taken a bite in the Russian economy, but domestic and international perception of the country's business climate is at a relative low. But despite current geopolitical tensions, some entrepreneurial efforts are thriving. From innovative Russian businesses entering the large, tech-savvy US market (e.g., Telegram messaging app, Prisma, Kaspersky) to eager Western professionals importing proven business models to Russia and the Commonwealth of Independent States (e.g., Uber, Airbnb), the sector is far from dormant.

Previous research suggests not only that a company's level of innovation is based on its own choices or internal factors, but also that external factors such as competition in the market or protectionist legislation play a significant role in an organization's success. The objective of this paper is to understand the range of factors that prompt Russian startups to do business in the US and to analyze the factors that determine the success of their efforts. Through a series of interviews with relevant stakeholders, including experienced entrepreneurs, venture capitalists, and government officials, we have compiled and curated a list of incentives and challenges that small and medium-sized Russian startups face upon entering the US market.

The paper is divided into four parts: an introduction, two sections that set the stage and discuss research findings, and a conclusion. Section Two, "Factors of Startup Internationalization," provides an overview of ideas from existing academic literature on the topic of startup internationalization. Here, we define key terminology such as "innovation," "internationalization," and "startup," before moving on to a discussion of the barriers to, and prerequisites for, internationalization. We conclude this section by classifying internationalization factors relating to companies, industries, and institutions. Section Three, "Incentives for Russian Startups to Expand to the US," complements our theoretical section with practical research conducted through a series of interviews with business practitioners active in both the US and Russian markets. In this section, we first describe the methodology used and then discuss insights gained from the

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interviews. Here, we discuss five incentives that motivate Russian companies to expand into the US market: market size, access to the venture capital, sophistication of the market, the strong brand of the Silicon Valley, and an unsatisfying domestic entrepreneurial environment. We compare and contrast our first-hand findings with existing theoretical frameworks and end the section with a description of the crowdsourcing concept in the context of startup internationalization. We hypothesize that—contrary to the existing literature—startups internationalize based on external factors and incentives. We suggest that internal factors—the traditional focus of scholarly work on internationalization—are considered by entrepreneurs as enablers, rather than incentives. Our conclusion sums up the theoretical and practical findings of our work.

2. FACTORS OF STARTUP INTERNATIONALIZATION

While there are many studies that focus on European-US business ties or the booming East Asian market, literature that addresses bilateral US-Russia issues primarily focuses on areas of conflict, like security or human rights, rather than on economic collaboration and business growth. In this paper, we seek to contribute to the latter body of knowledge with a focus on young Russian companies that seek to internationalize by expanding to the US market. Successful small innovative companies are predominantly those that disrupt the status quo by challenging existing business norms and dominant technologies. Often these companies push the boundaries of innovation by creating new business models and changing the way that people and businesses operate. US-based examples include Uber, which has disrupted the world of transportation, and Snapchat, which has made online social interactions simultaneously animated and ephemeral. Companies that can effectively operate internationally—while internalizing their new environment—will more successfully distribute their cutting-edge products and services to customers around the world, thereby disrupting existing practices and potentially increasing revenue. However, not all startups that internationalize have a strong commitment to internalization. The lack of dedication and resource commitment inevitably leads to a lower level of international performance (Wood et al. 2011). Half-hearted or failed attempts to internationalize provide yet another reason to study and clarify incentives for internationalization. This puzzle drives our research: the aim of our paper is to discover the incentives and motivations of internationalization for small, innovative startups. We attempt to define their internal motivations, to propose ways to improve their external conditions, and to encourage more innovative companies to start up and prosper abroad.

2.1 Defining Key Terms

First, we must define and explain what we mean by 'internationalization' and 'startups,' or the small, innovative companies we study in this paper. Although many researchers within the sub-field of entrepreneurial studies discuss and define internationalization, there is no generally shared definition (Sullivan 1994). For example, some scholars define internationalization as the proportion of international sales to the volume of all sales (Wood et al. 2011). For our paper, we have chosen a more straightforward definition: the share of sales achieved in international markets.

Researchers distinguish between two main types of small companies that internationalize early on: Born Globals (BGs) and International New Ventures (INVs). BGs are defined as "business organizations that, from or near their founding, seek superior international business performance from the application of knowledge-based resources to the sale of outputs in multiple countries" (Knight and Cavusgil 2004, 124), or as companies that have made "at least one international sale to any new market within two years of formation" (Bader and Mazzarol 2009, 11). On the other hand, INVs are "business organizations that from inception seek to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries'' (Oviatt and McDougall 1994, 46). These terms define essentially the same target group for our purposes—companies that start to internationalize within a short period after their launch. We will henceforth refer to these companies interchangeably as BGs, INVs, or simply startups.

We also want to narrow our focus to innovative companies. The core of innovation is the introduction of "a new idea, device, or method" (Merriam-Webster Online Dictionary 2016), hence innovative companies are ones that embrace such goals. In Russian legislation, innovation is defined as a new or considerably improved product (service or good), process, new way of sales, or new organizational method that is used for business; a new method of organization for the workplace; or a new avenue for external relations. (Russian Federal Law 2001) A startup can also be defined as "a human institution designed to create a new product or service under conditions of extreme uncertainty" (Ries 2011, 27). We agree with these definitions and more generally define the innovative enterprise as one that brings a new or considerably-improved service or technology to the market. In our own paper, we focus on the Russian startups that bring innovative products to American markets, thereby augmenting innovation, the economic situation, and the knowledge base in both countries.

2.2 Barriers for Startups to Internationalize

Incentives for internationalization are directly affected by underlying barriers to market entry. It is therefore important to establish a classification of these main barriers before moving further into discussions of other factors. These barriers can be broadly grouped into two categories: the liability of newness and the liability of foreignness.

The liability of newness refers to an additional level of risk that new ventures face in comparison with older companies that have already established themselves on the market. As Singh, Tucker, and House describe, "this liability of newness occurs because young organizations have to learn new roles as social actors, coordinate new roles for employees and deal with problems of mutual socialization of participants, and because of both their inability to compete effectively with established organizations and their low levels of legitimacy" (Singh, Tucker and House 1986, 171). The liability of newness is a risk that almost every new company faces.

Companies entering new, international markets face an additional layer of barriers. This liability of foreignness comprises "the costs of doing business abroad that result in a competitive disadvantage—[or] all additional costs a firm operating in a market overseas incurs that a local firm would not incur" (Zaheer 1995, 342-343). These barriers include adhering to regional laws, adapting to foreign languages, and navigating a new competitive environment (Li 2008, 877). The following table (Table 1) provides an overview of the types of the barriers.

Type of Barrier	Details
Liability of newness (why new companies fail more often than established ones)	• Low levels of legitimacy (low level of reputation, because the companies are not known) • Problems of mutual socialization of participants • Coordination of new roles for employees • The lack of knowledge about new roles as social actors • Inability to compete effectively with established organizations
Liability of foreignness (why foreign companies fail more often than local ones)	• Higher information asymmetries • Higher transaction costs • The lower speed of decision-making from a head office located in another country or time zone • Local biases toward any foreign country • Local laws • Local competition • Local language

Table 1: *The map of the barriers for INVs*

For our research, it is important to note that the liability of foreignness is less severe for INVs, as compared to older companies. Note Wood et al: "younger firms have fewer entrenched routines, and early exposure to international markets allows them to build dynamic capabilities for handling the uncertainties of internationalization" (Wood et al. 2011, 255).

2.3 Prerequisites for Internationalization

While the number of small companies that expand to other countries has increased considerably over recent decades, so has the speed at which INVs internationalize (Bruton, Ahlstrom, and Obloj 2008). Two main structural factors can explain this phenomenon. First, globalization (Evans and Wurster 1999) "facilitates the emergence of customers who are better organized, have more information, and are generally more demanding" (Knight and Cavusgil 2004, 130). Consequently, INVs seem to consider internationalization not as a secondary activity, but as a need that leads them to survive and thrive—a small company cannot fight big, global players if it does not better satisfy the needs of an international customer base. The second factor is the diffusion of a new, entrepreneurial class that holds an international vision (Andersson, 2003; Sahlman and Stevenson 1992). Globalization has ushered in cross-border communications and transactions, leading to more people pursuing business opportunities and advanced degrees internationally and, in the process, getting to know the peculiarities (and preferences) of other markets.

2.4 Classification of Internationalization Factors

There are two main classifications of factors that affect the internationalization of startups. The first classification defines the drivers of internationalization among small businesses: knowledge of foreign languages, experience in international business, transnational relationships, and the focalization of strategy (Zucchella et al. 2007, 274). The second classification takes into account different levels of factors that influence internationalization, from the micro to the macro level (Tsukanova and Shirokova 2012). These include:

1. **The inner resources of the company:** how the resources of the company, its capabilities, and its knowledge, including the decisions and skills of upper-level management, affect the choices that the company makes (McDougall, Oviatt and Shrader 2003)
2. **The industry:** how competition within the industry, the type of industry, and the industry's tendency to internationalize affect its choices (Arbaugh, Camp and Cox 2008)
3. **Institutions:** how institutional barriers to market entry, cultural differences, and the turbulence of the external environment affect the internationalization of the companies (Cieslik and Kaciak 2009)

We have chosen the second model—levels—for our research, as we believe that it provides a better starting point to analyze multi-level government-company relations and thus to draw conclusions for governments to craft new policy. In the following section, we further examine each of these levels to better understand the incentives of small innovative Russian companies to internationalize.

Company Level—Company Resources

According to previous research, innovative companies are more focused on internationalization than traditional companies (Boter and Holmquist 1996). For young, global players, internationalization and innovation blend together (Knight and Cavusgil 2004). In fact, the late twentieth and twenty-first century generations of companies have been founded without constraints imposed by physical infrastructure or inventory. Instead, they are free to peddle technology-driven solutions all over the world. Instead of physical restraints, a company's ability to innovate and internationalize is affected by alternative skillsets, namely its strategic competencies, labor, management, and know-how (Volchek, Jantunen, and Saarenketo 2013, 322-328). For INVs that seek to satisfy the needs of their globalized customer base, the most important skills are their ability to shape both an international entrepreneurial orientation and an international

marketing orientation. Therefore, their business strategies are based on the four pillars of (a) global technological competence, (b) unique product development, (c) qualitative focus, and (d) the leveraging of foreign distributor competences. For example, unique product development helps startups monopolize small markets instead of competing with big companies in more established or larger markets. Likewise, the ability to leverage foreign distributors is especially important in countries such as Russia, where successful internationalization depends heavily on networks of business ties (Coviello and Munro 1995).

Industry Level

Moving to the industry level, existing research helps to shed light on the industries that tend to give birth to INVs. These are typically industries with high levels of innovation and companies that expand exponentially within a period of five years. Zucchella (2001) convincingly argues that there is no single industry-level factor affecting the speed of internationalization. Indeed, there are several factors, based on the characteristics of a company's industry, that can influence their decision to internationalize. This includes, but is not limited to: industry evolution, industry concentration, knowledge intensity of the industry, local industry internationalization, global integration of the industry, industry venture capital, the return on investments in innovation, and the regime of appropriability in the industry (Smit 2014).

Institutional Level

The institutional level presents a set of factors that are particularly interesting for our research. Some consider institutional factors as key in explaining and governing the internationalization of business. For example, if the rules and norms that guide behavior are not clearly defined, then businesses have limited transparency on what levers, frameworks, and regulations are applicable to them (Peng and Wang 2008). Institutes can be understood according to three perspectives: regulative, or the laws and policies that constrain action; cognitive, or the knowledge and skills that societies share; and normative, or the social attitudes toward entrepreneurship within and across borders (Scott 2008, 56).

For the regulative approach, there are different factors, such as taxes, the legal system, monetary policy, the level of corruption, and the protection of intellectual property. Research reveals that perceived institutional barriers for developing economies, such as excessive tax regulation policies, political instability, and ineffective legislation, can increase their propensity to internationalize. These positively affect the level of internationalization of INVs, in contrast to the level of taxes, corruption, and bureaucracy, which can have negative effects (Tsukanova and Shirokova 2012, 43).

While this literature review has presented a thorough examination of work on the barriers, risks, and factors that determine the internationalization success of a born global, there is a scholarly gap in research dedicated to studying the motivations and incentives of INVs to internationalize. More specifically, there is little research that examines this subject from the perspective of Russian startups that internationalize to the American market, a phenomenon that we recognize as common. After summarizing the knowledge of academic work on the prerequisites and factors of internationalization, we can now move on to study the incentives of Russian INVs.

3. INCENTIVES FOR RUSSIAN STARTUPS TO EXPAND TO THE US

3.1 Methodology

Our research is based on interviews of leaders and founders of Russian startups that originally began in Russia and then moved to operate in the US. We conducted thirteen in-depth interviews with CEOs, co-founders, and top managers of these companies. Survey data was collected in Russia and in the US in the second half of 2016 and the beginning of 2017. The first set of interviews was based on open-ended questions about the incentives of entrepreneurs to move to US market. During this initial stage, we identified the main needs and problems of these Russian startups. We then aggregated the findings and created a questionnaire to better evaluate the main reasons for startups to move to the US. As a result, we received quantifiable results to check against anecdotal evidence from the first stage. We created an index to represent the importance of a factor on a scale from one (least important) to five (the most important). Note that the comparison is made between the factors identified as most important during interviews, and as such the index provides only information about relative preferences.

3.2 Results

The factors and commentary below represent the most salient and frequently cited motivations by Russian entrepreneurs that expanded to the US market, beginning with what interviewees identify as the most important:

The size of the market. The market of goods sold by innovative companies is bigger in the US than in Russia. There are generally more people and more money. Furthermore, currency depreciation from the recent financial crisis meant that Russians curtailed non-essential expenses, which adversely impacted sales in the consumer market.[1]

Bigger and more mature venture capital market. Many entrepreneurs express that Silicon Valley is a special region where the environment helps companies to considerably improve their performance and to find mature investors. This represents the view that an office in Silicon Valley offers a significant advantage for raising venture capital (Herndon 2007). Some entrepreneurs specifically state that investors in the US give more funding and ask for less in terms of control over the company, but more in terms of performance and results. One surveryed entrepreneur stated aptly: "The rules of the game are better developed and better regulated." Some interviewees also indicated that the Russian venture capital market shrunk after financial crisis.[2]

Sophistication of the market. Usually, the companies that

1 Level of importance: 3.8 out of 5. This received the highest average mark in the questionnaire. It is also important to note that none of the interviewees assigned a mark for this factor lower than 3.

2 Level of importance: 3.3 out of 5

move to Silicon Valley have something new that they can present to the existing consumer base. They bring innovative products that sometimes even disrupt current technological trajectories. These companies seek more mature markets where customers already use top-notch technologies and are ready for next-generation products. The US satisfies this need, in the opinion of these surveyed entrepreneurs.[3]

Strong brand of Silicon Valley. The brand value of Silicon Valley is viewed as enormous. Some companies understand Silicon Valley to be the only option without considering other possible locations. Many consider Silicon Valley as the best place for small and innovative companies, with the strongest professional community that can help the company to succeed. As two of the interviewees said: "If you want to do IT, go to the best place for it—without a doubt, this is Silicon Valley." "The cult of Silicon Valley is enormous. People do not know why they go there."[4]

Unsatisfying environment for entrepreneurs in Russia. This point can be expressed by one interviewee's statement: "It just feels like Russia is bad for business." In the opinion of surveyed entrepreneurs, conditions for building companies in Russia are not as good as in the US. In Russia, respondents said, entrepreneurs are not considered to be innovators, but corrupt money launderers or con-artists, a vision largely entrenched in the popular imagination by the prevalence of illicit schemes and scammers during the economic turbulence of Russia's 1990s. High levels of corruption and known cases of business rackets are depicted as some of the main deterring factors.[5]

The size of the market, its maturity, and its sophistication define a core incentive for Russian startups: larger possible capitalization of a company. Startups have a special need to grow users and revenue as fast as possible. Consequently, this impacts the capitalization of the company, the metric by which business success is measured. Companies also need to satisfy their current investors. By moving to the US, they open themselves to the increased possibility of being sold at a high price—the ultimate goal of a startup.

One of the most unexpected findings was that all of the interviewees founded their companies in the US, or alternatively founded a subsidiary at the time of the company's founding with a US-office. This seems counterintuitive, considering that most of these businesses were digital software companies with the ability to sell products globally from any location with access to the internet. Instead, these actors are Russian citizens that moved to the US—specifically, to Silicon Vallery—to develop a startup. The majority of interviewed startups were members of Russian accelerators, which after moving to the US, successfully became members of local business accelerators such as 500 Startups and Y Combinator.

These companies usually move their marketing and product teams to the US to better understand the market, while keeping their developers and technical teams in Russia in order to limit expenses.

3.3 Discussion

This section seeks to condense the results of our interviews and survey in order to better understand the incentives of internationalization. Each incentive corresponds with one of the three aforementioned categories: companies, industries, or institutions. For example, the most frequently cited influence—the size of the market—is mostly a function of industry-level factors, while the maturity of the venture capital market is a combination of industry-level factors and institutional factors. An unsatisfying environment in Russia is generally attributed to the work of institutions. The brand of Silicon Valley combines all three of the categories, as companies, industries, and institutions such as the state work together to coordinate innovation and investments. The maturity of the market is a combination of industry and institutional level.

Many of the insights are handily supported by evidence. The US market, for example, is no doubt bigger than the Russian one in terms of size. US gross domestic product, at nearly $18 trillion USD, is more than 13 times larger than the Russian economy (World Bank). The same is true of the venture market; while the Russian venture capital market increased from $108 million USD in 2007 to $1.2 billion USD in 2012 (Ilyin & Balashov, 2014, 35), it was still more than 26 times smaller than in the US, which has the world's largest venture capital market at more than $32 billion USD (Ilyin & Balashov, 2014, 9).

Another factor is the ease of doing business in different countries. According to one of the most prominent rankings, the World Bank's "Doing Business" index, the environment for businesses in Russia has considerably improved in the last few years, but Russia still ranks 40th globally. This is lower than Kazakhstan (35th), Belarus (37th), and Bulgaria (39th), but higher than Hungary (41th), Belgium (42nd), and Croatia (43rd). The US ranks 8th on the list. However, for international trade, Russia ranks a dismal 140th, highlighting the challenges for startups that are focused on the global market (World Bank).

Silicon Valley's brand is strong for several reasons. As mentioned, the volume of venture capital market in the US is by far the largest in the world. Even more striking, however, is that more than 40 percent of this (46 percent in 2011) is received by companies in Silicon Valley (Fenwick & West LLP). Other factors are also important in driving up the attractiveness of the Silicon Valley brand, such as a greater density of developers and higher wages. However, there is mixed evidence on whether or not the reality matches the hype, a topic beyond the scope of this inquiry. As seen in interviews, the brand factor has made the Silicon Valley a mecca for international technological companies. Research and design hubs like Russia's Skolkovo have been founded worldwide in an attempt to replicate Silicon Valley's formula for success.

The last main incentive on market maturity is supported by academic research. Customers in developing markets such as China do not have access to the same technologies as their peers in developed markets; this limits the rate of adoption for next generation products (Zhou, Yim, and Tse

3 Level of importance: 2.5 out of 5
4 Level of importance: 2.5 out of 5
5 Level of importance: 2.3 out of 5

2005, 48). This may also be a reason why INVs from developing markets tend to internationalize early (Wood et al. 2011, 260).

3.4 Crowdsourcing as a Possible Solution to the Lack of Investment Startups

While interviewing entrepreneurs and venture fund experts, we found that INVs typically have a unique set of skills. One of these skills is their adaptability and capacity to move out of their comfort zone, which helps these businesses respond to external market signals. These companies are able to pivot their business model toward market needs and, in the end, increase their success rate. One of our interviewees said: "Many Russian companies and entrepreneurs have great technological backgrounds, but they lack open-mindedness. They have to go out, listen, and test their idea before convincing themselves that everybody, or at least somebody, will use their services." We want to address this problem more thoroughly and propose a possible solution.

Startups have traditionally faced problems finding investments and other resources for development. In response, a new generation of companies uses crowdsourcing to circumvent these barriers. One such example is JumpStartFund. CEO Dirk Ahlborn once said that "many entrepreneurs think they need to raise money right out [of] the gate. But maybe what they really need to win at the early stage is validation from a community to rally around the idea. Then raise money once there's something to show" (Guerrini 2017). JumpStartFund uses the following two-step model: first, companies use crowdsourcing to attract and test ideas by inviting potential partners to propose and vote on their favorites. JumpStartFund then works as a platform, which helps to find employees that believe enough in a company to work in exchange for stock options. These employees work for free in the beginning as 'founders', but believe in the company, thus reflecting the sentiment of startup founders. Through JumpStartFund, companies can receive investments not only from funds or investors, but also from people all over the world. This platform has already enabled one of the most spectacular startup success cases, Hyperloop Transportation Technologies, a company with a mission to transform the traditional market of transportation. Currently, Hyperloop is developing a tube-like structure that will move people and goods safely in a closed environment, ultra-high speed vehicle (on average around 600 mph / 970 km/h). The company has only two full-time employees, with the rest of the work crowdsourced to more than 500 engineers and other professionals with day jobs at places like Boeing, NASA, and SpaceX. This latter collection of developers spends their free time working on Hyperloop in exchange for stock options, because they get to work on something that could genuinely revolutionize transportation and make substantial income in the process (Volmut 2017).[6]

While time will show the real feasibility of any given idea, crowdsourcing can help startups to test their hypothesis with even smaller costs and to find the best resources on the market.

4. CONCLUSION

In this paper, we focused on young Russian companies that internationalize to the American market. We found that there are different barriers that entrepreneurs face when they enter foreign markets that are not common to local players. These are liability risks such as local laws, language, the lower speed of decision-making, and higher transactional costs. However, these risks and barriers do not stop these companies from successful internationalization. In fact, the pace of their internationalization has increased over the years.

The choice of these companies to internationalize is based on two main dimensions: external factors (institutions and industry) and internal factors (the inner resources of the company). These factors have been thoroughly investigated, but the incentives of INVs remained an under-studied dimension of internationalization. We have found that the incentives of Russian startups to move to the US lie in five main areas, namely: the size of the market, the maturity of the market, the developed venture capital industry, the environment of doing business in both countries, and the brand of Silicon Valley. However, these incentives missed the internal enablers of internationalization, without which these companies would not start their business in the US in the first place. These enablers represent a promising direction for future research.

We also found that young, innovative Russian companies can be successful in a the highly competitive American market. We hope that by showing successful cases and conducting deeper research on them, we can contribute to increasing the number of such innovative companies that can , in turn, improve the lives of people and economic performance in both Russia and the US.

Finally, while Russian companies continue to search for investments and markets in the US, some new-generation companies start to use the power of crowdsourcing to test ideas and bring the best employees to the company. This approach can be used by both American and Russian companies, though this remains an idea whose feasibility has yet to be proven.

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6 The company has already signed partnership deals with the government of Slovakia (Guerrini 2017).

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3

Evaluating US-Russia Academic Exchange Outcomes: Evidence from Discourse and Survey Analysis

III. Education & Foreign Area Studies Working Group

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Abstract

Since the fall of the Soviet Union, fewer students in the US and Russia have chosen to undertake programs in area studies, where they could obtain expertise in these regions. At the same time, pervasive and outdated stereotypes have advanced to fill this lacuna, discouraging regional engagement and thereby risking an overall dearth of future expertise. Our research seeks to understand the role and effectiveness of current bilateral exchanges in addressing these concerns. We analyze the academic and non-academic impacts of exchanges, using online surveys of program alumni in Russia and the US. We reinforce our findings with close and distant readings of orientation materials distributed to participants of such programs. We expected to find more positive academic outcomes for American students on exchange programs in Russia, and better non-academic outcomes for Russian students in the US; however, our results indicate little difference between the groups. Our findings suggest that long-term exchanges provide a strong platform to expose students to their host country's local culture and residents for both groups. Our analysis of free-response questions from the survey provides strong evidence for positive program outcomes, especially regarding language acquisition and cultural competence. However, the reviewed orientation guidelines often contained non-neutral language that may reinforce pre-existing stereotypes. The overall results of our study show that exchange programs are invaluable in creating area studies knowledge, especially in the current political climate, but further investigation is required for a larger, more statistically significant analysis of outcomes that does not limit itself to university programs.

1. BACKGROUND

Only twelve American students studied abroad in the Soviet Union in the late 1950s. Today, the number of American students in the Russian Federation is in the thousands (Aref'ev 2015, 725). In the wake of the Soviet Union's dissolution, we might expect more permeable borders and higher rates of academic exchanges in both directions to result in an increase in area studies expertise and knowledge acquisition in both countries, as well as a decrease in the ubiquity of Cold War-style rhetoric (Monaghan 2015; Legvold 2014). However, the field of Russian studies has experienced a sharp decline, and stereotype-dominated discourse remains prevalent (Horowitz 2014). In one example, a 2013 handbook for students preparing to study abroad, developed by the American Councils for International Education (ACTR-ACCELS), asserts that one should not walk on Russian streets while wearing headphones, that pedestrians never have the right of the way, that groups of gypsies surround foreigners to beg for money, and that the police raid night clubs to steal from, detain, and beat visitors.

The lack of area studies expertise has become more apparent in the wake of substantial political disagreements, such as the 2014 conflict in Ukraine. Russian political scientist Andrei Tsygankov argues that experts in the US were not able "to appreciate and draw relevant conclusions from Russia's modernization of its military and Special Forces, which were deployed to take control of Crimea in February 2014" (Tsygankov 2016, 11). Others fear that the current state of poor relations leads to the further destruction of meaningful dialogue between experts at all levels, thereby preserving and exacerbating this disconnect (Zhuravleva 2016, 16). We believe that this cycle can be disrupted by bilateral exchanges. Specifically, student exchanges between Russian and

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American universities can be a viable avenue for developing the area expertise critical to promoting meaningful dialogue.

2. LITERATURE REVIEW

Our literature review first analyzes existing research on the benefits of, and justifications for, study abroad programs, and the ways that scholars measure such benefits. We then turn to literature specific to the United States (US)-Russia case and the documented problems of academic exchanges between these two states. This leads us to a discussion on academic and non-academic knowledge formation. Finally, we provide a review of common problems associated with sociological research, including selection bias.

2.1 Benefits of Study Abroad:

Much of the literature on study abroad programs provides evidence of both long and short-term benefits for individual participants (DeLong 2009; Paige & Freed 1998). This work is generally supported only by qualitative approaches and anecdotal evidence, and few large-scale studies have been conducted (Freed 1998). We divide the body of scholarship on exchange benefits into two main categories: the acquisition of language skills and the acquisition of cultural knowledge.

Scholarship focused on language argues that the main benefit of study abroad is language acquisition beyond the classroom setting (Freed 1998; Paige 2009). Barbara Freed, for example, highlights the pedagogical value of immersion with a survey of exchange students in Russia and the former Soviet Union (Freed 1998, Savage 2014). The 20-year longitudinal study showed that programs for foreign students in Russia are an effective way to learn Russian, regardless of the immersive nature of their residence, particularly when students were assessed alongside peers that had taken Russian at their home colleges (Brecht 1993). Mary Dwyer examines the impact of time spent abroad on language outcomes in a 2004 study. Specifically, she argues that a full academic year spent on exchange is more effective than a shorter period, with foreign language retention extending up to 50 years after the end of a program (Dwyer 2004).

Beyond language acquisition, cultural and personal benefits are also observed as exchange program outcomes. Carol Atkinson describes one such benefit as students' increased situational awareness after studying abroad (Atkinson 2009). Scholars have also noted the utility of exchange programs in forming globally-minded perspectives, although specific case studies are vague on how such formation occurs (DeLong 2009). Marilyn Delong argues that "survival in today's knowledge economy requires the acquisition, development, and regular updating of knowledge, skills, competence, and the ability to work cross-culturally," viewing academic exchange as one possible approach to achieve such a goal (DeLong 2009, 41). Michael Paige further argues that academic exchanges have a transformative cultural power, in documenting the relationship between exchange programs and civic awareness, philanthropic involvement, and international knowledge (Paige 2009). However, despite such observed outcomes, further research is needed to provide a more comprehensive understanding of exchange program benefits.

2.2 Problems Associated with Study Abroad

Scholars point to a range of general problems that exist for study abroad programs. One such dilemma is the isolation of exchange students in a host country. In 1955, Henry Schloss observed that an exchange student's social interactions are "to a large extent confined to other foreign students frequently from his own country" (Schloss 1955, 573). His contemporaries echoed this statement, many describing the problematic nature of cultural assimilation during study abroad experiences (Rose-Redwood 2013).

The complex nature of cultural transition may further prevent the effectiveness of immersion. In order to gain intercultural competence, Lee et al. stress the need to "effectively communicate, relate, and work cooperatively" with the people and communities in host countries (Lee et al. 2012, 45). A lack of foreign language skills and other cultural barriers may inhibit this communication. Furthermore, the authors argue that competence cannot be acquired by simple exposure to a different culture but requires active involvement on the part of the student and, even in an international setting, one's social environment can remain monocultural (Lee et al. 2012).

Finally, a range of barriers fundamental to exchange programs themselves also exists. The financial burden imposed by program fees and international travel can prevent students from participating and can limit diversity, favoring students from higher socioeconomic classes. A lack of financial and administrative support from universities, as well as academic requirement conflicts, limits participation. The latter factor may disproportionally affect students outside of the humanities and the social sciences, as some programs of study less easily accommodate language study courses (Bell 2016).

2.3 Particularities of US-Russia Exchanges

American and Russian exchange programs have historically had different priorities. Both countries' approaches were ideologically-driven, differing primarily in their ultimate goals and the participant selection processes. The Soviet Union strove to establish new, dominant classes in socialist bloc countries; choosing candidates for educational programs on the basis of family background and social origin became their modus operandi. Government documents from the 1960–80s state that "children of labor classes are primary targets to be trained in Soviet educational establishments" (Tsvetkova 2008, 204). These students were expected to become workers, technocrats, and political leaders—promoters of communist ideology in their countries.

In contrast, US government policies reinforced dominant groups, selecting candidates for exchange according to their professional status (leaders, teachers, or students), as opposed to their social origin. American programs have concentrated consistently on identifying future leaders during and after program completion (Fominykh 2008); such a focus was only adopted in Russia as late as 2002 (Tsvetkova 2008). This discrepancy may be a result of the Soviet Union and post-Soviet Russia's comparative difficulty identifying

which government institutions have the resources and mandate necessary to evaluate and optimize program outcomes (Dolinsky 2014).

The number of student exchanges between both countries shifted in 2013 when the US State Department discontinued funding for Title VIII. Previously, Title VIII had been a means for American scholars to develop research projects in Russia, as well as to obtain language training domestically. The fund also provided resources to universities and institutions with Russia-focused centers as means to recruit potential future leaders in Russian studies (Burder 2016), such as the American Councils for International Education, Indiana University, and the University of Arizona. As the Association for Slavic, East European, and Eurasian Studies (ASEEES) reported in 2014, "this means a significant reduction in the number of fellowships and grants available for language training and advanced research in 2013-14" ("Title VIII Funding Cut" 2013). While funding recently reopened, the lapse in funding presents a gap in regional expertise for a generation of scholars.

Despite budgetary concerns, educational exchanges remain a crucial tool for public diplomacy in both countries. Alexey Dolinsky notes that Russia began to leverage exchanges as a foreign policy instrument in recent years, a concept further explored by Joseph Nye in his theories of soft and smart power (Nye 1990; 2003). There is also a need for more clearly defined program goals, as well as a better assessment of the effectiveness of exchange programs. One logistical barrier to measuring program outcomes is the difficulty of decentralized contact with program alumni. While there are several US government-sponsored platforms that maintain alumni networks and communications, Russian programs lack such infrastructure (Dolinsky 2014).

Broadly speaking, the benefits of exchange programs described above apply to US-Russia exchanges, in particular. Alumni of exchange programs confirm the impact of their experience on their perception of Russia and report that their experiences helped to disrupt myths and bridge gaps in understanding (Koshkin 2014).

2.4 Academic and Non-academic Knowledge Formation

Academic exchange presupposes a close connection between the acquisition of so-called academic skills, such as language and subject-specific training, and cultural knowledge. Today, the sociolinguistic acquisition approach to foreign language pedagogy is considered the most effective way to master patterns of native speech (Regan et al 2009; McKay and Hornberger 1996). Thus, it is vital to balance in-class and peripheral learning for exchange students seeking sociolinguistic competence, or the ability to use language in a range of social and cultural settings.

Apart from acquiring language proficiency, academic exchange offers students intercultural competence, otherwise referred to in our study as non-academic knowledge. Scholarly attention has focused on intercultural competence throughout the last decade, partially as a reflection of an increasingly globalizing world economy (Salisbury 2011). But while the positive outcomes of studying abroad for language acquisition have been effectively measured and documented (Regan et al 2009), intercultural competence is far more subjective, and thus significantly harder to define and to evaluate adequately (Salisbury 2011).

Intercultural competence implies an ability to engage, effectively communicate, relate, and work cooperatively with people and communities of distinct backgrounds (Kumagai and Lypson 2009). Lee et al argue that such competence cannot be acquired by mere exposure to a foreign culture, but requires active involvement on the part of the student (Lee et al 2012). This raises the issue of isolation among international students, as it threatens to prevent a student from engaging with a foreign culture. For example, in a 1955 study, Schloss states that an exchange student was "to a large extent confined to other foreign students frequently from his own country" (Schloss 1955, 573). This statement has been echoed by Schloss' contemporaries, many of whom describe the failures of cultural assimilation during study abroad experiences and an overall lack of intercultural knowledge achieved (Rose-Redwood 2013).

Deardorff defines intercultural competence as the ability to appreciate the differences among home and foreign cultures, and also to be comfortable with these differences when functioning in a diverse setting (Deardorff 2004). Utilizing this definition, Salisbury measured these factors among 1,593 participants of the 2006 cohort of the Wabash National Study of Liberal Arts Education. More specifically, he evaluates whether language exchange programs have had an effect on three major factors: diversity of contact, relativistic appreciation of cultural differences, and comfort with diversity. He shows that, while diversity of contact has increased, no significant change has occurred in students' appreciation of distinct cultures and in their comfort with diverse environments. Salisbury's findings point to a gap between the theoretical and practical ideas of cultural competency. However, his study neither accounts for the specific target countries of this study, nor for the peculiarity and persistence of pre-existing stereotypes about these target countries.

2.5 Sociological Method Challenges

We conclude with a remark about commonly-encountered methodological difficulties among sociological researchers. It is known that the evaluation of academic exchange programs presents considerable challenges from a methodological standpoint (Sowa 2002). A major concern here is the so-called 'sample selection bias' (see further discussion in Elwert 2014). Such a bias implies that any measured outcome of programs might be a function of participant characteristics, rather than the programs in which they participated.

3. RESEARCH QUESTIONS AND HYPOTHESES

Our research focuses on exploring the main differences between student exchange programs in Russia and the US. For the purposes of our study, we measure two main types of exchange results: academic and non-academic knowledge. We base this structural division on the fact that most academic exchanges aim to produce positive outcomes for both kinds of knowledge. We also surmise that the current shortfalls in US-Russian exchanges can be understood as a failure to se-

cure the attainment of one or both types of knowledge.

We hypothesize that we will observe more positive traditional academic outcomes for American students on exchange programs in Russia than the inverse. This is due to the fact that American institutions offer more academic area studies opportunities, quantitatively, and create stronger expertise tracks for students following program completion (Sergeev 2015). At the same time, we expect that non-academic outcomes, such as cultural assimilation and resistance against stereotype formation, are more successful for Russian students on exchange to the United States because of increased informal opportunities for acculturation. We base our hypotheses on the assumption that American programs in Russia perpetuate the self-segregation of American students, which serves to confirm their initial perceptions of the country (Coclanis 2016). A second underlying cause for such perceptions may be the alarmist nature of some program handbooks and orientations (Rose-Redwood 2013; Ward and Kennedy 1999; Shannon-Baker 2015). We conclude our study by making suggestions of potential linguistic and content changes that could improve the tone of program handbooks and materials.

4. METHODOLOGY

Our research methodology involves a range of qualitative and quantitative methods including survey data, statistical modeling, and discursive analysis.

4.1 Survey Data

To collect the data relevant to our study, we distributed surveys among former participants of exchange programs in both the US and Russia. We utilized snowball sampling, a method by which respondents direct researchers to other qualified respondents to gather data. This non-probability sampling procedure allowed us to ethically circumvent the confidentiality rules that generally keep researchers from program participants. We distributed the survey among alumni, university, and social networks using a Google-powered form from November 2016 to February 2017.

The target audience for the questionnaire was former exchange program participants who studied abroad between the years of 2005-2016. We chose this time frame as it includes a variation of presidential administrations and political climates in both countries.

Initially, we identified our target number of respondents at 50 US-based and 50 Russia-based former exchange program participants. Our results consisted of 54 American and 10 Russian responses, posing a risk to the strength and conclusive viability of our statistical analysis. However, our research proposes to be suggestive and exploratory, rather than prescriptive, and therefore we feel confident with the statistical methods used.

4.1.1 Variable Specification

The main goal of the present study is to identify structural and resultative differences between Russian and US academic exchange programs, hosted by universities at all levels of study. In the survey, this difference is coded by home country or institution (Questions Three and Seven). Therefore, this variable figures in the statistical model as the main variable of interest, in our case the independent variable.

The variables of outcome (dependent variables) are academic and non-academic knowledge obtained as a result of exchange program participation. Questions regarding the academic results of student exchanges are addressed by Q. 20 – 31 in the questionnaire, while Q. 32 – 46 address non-academic outcomes (see Appendix A and B for English and Russian survey questions, respectively). Most of the aforementioned questions follow a Likert-scale method, which is considered to be the most efficient approach when evaluating participant attitudes (Allen and Seaman 2007). According to this approach, a higher level of agreement with these questions indicates the perceived positive outcome of an exchange program. In order to eliminate possible bias caused by sampling with a moderate number of observations, we present exchange outcomes as a three-level scale: low, middle, and high, respectively (the statistical routine of converting a Likert-scale into a 3-stage scale can be found in the Appendix). This approach allows us to increase the validity of our scale in consideration of the sample size.

Two groups of control variables—socio-demographic and exchange-specific program controls—inform the baseline models for our study. The socio-demographic control group consists of variables such as gender, age, country of origin, educational attainment, and a student's household income. The exchange-specific control group addresses the particularities of different exchange programs. These include the student's home institution, specialization (both at the home institution and on exchange), the length of their stay abroad, and funding status. This allows us to eliminate some of the differences between academic and non-academic knowledge outcomes caused by institutional or context- specific factors.

4.1.2 Statistical Model

The Likert-scale technique makes it possible to scale participants by differences in program outcomes. However, as the analysis covers the estimation of self-reported results, it is not possible to claim similarities between points of the Likert-scale. As a result, the scale used in our study presents relative, rather than absolute, differences in program outcomes. In order to demonstrate these relative differences, we run a logistic regression on both ordinal, dependent variables of interest: academic and nonacademic knowledge.

The model for both outcomes variables can be represented by the equations below:

$$Y_i = X_i\beta_0 + \beta_1 Exch_i + \varepsilon_{ij}$$

Where:

Y_i – dependent variable of respondent *i*;

$X_i\beta_0$ – contains the set of control variables;

$Exch_i$ – country of exchange of respondent *i*;

β_1 – coefficient reflecting relationships between country of exchange and dependent variables;

ε_{ij} – error term (residual variation) for respondent *i* within host university *j*.

To note, we employ the theoretical framework of proportional odds assumption, which suggests that the coefficients reflecting the relationship between the lowest and highest academic and non-academic exchange outcomes are the same as those coefficients that describe the relationship between medium and highest levels of exchange outcomes (Agresti 2002). Therefore, we recode statements with the framework of a three-level index, exemplified as low (p_1, one), medium (p_2, two), and high (p_3, three). This logic allows us to best address the relative differences between program evaluations by respondents. In statistical terms this can be presented in the following equation:

$$Y_i = \begin{cases} log\frac{p_1}{p_2+p_3}, & 0 - low \\ log\frac{p_1+p_2}{p_3}, & 1 - low\ or\ medium^1 \end{cases}$$

[1] *High* is a reference group.

4.2 Discourse Analysis

The second element of our methodology is a discourse analysis of guidelines, booklets, instructions, and other texts given to program participants prior to their participation in an academic exchange. We hypothesize that both the content and style of these written guidelines contribute to the perpetuation of stereotype formation and detrimental clichés about the host country.

The emphasis of discourse analysis regards not just the meaning of a text, but what it is "doing and achieving" (Wood and Kroger 2000, 5). Austin (1962) defines language as a speech act that not only applies concrete meaning to particular objects, but further shapes these objects and changes the nature of their existence. That is, words are "not only about things, they also do things" (Wood and Kroger 2000, 4). Wood and Kroger outline the three main features of utterances: what they are about, what a speaker does with them, and how they affect the listener. From the discursive perspective, utterances "are treated as actions … as meaningful, social doings" (Wood and Kroger 2000, 12). In order to fully define their functions, we need to analyze utterances in context. Along with the content, intentions, and context of the texts, we also analyze stylistic elements, such as format (Wood and Kroger 2000).

Methodologically, we analyze each document per a list of themes that we determine to be anomalous with the generally accepted goals of a formal, academic exchange: program participation and intercultural exchange. Instead, we suggest that the negative terms used in these texts—whether implicitly or explicitly—may discourage potential participants from engaging in exchanges. Our results will evaluate the language utilized by the authors of the chosen guidelines, and how this language contributes to the formation of the themes that we identify in the texts.

5. RESULTS

5.1 Quantitative analysis

In the following section, we provide a descriptive analysis of our sample **(Table 1)**.

Overall, those that responded to our study reported to be 57 percent female and 43 percent male. The mean age of this group is 23.3 years, with the minimum at 18 years and the maximum at 33 years. About 62 percent of participants surveyed have completed a bachelor's degree. Among reported areas of specialization, the most common were political science (49 percent) and Russian studies (23 percent), while medicine was the least frequently-reported area of specialization in both countries. More than 60 percent of respondents were students, with the rest representing various professional groups, such as lawyers, analysts, and journalists.

The US respondents were 55 percent female and 45 percent male, and the mean age of the group was 23.4 years. As reflected in the overall composition, the majority of respondents (64 percent) have a bachelor's degree and represent 30 different universities. Half of the group indicated political science as their major field of specialization, and around 28 percent selected Russian Studies. The American subsample consisted of almost 62 percent active university students.

Russia-based respondents represent a relatively small fraction of the responses. The respondents were mostly female at 67 percent, compared to 33 percent male with the mean age of the group at 23.1 years old. Of our sample, eight students hold at least a bachelor's degree. These students represent six universities. Their fields of specialization include mostly economics, sociology, and political science.

Both Russia and US-based survey respondents participated in various exchange programs, and more than 21 percent reported more than one study abroad experience. Overall, most exchanges in our sample took place between 2014 and 2016. The most popular study abroad destinations were Saint Petersburg State University and the Russian State University for the Humanities (RGGU). Almost all respondents indicated "language and culture studies" as a primary goal in relation to their exchange. On average, programs lasted for six months, with one month as the minimum amount of time and 15 months the maximum. Most participants received partial or full funding to study abroad. None of the Russia-based participants traveled abroad without funding, and the Russian government provided funding for one-third of Russian students. Finally, about 61 percent of overall participants claimed to be satisfied with the location of their exchange program.

The results of the regression analysis are presented in **Table 2**. From our dataset, we identify that there are no statistically significant differences between American and Russian exchange programs. This indicates that participants from both countries weigh academic and non-academic exchange progress equally. Interestingly, the length of exchange positively correlates with both academic and communicational closure outcomes. In both cases, an extra month in the host country slightly increases feelings that one has received greater benefits from the program. These findings suggest that longer exchanges provide a better platform to eliminate communicational isolations, a conclusion corroborated by scholarship on program length

Table 1. Summary Statistics: Exchange Students, by home country

	All	American Students	Russian Students
Gender (males, %)	42.1	44.6	31.9
Age (mean, st.dev.)	23.3 (2.7)	23.4 (2.4)	23.1 (4.1)
Educational attainment (%)			
Associate's degree	1.8	2.1	-
Doctorate	7.1	2.1	33.3
Bachelor's Degree	62.5	63.8	55.6
Master's degree	10.7	12.8	-
High school	17.9	19.2	11.1
Research field/ specialization(%)			
Exact & Medical Sciences	9.1	8.7	11.1
Economics & Sociology	9.1	4.4	33.3
Political Science	49.1	50.0	44.4
Russian studies	23.6	28.3	-
Linguistics & Philology	9.1	8.7	11.1
Income groups (%)*			
1	12.5	8.5	30.0
2	19.6	19.2	30.0
3	19.6	19.2	20.0
4	28.6	31.9	10.0
5	8.9	8.5	10.0
6	10.7	12.8	-
Number of exchanges (% for 2>)	21.0	29.2	10.0
Funding (%)			
No funding	23.2	27.7	-
Partial	41.1	40.4	44.4
Full funding	35.7	31.9	55.6

Source: original survey conducted as a part of the SURF program.

* Income groups:

1	Less than $30,000	Less than ₽40,000
2	$30,000-$50,000	₽40,000-₽50,000
3	$50,000-$85,000	₽70,000-₽120,000
4	$85,000-$200,000	₽120,000-₽275,000
5	$200,000-$330,000	₽275,000-₽450,000
6	More than $330,000	More than ₽450,000

(Kumagai 2009, Lee 2012, Schloss 1955).

We also draw our reader's attention to an observation on academic outcomes: students with high levels of language proficiency prior to their exchange tended to benefit less academically, according to self-reported data. For students with the weakest language skills, the probability of experiencing academic progress on a program was 2.5 times greater than for those with high initial levels of proficiency. Intriguingly, language proficiency before the exchange is not correlated with non-academic outcomes such as communicational closure. This suggests that factors other than language level are responsible for the socialization of exchange participants.

Last, our findings demonstrate the importance of pre-existing stereotypes and their transformation. As shown in Table 2, students that share common and widespread misconceptions about the host country reanalyze stereotypes at a rate three times greater than students who had more accurate knowledge about the host country. This complements Deardorff's studies (2004; 2006) regarding the necessity of taking into account pre-existing perceptions when analyzing exchange program results.

5.2 Qualitative analysis: Survey

The qualitative aspect of our research involves an analysis of open-ended questions from the same questionnaire. We use questions 51 – 54 to identify the main themes that were recurrent in the answers. These questions concern such topics as the usefulness and significance of exchange programs, as well as the greatest benefits and challenges of study abroad. Question 54, in particular, allows respondents to leave an extended comment regarding their exchange experience. In order to illustrate the principal themes that we identify in their answers—namely, language acquisition, cultural awareness, and stereotype reduction—, we include quotes from their surveys.[1]

The majority of answers mentioned the topic of language. Most respondents wrote about a general improvement in their language skills, however there were also more detailed reports on various aspects of language learning and usage. For example, many respondents already claimed to use English or Russian in their current and future occupations.

> *"I continue to speak Russian and am interested in pursuing a career in the post-Soviet space where I can utilize Russian…"*

> *"Service Russian-speaking clients at my current job. Finance related matter."*

Culture was also an observable theme in the answers. Apart from engaging in a general cultural experience on exchange, which was mentioned in the majority of responses, survey

1 Responses given in Russian have been translated into English.

Table 2. Ordered Logistic Regression Estimates of Academic and Non-Academic Exchange Program Outcomes†

	Academic		Non-academic: communicational closure		Non-academic: transformation of stereotypes	
	OR	*SE*	*OR*	*SE*	*OR*	*SE*
Home Country	.53	.35	1.96	1.29	.96	.66
Length of exchange (in months)	1.19*	.08	1.13*	.05	.92	.08
Language proficiency (before exchange)	.52**	.11	1.27	.25	-	-
Program's academic difficulty	.91	.24	-	-	-	-
Pre-existed stereotypes	-	-	-	-	3.05*	1.68
N	*64*		*64*		*64*	

Source: original survey conducted as a part of the SURF program.
*Note. *** p ≤ 0.001, ** p ≤ 0.01, * p ≤ 0.05, ˣ p ≤ 0.1 two-tailed.*
† Coefficients are obtained from separate regressions. Intercepts and controls for gender are included in the model, but only the estimates of interest are presented. OR – odds ratio; SE – standard errors.

participants talked about problems adapting to a new culture and values. In some cases, target language study facilitated a deeper understanding of the host culture.

> *"Adapting to the new culture. Russia is a harsh place for a young American to experience."*

> *"The feeling of alienation and culture shock were the greatest challenge for me…"*

> *"My summer program in Moscow was business language-intensive, and was particularly helpful in getting me to understand some of the vocabulary, issues, and culture of modern Russian business."*

One factor that may have helped in overcoming the language barrier and adjusting to a new culture more easily was connecting with locals in the host country. Several respondents emphasized the importance of communication outside the classroom and criticized a lack of out-of-class immersion. Some attribute this shortcoming to poor program management.

> *"This [communication with locals] put me miles outside of my comfort zone and allowed a series of awkward and uncomfortable-but-safe experiences to make way for enormous personal growth while improving my language skills dramatically."*

> *"The best and most influential lessons I learned from study abroad were not curricular, they were everyday interactions that I had in the target language with citizens of the host country."*

> *"At my exchange programs, which had classes entirely consisting of American students, getting out of the US bubble was difficult..."*

For many respondents, an exchange experience helped them to combat preconceived assumptions about the host country. This new perspective and nuanced understanding, in turn, resulted in personal and professional benefits. Exchanges also encouraged participants to reevaluate and appreciate their home country's culture and domestic affairs.

> *"It is impossible to understand Russia without experiencing living here."*

> *"I stopped viewing Russia as a monolith represented only by Moscow, and this makes it easier to imagine negotiating with Russians of various interests."*

> *"Acquiring new perspective on the benefits and strengths of both a new culture and one's own culture. Realizing that people across the world face similar challenges."*

The above themes show that exchange programs contribute to a more profound mutual understanding between these two countries and respective cultures. Responses indicated a bi-directional debunking of false stereotypes: exchange participants tested their own misconceptions about the host culture through lived experience, and were able to provide more accurate information about their home culture to people in the host country.

> *"Hearing people's stories from your host country that shatter your previously held ideas of what the host culture was like." (on the benefits of study abroad)*

> *"It helps you to see a country not as a mass of unknowable faces and endless facts and stereotypes, but as a composite of many different people..."*

Participants also expressed concerns that were directly relevant to the motivations of the current study. Namely, they wrote that exposure to life in the host country constituted a unique experience that might encourage them and other students to take action toward improving US-Russia relations.

> *"It made me see that I had high potential to make a diplomatic difference through my many language skills."*

> *"... appreciating the role of a single person in a country's public diplomacy" (on the significance/usefulness of study abroad)*

> *"I got a first-hand look into the country – this is missing from many government agencies now."*

In general, the answers from the survey indicate that students both from Russia and the US face similar problems and gain similar benefits from studying abroad. It is necessary to take into account that the number of American respondents was much larger than that of Russian respondents, hence it is impossible to conduct an even comparative analysis from our current dataset. Moreover, the quality of responses differed as well—US participants, on average, provided more exhaustive responses, elaborating on the free-response questions, whereas Russian participants gave more concise answers. Nevertheless, we can conclude that participation in exchange programs results in a series of important outcomes that prove useful for individuals working in various spheres of US-Russia relations. We see that study abroad experiences provide participants with unique first-hand knowledge and help them to gain essential skills and new perspectives.

5.3 Qualitative analysis: Handbooks

In addition to our survey results, we analyze a series of handbooks in order to gain a more nuanced understanding of the exchange preparation process. Altogether, we evaluate five handbooks designed for American students participating in academic programs in Russia, one set of guidelines for Russians that intend on going to the US, and one set of guidelines provided by a Russian university (Higher School of Economics) for international students coming to Russia to study (an extended version of the analysis can be found in Appendix C).

One complication in our analysis was the scarcity of handbooks generated by Russian universities and exchange programs. This, however, was in line with our expectations regarding differences between Russian and US exchange programs: in the US, these programs are numerous, well-funded, and well-structured, while in Russia there is a lack of equivalent academic exchange programs. And those that do exist are not as thoroughly structured as their American analogues. However, the two available sets of guidelines produced by Russia-based programs does allow us a point of reference that enriches our analysis.

The results of our handbook analyses confirm our hypothesis that certain stereotypes are perpetuated during the orientation process. While the handbooks largely contained neutral and positive information about the host country, the chapters dedicated to safety issues and cultural differences demonstrate non-neutral language and negative stereotypes, as well as factual mistakes. These occurred with alarming frequency, including such claims as "abortion is the primary method of contraception in Russia," "there are no feminist movements in Russia," and "being gay is illegal [in Russia]."

Compellingly, both US handbooks' treatments of safety issues in Russia and Russian handbooks' descriptions of safety issues in the US emphasized high crime rates, recommend against walking alone in the dark, and warned against pickpockets. Other safety 'recommendations' for US students included not speaking loudly or laughing in public places, not smiling at unknown people (especially men), not attending nightclubs, and securing one's backpack with a portable lock in order to avoid theft. Russian guidelines, while generally maintaining a neutral tone and language, still introduced negative commentary about the US, including the claim: "the US is not as free and democratic as it seems to be."

These orientation materials also addressed preconceptions, cultural expectations, and stereotypes. One Russian handbook sought to temper expectations about the US, stating that the US is not better (or worse) than other countries, and has all the negative features of developed capitalist societies; the handbook implies that most Russians have an inaccurate, idealized perception of the US that should be "brought down to Earth." In contrast, US handbooks start from the assumption that students have little or no prior knowledge of Russia. While these handbooks do include extensive paragraphs the on the importance of non-stereotyping and being open to new, unknown cultures and different ways of life, most sections on cultural differences seemed unable to avoid displaying Russian culture as the culture of 'the other'. Some contained exoticized descriptions of Russian people, describing women as dressed up with heavy make-up, tall boots, and high heels, while men were described as expecting a sexual relationship if smiled at by women. Certain passages expressed a broader criticism of both Soviet and Russian modes of life. For instance, the following paragraph from a brochure published by the American Council of Teachers of Russian (ACTR)'s study abroad department uses what might be considered an offensive tone, using a number of negative terms to describe Russia and Russians:

> *Below the thin veneer of equality during Soviet rule was a high level of hypocrisy with respect to women and minorities that is still in evidence today, especially among older and more isolated populations. To some extent, some Russian citizens still fall rather easily into the insensitive or harmful over-simplification of other groups that is called stereotyping in the US. Stereotyping, attributing certain personal characteristics to all members of a nationality, can easily lead to feelings of cultural superiority or inferiority. Americans are often upset by the speed with which some Russians will stereotype others, and while that practice may be widespread in Russia it can cause difficulties with Americans.*

There are other comments about Russians that appear to be stereotypes or descriptions based on anecdotal, and not factual, evidence. These statements seem not only untrue but also unnecessary for a handbook, lacking both practical value or cultural relevance. For instance, the authors of the ACTR handbook state that Russians eat often and a lot of food, stating that "Americans are frequently amazed by the amount of food that younger Russians eat." They add that Russian food is not only eaten in large quantities and often, but also lacks variety, and, overall, is inferior to the food eaten in the US.

6. CONCLUSION

We undertook this project with the aim of identifying whether academic exchange programs between the US and Russia are an effective tool for creating academic and non-academic knowledge in college students as potential, future bilateral relations experts.

In order to analyze US-Russia exchange programs, we conducted a survey among former participants of the programs from both Russian and American perspectives. We designed a survey that focuses on questions about academic and non-academic knowledge acquired by the students during the exchange, aiming at gaining clarity into whether or not exchange programs were effective for the acquisition of both types of knowledge. We also designed a number of questions aimed to explore the way that participation in an exchange program influences existing stereotypes about the host country.

To analyze the data gathered via the questionnaire, we used both quantitative and qualitative methods. The quantitative analysis was conducted with a sample of 54 responses from US-based and 10 Russia-based participants. Although the target number of 100 responses was not reached, the data is nonetheless meaningful as well as diverse, representing exchange programs affiliated with 30 different universities.

We carried out separate, ordered, logistic regressions to test the initial hypothesis that exchange programs for American students in Russia result in more academic, rather than non-academic benefits, whereas Russian exchange participants in the US receive a greater degree of non-academic benefits. Our analysis did not confirm this hypothesis—instead, we found that exchange programs in both countries are not statistically different and are quite similar in their academic and nonacademic outcomes. Nevertheless, we are able to report several important findings.

First, the length of the exchange experience positively correlates with an increase in benefits, which holds true while controlling for gender; even an extension by a single month results in a measurable difference in both academic and non-academic benefits. Hence, consistent with the existing literature, our analysis shows that longer exchanges might help to overcome the barriers to integration in non-academic exchange settings. Second, students with higher levels of language skills and academic knowledge receive greater non-academic benefits, while students with a lower level of previous knowledge benefit more academically.

The survey also includes open-ended questions analyzed with qualitative methods. After analyzing these questions, we do not observe any significant difference between US- and Russia-based participants. In both cases, the reported outcomes related to desired and achieved language acquisition and cultural adaptation. From more detailed answers, we were able to conclude that program participants felt that they gained greater benefit from immersive experiences, such as talking to locals or stepping out of their comfort zone. Respondents emphasized that study abroad experiences provided them with unique knowledge and skills that could not be obtained otherwise. Participants noted in several cases that they could have benefited more from out-of-class immersion, highlighting non-curricular experiences and interactions with local people as crucial.

Finally, we conducted a discourse analysis of handbooks provided to exchange students before their study abroad programs. The key issue that we considered in this analysis was whether these handbooks were written in a neutral-positive, encouraging tone, or whether there were elements that might generate a negative bias or perpetuate stereotypes of the host country.

Based on our analysis, we conclude that there is a significant degree of negatively-charged content present in pre-departure exchange handbooks, and that it would be beneficial for authors to carefully monitor their content for the rhetorical elements of the narrative. We have singled out the following elements of the handbook narratives that we would recommend being conscious of and avoiding: 1) Usage of non-neutral, emotional language, adjectives of exaggeration; 2) Gender-based stereotyping (broadly describing Russian men and women in specific terms); 3) Providing false or unproven assertions to prove a point, including one that emphasizes the 'otherness' of Russian or American culture or the dangers of being in the country; 4) Relying on anecdotal evidence to prove certain points (regarding safety and cultural differences); 5) Utilizing negative stereotypes about the Soviet period or other historical anachronisms; 6) Applying the dichotomy of 'West' and 'non-West,' with 'West' serving as the equivalent of high quality, progress, and civilization (and vice versa); and 7) Relying on facts that appear to be dated (such as recommending to bring chewing gum or pocket calculators as presents).

Considering these overall findings, we conclude that academic exchange programs still prove to be a valuable source of knowledge and experience for students both from Russia and the US. This is especially the case amid the crisis in current US-Russia relations. While more research is required in this field, our study represents a first step toward seeking a remedy for the range of bilateral stereotypes and segregation that occur between these two states.

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4

Boeing in Russia: An Analysis of the Aircraft Industry in Turbulent Times, 1990 to the Present

IV. Trade & Economics Working Group

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Abstract

The aviation sector is a primary driver of bilateral United States (US)-Russia trade. Between 2010 and 2015, Russia imported more airplanes from the United States than it did in the preceding 15 years (OEC 2016). At the same time, trade in most other industries either stagnated or decreased between these years, leading airplane trade to account for 35 percent of total US-Russia trade (OEC 2016). Meanwhile, the Russian administration actively encourages the development of domestic aircraft manufacture by subsidizing the United Aircraft Corporation and the production of planes such as the Sukhoi Superjet 100 and the Irkut MC-21. In this paper, we explain why, between 2010-2014, there was an increase in imports of American aircraft to Russia, but not in imports of Russian-made planes to the United States. Examining America's Boeing Company and Europe's Airbus Group, we consider a range of factors that influence these import shares, including private and public interests as well as purchase and leasing contracts.

1. INTRODUCTION

In 2015, the United States exported eight billion dollars' worth of high-value transportation goods, primarily airplanes, to the Russian Federation, which was roughly a 31 percent increase from 2009 (OEC 2016). Meanwhile, the Russian administration actively encourages the development of domestic aircraft manufacturing and production (Dagaeva 2016, Rogozin 2015, Rogozin 2016). For example, government officials subsidized the United Aircraft Corporation (UAC) (Ob"edinënnaya aviastroitel'naya korporatsiya) with lump-sum grants from the federal budget to compensate Russian airlines for various cost and aircraft lease payments. The federal government also encourages the promotion of two Russian-made aircrafts: the Sukhoi Superjet 100 and the Irkut MC-21. These two planes are hopeful competitors with the major civil aircrafts on the market: the Boeing 737 and the Airbus 320.

On one hand, an increase in aircraft imports to Russia may signal the adoption of free-trade policies that encourage an opening of the domestic market to external trade and investment. On the other hand, the subsidies for domestic airlines suggest Russia's desire to become self-sufficient in aviation.[1] And while free-trade policies seem to be the theoretical antithesis to protectionism, we contend that it is not rare for a country to implement protectionist policies while strategically targeting the development of one industry in order to foster a particular economic outcome that may not have occurred without state intervention (Evans 1995, Wade 1990). Our paper seeks to address the conflict between action—a factual increase in US aircraft imports—and rhetoric in contemporary Russia. We propose three hypotheses that may explain the increase in Russia's Boeing aircraft purchases:

> **Hypothesis One:** Russia increased its imports of American airplanes in response to the production constraints that stem from the nature of the global aircraft market and the relative strength of leadings corporations, such as Boeing and Airbus.

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1 The free-trade versus protectionism debate harkens back to the works of Adam Smith, David Ricardo, Friedrich List, Karl Marx, and John Maynard Keynes, and scholars on either side continue to make their case for more rapid and sustainable growth and economic development. For examples see: Robert Went, 2000, "Game, Set, and Match for Mr. Ricardo? The Surprising Comeback of Protectionism in the Era of Globalizing Free Trade," *Journal of Economic Issues* 34 (3): 655-658.

Hypothesis Two: Russia increased its imports of American airplanes because domestic demand has increased and domestic supply has not demonstrated that it can match demand.

Hypothesis Three: Russia increased its imports of American airplanes, specifically with America's Boeing company, because of highly integrated global supply chains in aircraft manufacturing and production.

Our findings suggest that there is a mutual financial dependence between Boeing and Russian companies, whereby both would be hurt if the trade was cut. Furthermore, the Russian aviation industry does not currently have the capacity to meet domestic demand for civic aircraft, thus explaining the inconsistency between imports and rhetoric.

Section Two contains general background on the global aviation industry. In Section Three, we demonstrate why Russia's attempts to create a strong competitor for foreign aircraft has not yet succeeded. Section Four outlines overall trends in US-Russia aircraft trade, highlighting the main competitors on the market: Airbus and Boeing. In Section Five, we evaluate industry and third-party data on recent trends in the aviation industry, concluding that protectionist theorizing and liberal trade practices are in conflict in Russia. Section Six explores the near future of US-Russia trade relations and the Russian domestic aviation industry.

General Background on the Aviation Industry

The global aviation industry is large and provides a service that is essential to the global economy, employing more than 9.9 million people (Air Transport Action Group 2016), transporting over 3.5 billion passengers (International Air Transport Association 2016) and 52.2 million tons of cargo yearly (International Air Transport Association 2016). Moreover, the industry contributes roughly $664 billion to global GDP annually, which is roughly the same as the nation of Switzerland (Air Transport Action Group 2016). As such, many governments treat their domestic aircraft industry as a strategic sector because of its importance to the global and domestic economy. In Russia, for example, the domestic aviation industry is seen as a politically-important and public utility that should be protected on the grounds of national security (Grancay and Szikorova 2013, 709-710). Meanwhile, foreign aircraft companies need to cooperate with nation-states and their regulators in order to comply with national safety standards. Often the regulatory oversight of foreign firms is much more strict than that of domestic companies, creating a further imbalance (Grancay and Szikorova 2013).

However, given the globalized nature of the aircraft industry, there are extensive interdependencies between aircraft part-suppliers, services, and airports. Given the advanced technology and capital needed for aircraft production, developing countries do not participate in aviation manufacturing as much as more advanced economies. And the industry is heavily regulated by the International Civil Aviation Organization (ICAO) to increase public safety, thus making it very difficult for new companies to establish a firm footing in this market (McGuire 2011). The largest companies in the aircraft market, Boeing and Airbus, have proven their ability to meet the stringent safety requirements and standards in the aviation industry, and thus have developed the added advantage of reputational effects. Boeing and Airbus's carrier capacity is over six times that of other firms (Embraer, ATR, Bombardier), and nearly 18 times that of UAC (UAC 2014). In short, while the aviation industry is competitive, the commercial aviation sector is dominated by two major players.

Since its conception in 2006, Russia's United Aircraft Corporation has been trying to enter the international aircraft market. It focuses on producing new aircraft models to compete with foreign products: notably the Sukhoi Superjet 100, a regional jet airliner, came out in 2008, and more recently UAC has been working on developing the Irkut MC-21, a short- to mid-range jet airliner, which should see its first flight in 2017 (Karnozov, 2017).

Both Boeing and Airbus have received support from their respective domestic governments, despite this being forbidden by World Trade Organization (WTO) rules (Hayward 2005, Necen and Sykes 2014). Given the strategic importance of the aircraft sector, government intervention in the aviation market is common to support a greater domestic market presence. And yet, their support makes it particularly difficult for new firms to emerge and compete in the international market. Policies favoring import-substitution, theoretically positioned to strengthen the sector and promote growth domestically, are particularly common in the Russian aircraft industry (Faltsman 2015). Another form of protectionism commonly used in Russia is the heavy subsidization of so-called 'industry champions'.[2] Foreign competition is thereby limited, which leads to a 'picking winners' practice that runs in contrast to free-market logic and policies. According to the practice of 'picking winners', the government supports certain industries and companies through business opportunities and tax incentives. Under President Vladimir Putin, the Russian government has made 'national champions', amalgamating corporations under a monopoly for enhanced competitiveness and efficiency (Goldman 2008). In 2006, the Organization for Economic Co-operation and Development (OECD) reported the "disturbing trend of state ownership" in Russia, noting vertical integration in the oil and gas sectors, electricity, nuclear energy, aviation industries, and titanium production (OECD 2006, 36-40).

Russia has historically had a strong aviation sector. The production of military aircraft was a crucial industry in the Soviet Union, employing numerous citizens and pulling resources from aerospace research, design, and production. Additionally, the territory of the Soviet Union comprised major commercial airfield routes, further highlighting the value of the aviation industry in the former USSR. Given the latent Soviet industrial infrastructure and skilled labor re-

2 For example: A utilization tax (utilizatsionnyy sbor) was placed on imported automobiles, whereas consumers who purchased domestic cars were not taxed for use.

sources that spilled over to Russia in the 1990s, as well as the state of global competition, Russia's decision to maintain its aviation sector appears based in tradition. And yet, such domestically-focused policies are not unique to Russia and have largely been accredited to the rise of the so-called East Asian Tigers—South Korea, Taiwan, Hong Kong, and Singapore (Evans 1995, Page 1994, Wade 1990). Proponents of 'picking winners' use the East Asian growth miracle as a decisive argument in favor of the policy, while others debate the validity and causal force of vertical integration as a key driver of growth. Additionally, there is debate as to whether the government will pick a sector that is struggling in order to address market failures, or if the government will select industries that are assuredly profitable (Shleifer and Vishny 1994, Shleifer and Vishny 1997). In any case, political rationale—combined with factors such as investor confidence and perceived risk—often drives policy and the practice of 'picking winners' (Bortolotti and Pinotti 2008; Dinc and Gupta 2011).

In contrast to the protectionist strategy of the Russian government and the East Asian Tigers, there is consensus among academics and policy-makers that a deregulated aircraft sector open to the market is economically and politically beneficial for a country (Grancay and Szirkova 2014, 710; Doganis 2010; Richman and Lyle). Indeed, the logic of the aviation sector points to contradictory trends and political incentives: ought states liberalize or protect? With respect to the aircraft industry, the numbers confirm this tension in Russia, suggesting that the state engages in protectionist policies while opening aviation contracts to foreign companies like Boeing and Airbus. Our paper addresses this puzzle, by attempting to better understand the bilateral trade relations between the United States and Russia in the aviation industry. We suggest that the historical strength of the Soviet aircraft sector is critical in contextualizing contemporary relations.

2. FOCUS ON THE SOVIET AND RUSSIAN DOMESTIC AVIATION INDUSTRY

The Russian aviation industry was very powerful throughout the Soviet era, manufacturing about 25 percent of global aircraft. Upon the USSR's breakup in 1991, the industry was comprised of approximately 400 state-owned firms controlled by the Ministry of Aviation. The industry was particularly vulnerable due its complex structure, characterized by a high degree of integration, cross-financing between the military and civil sectors, and the separation of aircraft design and construction (Vorobyev, 1996). Different companies handled separate stages of aircraft production, from financing to production, and these companies would often be geographically dispersed for political reasons, resulting in high transport costs and inefficiencies. As a result, the breakup of the USSR and the economic crisis of 1992 had a significant effect on the aviation industry. The passenger-to-kilometer ratio in air traffic greatly decreased, especially compared to all other forms of passenger transport (Kort and Kluiters 2003). According to Kort and Kluiters, in the 1990s, Soviet enterprises produced approximately 100 aircraft and 90 helicopters for civil purposes (2003). By 2000, the industry produced only ten aircraft and 40 helicopters for civil purposes. Military capacity also declined.

In addition to this, the collapse of the Soviet Union allowed for increased competition with foreign aircraft producers, Russian companies lost market shares rapidly. In 1998, Russian carriers purchased 26 western-made aircraft and only 23 Russian-made ones (Kort and Kluiters 2003). In former Soviet countries, too, Russian carriers rapidly lost their market dominance. Russian aircraft were perceived as uncompetitive—most of the aircraft produced in the 1990s had been designed in the 1960s and 1970s, had fuel consumption between 1.5 and two times that of comparable western aircraft, and engines which needed more maintenance and often did not comply with noise and pollution restrictions. Following this deterioration, reviving the aviation industry became a matter of national strategic priority; 1992 saw the adoption of the Program for Development of Civil Aviation in Russia, which aimed to provide government support of 1.06 trillion rubles in the form of tax exemption, credits, and grants. However, only a fraction of this allotment was paid out (Kort and Kluiters 2003). A new program for the development of the aviation industry was adopted in 1999, aiming to make Russian aircraft more competitive. In 2006, a presidential decree established the United Aircraft Corporation (UAC), a joint-stock company consolidating over 100 commercial and military aircraft companies, with 91 percent of shares belonging to the Russian state. UAC is behind most innovations and developments in the Russian aircraft industry today, such as the production of Sukhoi Superjet and Irkut MC-21 aircraft. Formed with the aim of increasing the competitiveness of Russia's aviation industry on an international scale, UAC has been limited in terms of growth due to its inability to meet domestic demand and faults in the production process that limit its room for growth in the existing aviation market. In addition to the constraints faced by UAC, complex integration and interdependence between Russia and the US in terms of the aircraft-production-supply-chain has added incentives to maintain close business relations. Each constraint is outlined subsequently.

Constraint One: Limited Capacities for Domestic Demand[3]

Although the Russian aviation sector was very prominent in the Soviet era, it suffered a steep decline following the breakup of the Soviet Union and has since experienced a slow recovery. UAC's production of civil aircraft has lagged behind not only Boeing and Airbus, but also smaller competitors such as Bombardier and Embraer, each of which produced more than twice as many planes as UAC in 2014 (79 and 90 respectively compared to UAC's 33) (UAC 2014). However, UAC is currently focused on increasing its production and market share both in the international and the domestic market, particularly with the production of the Sukhoi Superjet 100 and the MC-21. The two new models have been developed to compete with the narrow range Boeing and

3 The information, data, and inferences in this section emerged from an informal interview at Boeing headquarters in Moscow, November 2016, with Jorge Molina.

Airbus planes. UAC aims to acquire 3.2 percent of the global civil aircraft market by 2025, up from 2.12 percent in 2014. However, despite UAC's predicted increases in output, such increases would still leave them as the smallest of the large aircraft companies.

Although, in the domestic market UAC is the third largest manufacturer of planes in service, with 144 planes compared to Airbus' 259 and Boeing's 231. The main models provided by UAC are old aircraft supplied by Russian design bureaus such as Yakovlev (45 units with an average age of 31 years), Tupolev (37, aged 26) and Ilyushin (12, aged 39) design bureaus as well as 50 new SSJ-100 (average age of two years) out of a total of 1,019 passenger aircrafts in service (as seen in Table 2).[4] And yet, UAC has the capabilities to produce and service as many as 822 aircraft, or almost 72 percent of the market in 2000. However, due to a long period of stagnation, the UAC now lacks the technology and facilities to produce up-to-date and economically effective planes, which led to a stable decrease in its market share since 2000 [Table 2]. Thus, the production capacities of the Russian aircraft manufacturers are restricted in scale, at least for the near future. As such, Russian airlines continue to import non-Russian aircrafts in order to meet market demand for flights.

In light of these limited capacities, it seems that Russian aircraft production cannot cover demand in the domestic market. The demand for air passenger traffic transported by Russian companies increased by an average of 11.7 percent per year between 2000-2013, which is approximately twice the rate of the global market. Even though the growth rate fell in 2014 to 7.2 percent, demand in Russia still stayed well ahead of the global market growth rate of 5.9 percent. UAC is smaller than Boeing and Airbus, delivering 33 aircraft in 2014, compared to Boeing's 667 and Airbus's 609. According to a long-term forecast by UAC, Russian carriers' demand for new passenger aircraft will reach approximately 1,250–1,350 aircraft of different capabilities between 2015 and 2035, approximately 65 planes per year. While UAC provided 18 of the 65 new civil aircrafts acquired by Russian airlines in 2014, and 11 of 71 in 2013, it seems that UAC does not currently have the production capacities to meet all of the demand, and in fact only aims to acquire 60 percent of the domestic civil aircraft market by 2035. Questions of fuel efficiency at a time of rising fuel prices (in rubles), safety and quality, and the lack of warehouses stocking spare parts around the world further biases demand away from the newer Russian planes toward more established competitors and their aircrafts. With a growing demand for air travel that cannot be matched by the supply of Russian aircrafts, American imports in the aircraft sector increased.

Constraint Two: Entering an Established Market

The second major constraint facing UAC in entering and competing in an established market relates to the incentives and needs of airline companies. Airlines that are purchasing SSJ-100s, at the time of writing, include Aeroflot, Rossiya Airlines, Comlux (Switzerland), City Jet (Republic of Ireland), and Interjet (Mexico). The MC-21 and Sukhoi Superjet 100 entered an already established market and will need to present themselves as equally competitive, if not more so, to existing planes. Additionally, it will take time for UAC's new models to demonstrate their competitiveness. As a new player in an established field, time is working against UAC.

In addition, the SSJ-100 has faced issues including production delays, technical malfunctions, and a crash during a promotional flight (Der Spiegel 2012), later attributed to an error of the pilot's judgement (Flying 2012). Russia's leading airline, Aeroflot, issued a report in 2012 voicing concerns over the safety of the Sukhoi Superjets, which constituted eight percent of their fleet. Aeroflot claimed that the Sukhoi Superjets accounted for 40 percent of all technical mishaps experienced that year (Pyadushkin 2013). However, the Russian government has encouraged Aeroflot to acquire more Sukhoi Superjets, and so, Aeroflot's fleet currently includes 30 Sukhoi Superjet aircraft and is currently working on contracts to acquire 20 more Sukhoi Superjet and 50 MC-21 aircraft (Sputnik News 2016). Fuel prices also affect airlines' calculations: fuel prices were very high in 2012-2013 and fell in 2014. However, given the simultaneous depreciation of the ruble, fuel prices remained high. As such, Western-made aircraft, with greater fuel efficiency, were increasingly attractive for Russian carriers. UAC likely lost business opportunities as a consequence of this complex fuel-aircraft-currency dynamic. Fuel prices will likely continue to be an influencing factor in the future for UAC.

Most recently, the discovery of a technical fault with SSJ 100's stabilizers prompted Rosaviation to demand that all airlines conduct security checks, resulting in a temporary grounding of Sukhoi Superjets by some of its largest operators, including Aeroflot and Interjet (Vedomosti 2017). Finally, UAC's less-established position in the aircraft market compared to its competitors, Boeing and Airbus, is an intuitive disadvantage due to reputational advantage. UAC also has fewer repair centers and warehouses with spare parts than the other plane manufacturers (UAC 2014), making the operation of their planes riskier and repairs costlier. Despite governmental subsidies in support of domestic aircraft, the above-mentioned production problems, technical flaws, and issues related to fuel cost and efficiency likely incentivize Russian airlines to continue purchasing American-made planes rather than those produced by Russia's UAC. The following section will further explain the strength of US-based firms in the Russian market, both by evaluating Boeing independently and by comparing it to its competitor, Airbus.

3. COMPARATIVE FIRM ANALYSIS: BOEING (US) VS. AIRBUS (FRANCE)

In order to better understand the increase in US aviation exports to Russia since 2010, we must situate Boeing's sales in Russia within a larger context. While the US military-industrial complex and large domestic market bolstered the American aviation industry throughout the early and mid-twentieth century and helped to stave off foreign competition, the collective European effort to produce a rival in Airbus in the 1970s forced Boeing to turn increasingly to international markets in order to remain competitive. Airbus

4 All tables and footnotes for this article can be found in Appendix D

became Boeing's primary competitor in the production of civil, commercial aircraft, superseding the American company's market share not only in Europe, but in Russia and the CIS markets as well. Thus, Airbus serves as an excellent comparative study for Boeing's business in Russia.

In 1991, Airbus became the first Western company to enter the post-Soviet, Russian aviation market, when Russia granted a *type certificate* signifying the airworthiness of Airbus' twin-engined, widebody A310 (Airbus 2016). In 1995, Airbus established a regional office in Moscow, a significant step toward cementing the firm's interests in the region. Over the following years, Airbus continued to invest in its Russian partnerships, for example, establishing the Airbus Engineering Centre in Moscow. Airbus also continued to produce aircraft components at Russian plants (Airbus 2016). These supply chain linkages became crucial to Airbus' competitive position in the Russian market. By 2008, Airbus was supplying the fleets of Uzbekistan Airways (Uzbekistan), Ural Airlines (Russia), KD Avia (Russia), and Air Astana (Kazakhstan), in addition to its longstanding contracts with Aeroflot (Airbus 2016). As of 2015, 28 airlines in Russia and the Commonwealth of Independent States (CIS) region operated 340 Airbus aircraft, and Airbus continued to project an upward trend. In its 2014 Global Market Forecast, Airbus projected that the "Russian and CIS air passenger market [would] more than double in the [coming] 20 years, with over 2,000 aircraft needed by 2034 compared to the 922 in operation" at the time. By Airbus CEO Christopher Buckley's estimations (dated 2014), the company could achieve its goal of claiming a 50 percent market share in Russia and the CIS as a result of both new purchases due to increased demand and also to the fuel-efficiency, technology, and safety upgrading of older fleets.

In terms of commercial aircraft, Boeing initially lagged behind its European counterpart in its slower entry into the Russian market. Reasons for this included less intensive foreign direct investment, weaker partnerships, and a less-established regional supply chain. However, outside of civil aircraft, Boeing and Russia have an intense history. For example, Boeing was involved in the historic Apollo-Soyuz space mission of the 1970s, where spacecraft from both the United States and Soviet Union docked in orbit (Boeing 2016). In addition to the Boeing-Russia spacecraft collaboration, Boeing was also involved with Russia's first aircraft design bureau TsAGI (Tsentral'nyy Aerogidrodinamicheskiy Institut) and has historically collaborated with Russian research institutes and aircraft design and production facilities.[5] After the collapse of the Soviet Union, economic recession and a decline in military orders left Boeing cash-poor and the company did not enter the Russian civil aircraft market until 1993 (even then, to a limited extent). However, by the early 2000s, and especially after Boeing's acquisition of McDonnell Douglas—making Boeing the world's largest aerospace company by a sizeable margin—Boeing had the resources it needed to invest in more advanced technologies and in foreign markets. As a result, Boeing quickly began to close the gap with Airbus in its market share in Russia and the CIS region.[6] Despite its late entry and dominance of the Russian aircraft market, Boeing then took advantage of a skilled and under-employed labor force, and the decline of the Russian domestic aviation sector, particularly after the collapse of the Soviet Union.[7] In addition to the aerospace partnerships, Boeing set-up a design center in Moscow, began testing and researching in Russia, and then opened a joint venture with VSMPO (Verkhnesaldinskoe metallurgicheskoe proizvodstvennoe ob"edinenie). The partnership with VSMPO ensured that Russian titanium, a domestic material, would be used for Boeing plane production. From this point, Boeing's increasing involvement and dominance in the Russian market became evident. Shortly after, Aeroflot, the largest domestic Russian carrier, shifted its lease and purchase portfolio from Airbus to Boeing (Aeroflot 2016).

Despite such positive developments, Russia's less than stable investment climate was certainly a factor that influenced these firms' production and expansion decisions. The investment climate is, and was, perceived as risky and unstable, with frequent legislative changes posing particular concern to foreign corporations. Despite Russia's proximity and strategic location to both Asian and European air markets and the Arctic passageway, limited investor confidence has predetermined the extent to which Russia has seen an increase in foreign investment and further involvement (Ernst & Young 2015). This issue places constraints on the degree of integration Airbus and Boeing are able to achieve in the Russian market.

A brief analysis of order dynamics shows that the number of Boeing planes that Russia ordered increased significantly, by almost 1300 percent or 82 units, from 2005 to 2010 [Table 1]. The same is true for Airbus with 80 planes ordered. However, Boeing managed to increase that number even further to 106 units in 2016, whereas Airbus only went up to 86 [Table 2]. This can be in part explained by the fact that, contrary to Airbus, Boeing increased sales to leasing companies, resulting in a quicker growth in 2010 with a relatively low start as well as a positive dynamic in 2016.

Boeing in Russia

In addition to the supply chain incentive driving US exports to Russia, there are strong trade connections between the Russian aviation market and Boeing. Russia annually imports roughly 5.3 billion USD from Boeing, and Boeing plans to invest 21 billion USD into the Russian market by 2021 (Boeing 2015). And, in 2015, a deal between Boeing and Russia's Volga-Dnepr Airlines that amounted to 7.6 billion USD was closed. However, aside from pure investments and international capital and product exchange, there is also close integration between Boeing and the Russian aviation sector in terms of research and development, as well as employment. Boeing's international supply chain is dependent on Russia, driving the persistent US exports of aircraft to Russia.

In 2010, then-President Dmitry Medvedev signed a part-

5 Interview at Boeing headquarters in Moscow.

6 McDonnell Douglas had previously been the single largest aerospace company, topping both Boeing and Airbus. As a result, Boeing's acquisition.

7 Interview at Boeing headquarters in Moscow.

nership agreement with Boeing. Through this agreement, research and development centers were established in Moscow: the Technical Research Center, the Moscow Design Center, the Aviation Training Center, and most recently, the Training and Research Center in Skolkovo. Over 1,250 engineers, researchers, and informational technology specialists from these institutes find employment in the Russian aviation industry. A medium-term cooperation agreement signed in 2002 had already mandated shared exploration of opportunities in joint engineering, product development, maintenance, crew training, marketing, and customer support (Aviation Voice 2016). And so after Sukhoi was selected to lead Russia's regional jet program by the Russian government, Boeing's advisory role was extended and expanded to advising on the development of the Sukhoi Superjet 100 (Boeing 2007). Boeing has also expressed interest in establishing a joint management-service with Rostec, Russia's state corporation that promotes the development and production of high technology goods, in order to improve Boeing's in-country repairs, a relationship that could also boost Boeing's returns on the Sukhoi Superjet-100.

As briefly noted, the world's largest titanium producer, VSMPO, began cooperating with Boeing in 1993, signing their first contract in 1997 (VSMPO 2014). Since then, Boeing has further invested 70 million dollars into a joint titanium treatment center in Russia's Sverdlovsk region. Currently 40 percent of Boeing's titanium is supplied by VSMPO. In July 2014, the existing contract was extended to 2022, extending beyond the current deal VSMPO has with Airbus. The Russian titanium is processed in Oregon for aircraft forgings and excess is sent back to VSMPO for recycling, highlighting a tight production loop that further binds Boeing with the Russian aviation sector, reinforcing bilateral trade.

Trade relations between Boeing and Russia are extensive, and there is a mutual incentive not to sever these relations. However, it is also apparent that very real market constraints enable the continued US exports of aircrafts to Russia. The aviation sector has made a slow recovery since the collapse of the Soviet Union and has endured many unforeseen roadblocks to global market competition, largely the safety regulations and international standards imposed by the ICAO. The United States export of aircraft continues to dominate US-Russia trade, partly due to high market integration, interdependence, and the international supply-chain, as well as the constraints on domestic competitors like UAC. In sum, the confluence of the above factors can help us understand why Russia continues to import US aircrafts, driving the US-Russia trade balance.

Data Evidence of Boeing's Dominance of Russia's Domestic Aviation Market

According to Observatory of Economic Complexity (OEC) data, the total Russian imports of foreign aircraft increased steadily between 1992 and the 2008 financial crisis. In 2008 and 2009, the total value of imports stabilized before dropping to a four-year low in 2010 (Simoes and Hidalgo 2011). This was likely caused by a decrease in Russian domestic demand for airlines' services, following a drop in national income. However, this crisis-related pause was soon replaced with renewed growth, and imports in 2012 surpassed those of 2009. Notably, almost all of this growth can be attributed to an increase in imports from the US. In the following section, we evaluate the OEC dataset, with a particular focus on the transportation industry.

In order to provide a check on the trade data provided by the OEC, we compared it with the internal industry operation time-series data made available to us by Boeing's Regional Marketing Director for the Middle East, Ukraine, and Russia, Jorge Molina. These numbers depict the structure of aircraft ownership and production in Russia over the last two decades. Both the OEC data and the industry operation time-series data are excellent sources in their own regard. The former provides an extremely detailed breakdown of trade statistics, while the latter is used by industry professionals who consider it to be one of the most reliable datasets available.

Figures 1 and **2** present a by-sector breakdown of American exports to Russia and vice versa, demonstrating that, despite significant variation in US-Russia trade, the big picture is outlined by very few goods, airplanes being one of them.[8] Relative to other trading partners in the aviation industry, the US-Russia trade relationship is significant to both countries. Russia buys almost 10 percent of American planes sold on the international market—an astounding 70 percent of all foreign planes bought by Russia—, after China with 28 percent and the United Kingdom with 11 percent (OEC 2014). Accounting for 16 percent of overall trade between the US and Russia (in 2014), the aggregate category of "Planes, Helicopters, and/or Spacecraft" in our dataset is the second largest traded good after oil (the latter comprises 24 percent) (OEC 2016). **Figure 3** illustrates this steady trade-related growth between the US and Russia, which grew exponentially since 2009 while other industries stagnated (Simoes and Hidalgo 2011). On the one hand, this observation exemplifies the magnitude of growth in aviation sector trade, and on the other, it suggests that the aviation sector may have a tremendous impact on various macroeconomic variables, including exchange rates, and capital inflows and outflows. Aviation-related trade is thus significant not only for bilateral relations and for the national corporations, but ultimately for the domestic economies of both the United States and Russia.

Given the data, we can further deconstruct the US aircraft exports to Russia. For example, **Figure 4** presents American exports to Russia at the product level. From this graph we can deduce that the major driver of the aggregate transportation sector is an increase in purchases of "Fixed Wing Aircraft, Unladen Weight > 15,0." These are large aircrafts that include passenger carriers and cargo jets. Smaller planes and niche planes do not seem to play an important role in this market. One possible explanation for this phenomenon is that the latter includes military planes, and the Russian government might be reluctant to buy American fighter jets for national security reasons and because Russia's own military plane construction industry is well-developed and competitive on the international market.

8 All tables and footnotes for this article can be found in Appendix D

Figures 5 and **6** use industry data from the Ascend Fleets Online Database to examine Boeing and Airbus, in particular. **Figure 5** shows that the total number of planes in service does not favor Boeing, which corresponds with our understanding as Boeing holds a smaller share in the Russian market relative to Airbus. Meanwhile, **Figure 6** shows that Boeing surpassed Airbus in the number of planes ordered, while remaining second to the UAC—a relationship that we will address later in this paper. Our findings from the industry-provided data are consistent with the OEC data, which quotes an approximate five billion USD in American exports to Russia in 2014 (**Table 9**) divided by 70 million USD per Boeing 737, to yield about 70-80 planes. We determine that the pace of the increase in the number of orders does not reflect the protectionist trade dynamics discussed above.

From this data, we interpret that Russia's recent increase in the import of American planes (primarily Boeing) was not mirrored by a similar increase of aircraft trade with European aircraft (Airbus). While, historically, American and European planes held a similar share of Russian imports, 2011-2014 saw an unprecedented increase in Boeing sales that did not correlate with those of Airbus. If anything, the latter declined in the same time period (Simoes and Hidalgo 2011). In order to prove that this is indeed an idiosyncrasy of US-Russia trade relations, we compare the trade data of Russia, Brazil, Mexico, and Turkey. These four countries are similar in terms of overall economic development (The World Factbook 2016) and have comparable outcomes in the aviation sector. Specifically, we compared the number of passengers carried in these countries from 1992-2016 and the numbers of registered planes departing in the same time period (World Bank 2016). These variables follow a similar trend and closely resemble the absolute values of the given variables as applied to Russia. Although the European-US aircraft import ratios vary considerably between these countries—from 47:39 in Brazil, to 54:38 in Turkey, and 60:19 in Mexico—, the absolute growth of aircraft imports is proportional (Simoes and Hidalgo 2011). This fact suggests that the remarkable increase in Russian imports is a symptom of Boeing gradually outcompeting Airbus in the international market.

We acknowledge that there are two details that complicate the interpretation of these datasets. First, the operations data has only four time points over 16 years. Consequently, we do not know with certainty the structure of the Russian aviation sector from 2010 and 2016, and the information does not enable strong inferences on the dynamics in this part of the economy. Second, it is unclear how trade data translates to actual aircraft usage. We know that the majority of planes in operation are leased, and leasing companies from the US, Europe, or Russia can equally lease Boeings and Airbuses to Russian airlines. Consequently, a portion of planes operating in Russia were never formally imported into the country, so the trade data does not capture them. From this standpoint, an alternative explanation to the rapid increase of American exports to Russia between 2009 and 2014 would be the change in the ownership structure of planes rather than in the increase of raw number of them in Russia.

4. THE FUTURE OF THE RUSSIAN AVIATION INDUSTRY: MC-21

Despite the decrease in market share over the last two decades and the relatively low sales of the SSJ-100 [**Tables 2 and 3**], recent data shows that UAC is not beyond recovery. In fact, it can be seen that UAC has now managed to partially reverse the negative tendency that started back in 2000, when it was losing an average of 15 active planes per annum [**Tables 3 and 4**]. This fact is especially evident from the order data: over 40 percent of all the planes currently ordered are UAC planes [**Table 5**], with an increase of over 200 percent since 2010, in a market grown by only 44 percent [**Table 1**]. This increase in activity is mostly due to the announcement of the MC-21. In fact, the MC-21 by itself takes up as much as 35 percent of all orders in 2016, with all models of Boeing and Airbus combined taking up only 38 percent [**Table 5**]. There appears to be in line with UAC's target of acquiring 60 percent of the domestic new civil aircraft market by 2035 (UAC 2014).

An analysis of the main customers shows that although some orders are made by a subsidiary firm (Ilyushin Finance Company), they only account for 23 percent of orders. The biggest customer is Aeroflot with as many as 50 planes ordered out of a total of 175 (28 percent). Other customers include both leasing companies (VEB-Leasing) and airlines (UTair) [**Table 6**].

5. CONCLUSION

In this paper, we presented a detailed analysis of trade relations in the aviation sector between Russia and the US, focusing on recent trade developments and conflicting incentives to protect and to liberalize the Russian aviation industry. By providing an in-depth summary of the structure of these trade relations within their political contexts, we sought to explain why this trade dynamic is so particular—subsidies and protection for Russia's UAC and yet an increase and sustained high level of US-aircrafts imported by Russia—and to contribute to a better understanding of the logics of bilateral trade relations in the aviation sector.

The rapid decline of the Russian aviation industry after the fall of the Soviet Union was dramatic. In 2006, the Russian government intervened, establishing UAC in an attempt to repair the industry. Since, Russian political priority has moved toward supporting domestic production of aircraft with substantial budget contributions to UAC, subsidies and grants for producers and airlines willing to acquire domestically-produced aircraft, and launching the Russian Regional Jet Program which culminated in the production of the Sukhoi Superjet 100.

Despite these initiatives centered on making the Russian aviation industry more competitive, UAC continues to face limitations in its production capacity, as is evidenced by its small share of the local and global civil aviation market. At the same time, Russian demand for air travel consistently increased in the 2000s at a pace well above that of the global market. Consequently, the Russian aviation sector is unable to produce enough aircraft to meet domestic demand, resulting in the necessity to import foreign aircraft. A second

constraint exists with regard to UAC entering a market with very established competitors. Given that Russian planes are not as widely recognized, combined with production halts and mishaps, potential customers may hesitate to buy Russian planes due to considerations of quality, efficiency, and risk.

Meanwhile, Boeing's significant investment in the Russian aviation sector and collaboration with UAC has created supply chain incentives to preserve trade relations with Russia. While Russian firms import Boeing aircraft and supply titanium for their plane parts, Boeing provides Russia with investment, research and development capacity, and an advisory figure. Ending these trade relations would be harmful to both players.

The US-Russian aircraft trade structure stems from a combination of historic, political, and economic factors. Although Russia once had the capacity to be a significant player on the world market for civil aircraft, and it is in the current political interest to make this sector more self-sufficient and competitive internationally, there are demand and supply constraints to UAC. In the short-term, Russia will likely continue to import aircraft from the United States, maintaining strong and positive trade relations in this crucial sector.

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Cooperation or Competition? Russia, The United States, and the Elusive Promise of Missile Defense

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Abstract

The United States' (US) 2002 withdrawal from the 1972 Anti-Ballistic Missile (ABM) Treaty and its corresponding decision to establish a national missile defense program represented a major setback for the global arms control regime. It also dealt a blow to US-Russia relations. This pivot was based upon assessments of growing nuclear threats posed by terrorists and states such as North Korea and Iran. Additionally, American policymakers concluded that normalized relations with post-Soviet Russia reduced the need for bilateral constraints on national missile defense programs. However, as the potential utility of missile defense technology progressed, the strategic stability that has prevailed since the signing of the ABM Treaty became increasingly tenuous. Furthermore, the US deployment of an ABM system in Eastern Europe has aroused Russia's suspicion. This study, drawing from interviews and research conducted in both the United States and the Russian Federation, evaluates the risks of a new missile defense arms race and explores possible avenues of cooperation. It posits that security cooperation between the US and Russia, particularly when related to ABM systems, is more likely to occur when the pace of technological advancement is slow and tensions between both countries are low. With this in mind, this paper concludes that given the poor state of US-Russia relations, and the perceived potential effectiveness of ABM systems, the likelihood of cooperation is poor. Nevertheless, given the new US administration, cooperation on this issue may be possible. The paper concludes by offering policy suggestions for initiating a dialogue and highlights the dangers of failing to do so.

1. INTRODUCTION

October 1962 witnessed a world poised on the brink of nuclear war. For thirteen days, the Soviet decision to place intermediate-range ballistic missiles in Cuba tested the mettle of leaders in Moscow and Washington. At the height of the crisis, US President John F. Kennedy wrote to Soviet Premier Nikita Khrushchev, stating: "I have not assumed that you or any other sane man would, in this nuclear age, deliberately plunge the world into war which it is crystal clear no country could win and which could only result in catastrophic consequences to the whole world, including the aggressor" (Kennedy 1962). Mutual recognition of this existential danger finally prevailed. With extreme care, surreptitious diplomacy, and some good luck, the crisis finally ended on October 28th.

The Cuban Missile Crisis put into stark relief the need for some form of arms control between the United States and the Soviet Union. Ten months later, American Secretary of State Dean Rusk, Soviet Foreign Minister Andrei Gromyko, and British Foreign Secretary Alec Douglas-Home signed the Partial Test Ban Treaty (PTBT), marking the beginning of the arms control era. Nine years later, a much more comprehensive agreement, the Strategic Arms Limitation Talks (SALT) and the accompanying Antiballistic Missile (ABM) Treaty, greatly reduced the risk of nuclear confrontation.

Anti-Ballistic Missile systems, the focus of this paper, are ground-based interceptors designed to destroy or disable a ballistic missile before it reaches its target. They are the oldest and most prevalent form of missile defense today, though research continues into kinetic projectiles and laser-based systems. Even before the advent of nuclear weapons, the US had begun developing ABM technology to intercept German V-1 and V-2 rockets during the Second World War. Later, the possibility of shooting incoming Interconti-

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nental Ballistic Missiles (ICBM) out of the sky proved tantalizing to both America and the Soviet Union, as it could neutralize an opponent. Consequently, when both nations became aware of the other's development programs, the perception of strategic stability came under threat. Both states were intimately aware of the shortcomings of their own ABM capabilities, yet they feared the other superpower would achieve a breakthrough. This sense of vulnerability drove the US and the Soviet Union to sign the ABM Treaty in 1972.

Now, however, the stable system created in 1972 has begun to unravel. Since its adoption, the ABM Treaty has been called the cornerstone of the international nonproliferation regime: it halted a potential arms race for defensive weaponry that might have upset the nuclear strategic balance (Bunn 2003). But in the aftermath of the September 11th attacks, the United States withdrew from the ABM Treaty. This represented a major setback for the global arms control regime. It also dealt a major blow to US-Russia relations. In response to US withdrawal, Russia withdrew from the Strategic Arms Reduction Treaty (START) II in 2002, a largely symbolic move. As the potential utility of missile defense technology has progressed, the strategic stability that has prevailed since the Cuban Missile Crisis has become increasingly tenuous, and the American deployment of an ABM system in Eastern Europe has aroused deep suspicion from Russia.

This paper, drawing from expert interviews and research conducted in both the United States and the Russian Federation, evaluates the risk of a new missile defense arms race and explores possible avenues of cooperation. This subject matter is topical because of global efforts to reestablish an arms control regime, as well as the aforementioned tensions between these two global superpowers. We propose that security cooperation between the US and Russia, particularly when related to ABM systems, is more likely to occur when the pace of technological advancement is slow and tensions between both countries are low. Therefore, we hypothesize that given the poor state of US-Russia relations and the perceived potential effectiveness of ABM systems, the likelihood of cooperation is low. This does not mean, however, that ABM cooperation is not a promising avenue. Rather, by having a realistic understanding of the current political, technological, and security constraints, both nations can devise a cooperative ABM framework that will set the conditions for a more comprehensive agreement in the future.

In this paper, we first examine current international relations (IR) theories related to security cooperation. We then analyze critical events in US-Russia relations vis-a-vis missile defense: the 1972 ABM Treaty, the 2002 American withdrawal, and relations since the 2010 signing of the New START Treaty. There are two major sets of questions that we hope to answer in this paper: first, are there structural factors in different time periods that favored or hindered ABM cooperation? And second, is the phased deployment of ABM systems in Europe by the US likely to effectively neutralize threats posed by malign-intentioned states, as President Obama argued, or does it risk destroying the strategic balance with Russia without reducing the threat from non-Nuclear Proliferation Treaty (NPT) compliant regimes? In our conclusion, we offer concrete policy suggestions for beginning a new dialogue on the question of missile defense.

2. SECURITY COOPERATION THEORY

To what extent can states achieve meaningful security cooperation? This has been a topic of much debate in IR literature. Among the major theoretical schools, realism and neoliberalism allow for compelling, if not the most direct, applications of security cooperation. These two theories offer alternative explanations of the payoff calculations for inter-state security cooperation during the decision-making process, as well as different predictions of the future likelihood of such cooperation. Each depends upon broad assumptions regarding anarchy, absolute versus relative gains and distribution (Powell 1994). Therefore, before discussing historical case studies, it is necessary to elucidate how various theoretical approaches to security cooperation compare and contrast.

Realism, sometimes categorized into offensive and defensive realism, is a structural theory that emphasizes the limits that the international environment places on security cooperation. A representative of offensive realism, John Mearsheimer sets a high threshold for security cooperation in his book, *the Tragedy of Great Power Politics* (1994). He argues that in an anarchic system, states are concerned about relative payoff distribution and the likelihood that others will cheat. Consequently, security cooperation between states is not only hard to attain but also difficult to sustain (Mearsheimer 1994, 11). Kenneth Waltz, proponent of a theory dubbed defensive realism, posits in *Theory of International Politics* (1979) that although states are security-maximizers, they build up enough military strength to defend themselves, rather than relying solely on offensive tactics and weapons (Waltz 1979). In this view, cooperation may sometimes be the best option available for a state's self-interest, though it is still dependent on a number of variables. It is worth mentioning that the difference between offensive and defensive realism is theoretically blurred and remains a hotly-debated topic amongst scholars (Lieber 2007; Snyder and Lieber 2008). Realism directly challenges the possibility of security cooperation, and if anything, makes cooperation an exception or anomaly. However, the United States and Russia have managed to cooperate on security issues despite strong mistrust. As such, these theories have difficulty adequately accounting for instances of US-Russia security cooperation.

This offense-defense security balance is an important variable in explaining the probability of cooperation or conflict between states. It does so by helping to determine whether a given security environment is offensive, defensive, or neutral, mainly by looking at the current state of technology and geography (Kearn 2015, 18-19). Robert Jervis further developed this concept by using the offense-defense differentiation model to predict the intensity of any given security dilemma (Jervis 1978). Jervis' framework may help to gauge the intensity of the existing security dilemma between the US and Russia during periods of cooperation. When applied to our analysis of US-Russia instances of ABM

cooperation, the offense-defense balance model has two important deficiencies: it assumes that a country's military capabilities can be strictly defined as offensive or defensive, and it fails to account for the impact of expected technological advancement. ABM systems leveraged in an offensive capacity, for example, may blur the distinction between offense and defense. Russian officials, in fact, do often suggest that ABM systems may qualify as offensive missiles; by deterring an enemy state's attack, ABM systems also allow time for counter-offensives. This, coupled with the uncertainty generated by the possibility of successful military defense, means that the maturation of ABM technology undermines Mutually Assured Destruction (MAD). Such a prospect is often considered strategically destabilizing.

Neoliberal institutionalists seek to identify the conditions under which the likelihood of security cooperation increases. They posit that three factors shape the likelihood of cooperation: mutuality of interests, future cooperation, and the number of players. Using game theory, key scholars such as Robert Keohane argue that by altering the payoff structure, player-nations can devise an international regime that makes mutual cooperation preferable to unilateral defection (Axelrod and Keohane 1985, 229). Furthermore, states may even establish institutions which embody particular principles, norms, values, or procedures, thereby modifying the context of international cooperation—an approach drastically different from the deterministic one taken by structural realism (Axelrod and Keohane 1985).

David Kearn Jr.'s Military Expectation Theory (MET) argues that states do in fact take into account anticipated technological developments when deciding whether to cooperate or to compete. He argues that there are two primary factors that influence a nation's decision to cooperate in arms control: the expected decisiveness of advances in military capabilities, and the state's ability to ensure that cosigning states comply with the cooperation agreement (Kearn 2015, 191). In other words, security cooperation is possible only if there are incremental, rather than decisive, security benefits from a given military technology. Following from this theory, Kearn argues that the US and the Soviet Union succeeded in signing the 1972 ABM Treaty because both countries expected their respective ABM systems to be largely ineffective in the medium term and were confident in their ability to detect cheating by the other party. However, they also feared that the other party would eventually achieve a breakthrough that would disrupt the strategic balance (Kearn 2016).

Under defensive realist and neoliberal institutionalist theories, certain arrangements of the international regime affect the likelihood that a cooperative agreement will be signed and maintained. On the one hand, MET fits within the framework of defensive realism. If the security benefits of a particular military technology are perceived to be insignificant, states do not need these technologies for self-survival, and an arms control agreement will be both possible and enforceable. On the other hand, arms agreements buttress mutual interests, such that the benefits of security outweigh the costs of abandoning certain technologies like ABM. Borrowing variables from Kearn's MET, this suggests that expected technological changes matter in the payoff calculation when establishing such a regime (Kearn 2015, 36). Using the framework of neo-liberal institutionalist theories, we add an independent variable that we believe will influence the outcome of security cooperation. Specifically, we hope to understand how the *international security environment* affects the likelihood or survivability of ABM cooperation. To understand the influence of this variable and the variations in conditions which make security cooperation in ABM possible *and* desirable, we will conduct historical case analyses within these theoretical frameworks.

3. CRITICAL EVENTS IN MISSILE DEFENSE

3.1 The 1972 ABM Treaty

From a security perspective, the world of the sixties and early seventies is remarkably different from the present era. The world order then was largely characterized by bipolarity, with the Soviet Union and the United States viewing one another as their single greatest security threat. The shadow of a large-scale conventional war in Europe loomed alongside the dread of nuclear holocaust (Sokov 2016). Despite this, much of the era was one of détente between the two superpowers, characterized by both competition and significant cooperation (Von Bencke 1997, 81).

Having endured the 1962 Cuban Missile Crisis, policymakers of this generation in both the US and the Soviet Union still vividly remembered the fear of a potential nuclear exchange (Sokov 2016). With the understanding that they were at a nuclear stalemate, both nations continued to bolster their nuclear deterrent. As the Soviets focused on expanding their ICBM inventory, the US continued to improve its nuclear triad and Multiple Independently Targetable Reentry Vehicle (MIRV) capability (Burr and Rosenberg 2010, 92-98). In addition to strategic offensive arms, both sides sought to improve their strategic defensive capabilities—their ABM systems—but to little avail. Each side believed that it was incapable of developing a workable system, yet feared the other's potential progress. This mutual concern enabled the US-Soviet ABM Treaty.

Until the late sixties, the United States enjoyed an advantage over the Soviet Union in terms of offensive strategic weapons. Consequently, the Soviet Union's primary goal during the second half of that decade was to achieve parity with the United States. This is likely one of the reasons for which Alexei Kosygin, then-Soviet Premier, rejected the US administration's idea of limiting ABM systems at a June 1967 summit in Glassboro, New Jersey (Arbatov and Dvorkin 2009, 162). That is not to say, however, that the Soviet Union was no longer interested in missile defense. On the contrary, in 1965, the Soviet Defense Council commissioned the Aurora plan to defend Moscow from a nuclear ballistic missile attack. In 1967, the council realized that the system could not work (Holloway 2016). This perceived failure was perhaps another reason why the Soviets downplayed the importance of limiting defensive weapons.

It was also at the Glassboro summit that Robert McNamara, the US Secretary of Defense, articulated the de-

stabilizing role of anti-ballistic missiles. His key argument was that a country could expand its nuclear arsenal during a bid to overwhelm a rival's ABM system, while a country in possession of an ABM system could provoke a preemptive strike by the side lacking this "shield" (Esin 2009 and Rozanov 2001, 57). The Soviets' rejection of ABM limitation is likely what drove McNamara to announce the deployment of the Sentinel ABM system (Kearn 2015, 179), allegedly in response to the growing Chinese threat (Burr and Rosenberg 2010, 106). Continuing this trend, in 1969, President Nixon and National Security Advisor Henry Kissinger proposed the development of the Safeguard ABM system. Safeguard was intended to provide moderate protection of nuclear launch sites and to defend against small-scale or accidental launches. Congress, however, did not see the merit of the program, and never fully funded it (Burr 2001).

By 1970, for remarkably similar reasons, both the US and the Soviet Union were concerned with the other's ABM system. In 1969, the Soviet Union achieved strategic parity with the US in terms of offensive weapons. The next year, US satellite imagery revealed that the Soviets had been working on their Moscow ABM system for the past five years. Given that the Soviet Union was now equal to the US in terms of offensive weapons, these ABM developments became an increased source of concern for US policymakers, who sensed that the US had fallen behind (Kearn 2015, 164). Interestingly, even after more than a decade of heavy investment, the Soviets believed their ABM system to be largely incapable of performing its intended mission, and saw the US ABM as superior (Kearn 2015, 172). On the one hand, both countries were attuned to their ABM systems' limitations. Yet at the same time, they feared that the other's system was more advanced and would eventually achieve a breakout capability that would disrupt strategic stability (Sokov 2016). Fundamentally, it was the interplay of these two factors, combined with the fact that this was a period of relative thaw between the two powers, that drew the superpowers to the negotiating table.

The formal negotiations that eventually resulted in the signing of the 1972 ABM Treaty were years in the making. Beginning in 1964, in order to reduce tensions, the Johnson administration and the Soviets engaged in talks that ranged from cultural exchanges to parallel defense budget reductions (Schwartz 2014, 6). By 1968, they were close to engaging in Strategic Arms Limitation Talks (SALT). However, the Soviet Union's invasion of Czechoslovakia resulted in their temporary suspension (Schwartz 2014, 4). SALT talks resumed in Helsinki in November 1969. During this first round of talks, the chief negotiators, Vladimir Semonov and Gerard Smith, did not commit to a particular position, but instead presented their views on strategic and defensive nuclear forces.

These talks were to be the beginning of an arduous negotiations process. Over the subsequent two and half years, both the Soviet and US positions regarding ABM limitations evolved, each side striving to gain advantage over the other, and each side finding new issues with which to be concerned (Burr 2001). Ultimately, however, both understood that an ABM limitation agreement was to their advantage. During a congressional briefing in 1972, US National Security Advisor Henry Kissinger stated that "by setting a limit to ABM defenses, the treaty not only eliminates one area of potentially dangerous defensive competition, but it reduces the incentive for continuing the deployment of offensive systems" (Burr 2001).

The signing of the ABM Treaty between the United States and the Soviet Union in May 1972 was a predictable response to the threats that defined the Cold War period. It was a product of an almost two-decade-long bilateral arms race aimed at achieving parity in both strategic and tactical offensive weapons amid a growing rivalry in ABM systems. Ultimately, the superpowers achieved an ABM limitation agreement because they understood the limitations of their own ABM capabilities, feared that their rival would achieve a technological breakthrough, and wanted to avert destabilizing growth in strategic nuclear weapons. An effective ABM system would give one side a significant strategic advantage, thereby offsetting nuclear deterrence, a disruption to détente that neither side wanted.

3.2 The 2002 US Withdrawal from ABM Treaty

As a product of the Cold War period, the 1972 ABM Treaty between the Soviet Union and the United States served the goals of mutual containment in a bipolar world order. With the dissolution of the USSR and the end of the Cold War, the bipolar world came to an end. Together with a thaw in the adversarial US-Russia relationship, a new set of uncertainties and challenges emerged.

The ABM Treaty's relevance, given the new realities of international nonproliferation and the new arms control order, was increasingly challenged. The emerging threat of rogue states which had acquired nuclear technologies, coupled with the strict limitations on national missile defense agreed upon in the ABM Treaty, presented the US and Russia with inherent danger. With the dissolution of the Soviet Union, the threat of weapons of mass destruction (WMD) proliferation increased dramatically. As Payne (et al) put it, "one main feature of the post-Cold War strategic landscape is that US-Russian relations are no longer autonomous, but are shaped by developments in third countries, i.e. proliferation" (Payne et al 1997, 5). Indeed, in the eyes of US policy-makers, North Korea, Iran, and Iraq posed the biggest threat in terms of acquiring Weapons of Mass Destruction (WMDs) (Pifer 2016). The primary American concern resided in the fact that, should they develop their arsenals, these nations would inevitably target the US: "These countries believe that missiles offer them a capability to deter or coerce the United States and its allies, especially if linked to a WMD capability" (Payne et al 1997, 5).

These developments led to a significant change in the American perception of the global security architecture and the treaties that shaped it. The ABM Treaty, initially seen as the "foundation of the US-Russian strategic balance," started to appear as contrary to "the US' interest because it denied the US the ability to deploy missile defense to protect its entire territory." (Woolf 2000, 2) Consequently, some influential members of Congress determined that the ABM

Treaty, which had been formed by and for the realities of the Cold War era, was no longer relevant given the security context of the new age (Payne et al 1997, 6).

Former Russian President Boris Yeltsin attempted to preserve the influence of the ABM Treaty, which was viewed as a cornerstone of international (and specifically Russian) security by "most of the Russian military and political establishment" (Payne et al 1997, 6). In his address to the United Nations Security Council in January 1992, President Yeltsin outlined the concept of a Joint Global Defense System (JGDS) that would serve as an alternative to the long-contentious Strategic Defense Initiative (SDI) previously developed by the United States.[1] The proposal's core idea was to introduce a more inclusive global system for ballistic missile protection, with both sides continuing to "faithfully observe all of the provisions" of the ABM Treaty (Yeltsin 1992). Initially, former President George H.W. Bush welcomed the proposal. He called this move a "landmark departure from previous Soviet policy" and a "promise of real cooperation" (Arms Control Association 1992). However, the subsequent change of administration in the United States brought an end to negotiations. In 1994, a US member of the Standing Consultative Commission (SCC) announced a "termination of the Defense and Space Talks with Russia," essentially burying Yeltsin's initiative (Spring 2000).[2]

The succeeding Clinton Administration also viewed the ABM Treaty favorably. But the dangers looming from the spread of regional conflicts "generated new interest in the development of advanced theater missile defenses" (TMD) (Woolf 2000, 4). However, the ambiguity of the ABM Treaty's text regarding the place of TMD systems in the ABM limitations structure puzzled policymakers on both sides. As Amy Woolf notes, "the Treaty did not explicitly limit TMD systems, but it also did not define precisely the difference between ABM systems and TMD systems." (Woolf 2000, 4) Simply put, there was no clear distinction between ABM and non-ABM systems. This distinction became crucial by the beginning of 1990s, when both states' tactical missile defenses were developing dramatically, challenging the existent boundaries of permitted and unpermitted deployments.

For these reasons, in November 1993, the US initiated a demarcation clarification, aimed at establishing "guidelines for the deployment of Theater Missile Defense systems, which are permitted by the ABM Treaty" (Godsberg 2016). This process of delineation became a source of dispute between the Yeltsin and Clinton Administrations. Frustration over disagreements regarding the velocity and ranges of interceptors grew in both countries. The US suggested a demarcation line for the ABM interceptors, identifiable by their "capability to destroy a target ballistic missile with a velocity greater than 5 km/sec," essentially excluding the advanced interceptors of the time from the limitations of the ABM Treaty (Woolf 2000, 12).[3] The Russian side grew fearful of this proposal, as it anticipated that the deployment of such high-velocity interceptors would "undermine Russia's nuclear deterrent" (Woolf 2000, 13). In addition, Russia sought to limit the number of TMD locations and to restrict the power of TMD radars. The US objected to the suggested limitation.

In November 1995, only two years after the start of the 'clarification' process, the Russian and US leaders achieved a preliminary agreement on the framework for negotiating the demarcation (Woolf 2000, 15). It was decided to distinguish between interceptors of slower and higher velocity with simultaneous limits on the test ranges.[4] The so-called 'phase-one' demarcation limits, outlining characteristics for permitted slower-velocity interceptors, were agreed upon and announced by both sides. However, no formal document was signed. The Russian side requested simultaneous development of 'phase-two' demarcations—meant for identifying limits for deployment of higher velocity TMD systems—in order to ensure clarity in future developments. This became a point of contention for the US, which was unwilling to negotiate further agreements without formally securing the first. Eventually, internal opposition in the US and Russia regarding the sustainability of the amendments led to the stalling of negotiations through the end of 1996.

Along with the TMD clarification process, the Clinton Administration proposed a plan to develop a limited national missile defense (NMD), branded as the "3 plus 3" program. The proposal was largely an attempt to reduce domestic discontent with the provisions of the ABM Treaty that prevented the US from developing missile deterrence. The "3 plus 3" idea provided the US with a three-year window of research and development opportunities. The proposal suggested a theoretical disposition of missile defense systems throughout the country's whole territory as opposed to just one site, as was initially negotiated in the ABM Treaty. Some saw this proposal as a threat to existent anti-ballistic limitations and suggested that it would undermine the ABM Treaty's underlying principle of containment by mutual cooperation. As a result, proposed amendments to the ABM Treaty, which allowed for the NMD program, drew some criticism both from the US and Russia for potentially spurring on a new arms race (Monaghan 1995). In essence, the idea behind Clinton's proposal was to "gain some added flexibility to provide a national missile defense against a limited ballistic missile attack in a manner that preserved the ABM Treaty and left the US and Russia able to overwhelm the other's defenses" (Pifer 2016). However, this was a step beyond what the

1 The Strategic Defense Initiative (SDI), also known as 'Star Wars,' was a US program aiming at creating a space-based anti-missile system. The system was announced in 1983 by President Ronald Reagan.

2 The Standing Consultative Commission was established by the USSR and the US in December 1972 in order to "promote the objectives and implementation of the provisions" of the ABM Treaty. (MOU of December 21, 1972)

3 At the time the greatest registered velocity of ballistic missiles was reported at 7 km/sec. Ballistic missiles with velocity of 5 km/sec (like Chinese CSS-2) was still considered very advanced. At the same time the capacity of the existent TMD systems' interceptors (e.g. the Army's Theater High Altitude Area Defense (THAAD)) did not exceed 3 km/sec. (Woolf 2000)

4 TMD systems could be tested against targets with velocities below 5 km/sec (higher velocity) and ranges below 3,500 kilometers. The interceptors with velocities less than 3 km/sec (slower velocity) were considered non- ABM systems. (Woolf 2000, 15)

Russian side could accept. Pushing for limits in deployment sites in TMD/ABM demarcation negotiations, Russia was not inclined to compromise the cornerstone provisions (as seen by Russia) of the ABM Treaty.

In September 1997, after four years of heated debate and detailed negotiations, Russia and the US finally reached an agreement regarding the characteristics of the TMD systems not limited by the ABM Treaty. Essentially, this agreement not only allowed testing, development, and deployment of TMD systems with slower- and faster-velocity interceptors, but also paved the way for further negotiations on the NMD plans envisioned by the Clinton administration, as the initial Russian proposal to limit the TMD sites was not included in the final text of agreement. Arguably, a set of confidence-building measures incorporated into the text of the ABM/TMD demarcation agreement played a decisive role in 'closing the deal' (Standing Consultative Commission 1997). These provisions were specifically designed to "address Russia's concerns about the potential capabilities of future US TMD programs" (Woolf 2000, 19).

Nevertheless, the demarcation agreement proved to have only limited impact on US public opinion. By 2000, security concerns regarding US missile defense became one of the most debated topics in Washington. Hawkish voices blamed the Clinton Administration for the failures of US nonproliferation policies due to "unrealistic faith in arms control agreements" and "engagement with Russia" (Schneider 2000, 281). William Schneider, the Chairman of the Defense Science Board, argued that "US efforts to sustain good relations with Russia following the collapse of the Soviet Union caused the administration to ignore, minimize, and conceal its concerns about Russian proliferation behavior" (Schneider 2000, 281). Others harshly criticized Clinton's policy on missile defense and suggested that "President Clinton's failure to address the threat of ballistic missile attack is perhaps the single greatest national security failure of his administration" (Spring 2000).

With former President George W. Bush's election, the 1972 ABM Treaty faced increasing criticism domestically. By 2001, the idea of complete withdrawal from the treaty was increasingly popular among members of the new administration. During the July 2001 hearings before the US Senate Committee on Foreign Relations on the Administration's Missile Defense Program and the ABM Treaty, Undersecretary of State for Arms Control and International Security Affairs John Bolton outlined President Bush's plan to develop new defensive capabilities, outgrowing the ABM Treaty limitations. He suggested that "supplementing retaliatory deterrence" with "effective defenses" is "a clean break from the past, and especially the adversarial legacy of the Cold War, of which the ABM Treaty is a part" (US Senate 2001, 13). Deputy Secretary of Defense Paul Wolfowitz, during his Senate testimony to the Armed Services Committee, suggested that "ballistic missile defense is crucial to US national security, and its development will eventually conflict with the 1972 US-Soviet Anti-Ballistic Missile Treaty" (Department of Defense 2001).

It is important to mention the international security landscape surrounding the deliberations on the ABM Treaty. The attack on the Twin Towers on September 11, 2001 played a crucial role in reconsidering existing defense arrangements. The terrorist attack once again made clear that ballistic missile defense was not only about the US and Russia deterring each other. The perceived threat from terror groups proved real and, hence, were brought to the forefront of the decision-making process. This reshaped the domestic debate on missile defense, giving further impetus to withdraw from the treaty.

Eventually, the Bush Administration's reconsideration of the international security landscape, combined with its optimistic views of the technological potential of the new ABM projects under development, paved a way to a formal revision of the American policy position on ABM. In December 2001, President Bush gave Russia a six-month notice of the US' withdrawal from the ABM Treaty (Arms Control Association 2001). By May 2002 the US was no longer a part of the treaty, terminating three decades of understanding on the issue of missile defense and threatening the strategic security of the US-Russian relationship.

Initially, US withdrawal from the ABM Treaty resulted in a relatively muted international response. Domestically, the decision was met enthusiastically by some Republicans and many proponents of US missile defense development. But other arms control experts were concerned that "the US withdrawal destroyed the entire foundation upon which strategic arms control had been built since the 1970s" (Berls 2016). Russian officials called the US withdrawal "mistaken," but did not take any immediate measures to retaliate (Neilan 2001). In a response statement, the Russian State Duma expressed concern that unilateral steps by the US in the sphere of international security represented a worrisome trend, urging Russian leaders to undertake additional steps to upgrade Russian defense systems (Pravda 2002).[5]

3.3 Current State of Affairs

After the American withdrawal from the ABM Treaty in 2002, the Bush Administration invested heavily in missile defense systems. In 2007, the Bush Administration began formal talks with Poland and the Czech Republic on the possibility of basing MIM-104 Patriot interceptor missiles within their borders. Initial reluctance by the administrations of Donald Tusk in Poland and President Vaclav Klaus in the Czech Republic faded during the Russian-Georgian conflict in 2008. That year, Poland and the United States agreed to allow ground-based ballistic missile defense interceptors within Poland (US-Poland BMD Agreement 2008). In response, the Russian government objected "vociferously" (Pifer, O'Hanlon 2012, 121).

President Barack Obama attempted to ease Russian concerns about American interceptors in Europe by eliminating the planned ABM bases in Poland and the Czech Republic (Pifer 2012). Instead, the administration announced the "European Phased Adaptive Approach" (EPAA) plan on September 17, 2009 (Thränert and Kartchner 2015, 161). This involved four stages, beginning with the dispatch of Ameri-

5 Russian State Duma is the Russian Parliament's lower house.

can warships to Europe armed with SM-3 IA AEGIS missiles capable of only short- and medium-range interception. With maximum speeds of only three kilometers per second, they would be incapable of hitting Russian ICBMs like the Bulava missile, which travels twice as fast. But the Obama administration's planned deployment of AEGIS-capable ships in the Mediterranean and Black Sea raised additional Russian concerns about their use. Furthermore, after Obama's decision to cancel the Bush Administration's plans—an act that received broad accolades in the Russian media—the sudden announcement of the new EPAA plan was seen by many Russian policymakers as a betrayal.

ABM remained a major point of contention during the New START negotiations which began the following year. Russian negotiators repeatedly raised the issue of missile defense limitations, but the United States succeeded in excluding any language regarding ABM into the new treaty. The Putin Administration eventually acknowledged that "current US missile defenses do not threaten Russia's deterrent" in exchange for concessions on other issues incorporated into New START (Thielmann 2011).

The Russian government, however, made it clear that if the North Atlantic Treaty Organization (NATO) was to deploy "a missile system capable of significantly reducing the effectiveness of Russia's strategic forces," Russia would withdraw from its New START obligations (Collina 2011, 68; Lysenko 2016). The Kremlin also argued that such a system might not only potentially blunt Russia's nuclear capabilities, but it might also function as an offensive weapon that could be aimed at Moscow (Korjouev 2016). However, with tensions escalating over the Russian intervention in Ukraine in 2014, NATO allies pushed for the continuation of the EPAA plan. On May 12, 2016, NATO officially opened its first land-based missile defense station in Deveselu, in Southern Romania. This station was armed with SM-3 missiles and also hosted a radar station. In 2018, the next ABM NATO base is planned to become operational at Redzikowo, in Poland (Thränert and Kartchner 2015, 168). In addition, the US increased considerably the number of AEGIS anti-ballistic-missile-equipped ships. By Phase Three in 2018, NATO will have 32 AEGIS-equipped vessels, accompanied by 48 SM-3 IB land-based interceptors. Phase Four, which would have seen the deployment of higher-speed interceptors that posed a greater threat to Russian ICBMs, was cancelled by President Obama in 2013. This decision was meant to ease Russian concerns and prevent a withdrawal from New START.

The issue of missile defense remains highly charged. The EPAA program was officially designed against threats from the Middle East, to eliminate any potential 'rogue missile' launches or any deterrence power that a new nuclear-armed state like Iran might try to use in reshaping the Middle East. But with the Iran deal forthcoming, Russian President Vladimir Putin argued that the rationale for the continued existence of the NATO ABM program was clear: "The whole purpose of this system [NATO's ABM network] is to reduce the nuclear capabilities of all countries but the USA itself to zero" (Putin 2015). It has been argued that Russian rhetoric against the EPAA has been hyperbolic for political reasons (Berls 2016). But, given the possibility of a future threat to Russian strategic deterrence, withdrawal from New START seems like a genuine possibility. This makes compromise unlikely, as NATO remains wary of the threat posed by non-NPT signatory states and is unlikely to dismantle the system that guarantees "damage limitation" from such threats (Thränert and Kartchner 2015, 162).

4. MISSILE DEFENSE AND AMB SYSTEMS TODAY: TECHNOLOGICAL CHALLENGES

SALT I's successful approach to the puzzle of missile defense was possible because of the technological "infeasibility" of the system (Kearn 2015, 191). Both the United States and the Soviet Union invested heavily in ABM systems until it became clear that it was impossible to achieve a truly decisive system given technological limitations. But does that impossibility remain true today? What are the technological limitations of the ABM systems currently under development, and how do their capabilities alter the possibility of a renewed US-Russian understanding on ABMs?

The two primary inhibitors of ABM system effectiveness are targeting and speed. An effective interceptor has to be faster than the missile it is targeting (Boord and Hoffman 2016, 24). The average speeds of the SM-3 IIA US interceptors have risen to 4.5 m/s; the top Russian interceptor can now travel at 4.8 m/s. To the other challenge, American detection and targeting capabilities, in particular, are vastly greater than they were in 1972. Beginning in 1995, the US conducted yearly tests for its three main interceptor systems: Ground-Based Midcourse Defense (GMD), Aegis, and Terminal High Altitude Area Defense (THAAD). In the first year, the fail rate of these systems was 100 percent. In 1998, there were two successful tests out of four conducted. In 2013, six of seven tests were successful (Lewis 2015, 79).

However, despite these technical advancements, interceptors remain an implausible threat to the fabric of deterrence. At present, the utility of ABM systems is nevertheless limited by technical realities: "Past, present, and foreseeable missile defense systems are simply unable to discriminate between real warheads and decoys" (Postol 2016). Given that many ICBMs in the US and Russian arsenals contain decoy warheads—and it is relatively easy to increase the number of decoys—this significantly reduces interceptor effectiveness. Even if ABM interceptors could distinguish a real warhead from a decoy, the difficulties of hitting a warhead in mid-flight are immense; in the words of retired Russian Major General Pavel Zolotarev, the solution to the problem would be "worth the Nobel Prize in mathematics" (Zolotarev 2016). Until it becomes clear that ABM interceptors are capable of routinely striking enemy missiles in their early or middle stages, current ABM systems pose no threat to the fabric of strategic deterrence. Further, interceptors remain slower—intentionally so in some cases—than the ICBMs in Russian or American arsenals. However, even lesser targets remain problematic: by one estimate, five interceptors would be needed to shoot down even a relatively primitive Iranian ICBM (Dvorkin 2015, 124). There is little possibility that an American system in Europe would be capable of intercepting

a first launch numbering in the hundreds, particularly when each interceptor can cost up to 24 million US dollars. This is a crucial point: as long as these technological limitations remain, strategic consensus remains possible.

There remains a long-term problem, however. If ABM systems continue to advance, will they threaten deterrence? Advocates argue that the future of ABM systems lie in railgun- and laser-based technologies, which avoid many of the limitations of solid-propellant-based missile. Both types of system are currently under development in the United States, with some proponents arguing that they may be deployable within ten to fifteen years. Even if those systems prove infeasible, innovative avenues of a new generation of missile defense technology might prove more successful. Therefore, the initial Cold War-era problem remains: without a coherent fabric of data-sharing and basic transparency, any technological success by either state will muddy the waters of Mutually Assured Destruction, and with it, strategic stability.

5. CONCLUSION

Vladimir Dvorkin argues that missile defense cooperation, prior to the Ukraine crisis, "would have been able to transform the relationship among Russia, the United States, and NATO into the framework of allies" against mutually-recognized threats (Dvorkin 2015, 121). Missile defense provided a means of decreasing tensions in 1972, and as this paper argues, may serve a similar role today.

However, there remain a number of major impediments to missile defense cooperation. The two states' poor relations and lack of a communication forum makes it difficult to even initiate a conversation on the subject. In the US, members of the Republican Party have traditionally been more enthusiastic about missile defense's potential, and currently control both the executive and legislative branches. As Steven Pifer notes, everything else held equal, the primarily Republican Congress presents one of the biggest obstacles toward achieving substantive progress on missile defense (Pifer 2016). In 2012, for instance, Congress blocked efforts by the Obama Administration to share details on America's missile defense capabilities (Sokov 2016). For its part, the Russian Federation is in the midst of a major modernization program regarding its own nuclear arsenal, the costs of which may discourage it from reducing its arsenal or limiting its missile defense capabilities. Until the Russian Federation feels secure in the global strike capabilities of its upgraded nuclear arsenal, the state is unlikely to compromise (Berls 2016).

As president-elect, Donald Trump gave a hint of his nuclear strategy when he stated that "the United States must greatly strengthen and expand its nuclear capability until such time as the world comes to its senses regarding nukes" (Fisher 2016). He also expressed his discontent with the New START Treaty during his first official phone call with President Putin (Landay and Rohde 2017). Whether or not the world 'comes to its senses', Trump's administration will have to address the question of nuclear arms control as the current New START Treaty is set to expire at the beginning of 2021. Given that President Trump seems to consider partnership with Russia a possibility, there is a unique chance to build on the existing arms control regime, and to improve US-Russia relations.

There are reasons for optimism. The United States is currently well ahead of the Russian Federation in defensive and early warning technologies, ranging from interceptor missiles to Earth-Limitation Viewing (Sokov 2016). But while Russia is well along in its nuclear arsenal modernization program, the United States is just beginning to embark on its own trillion-dollar program. Given the American lead in ABM, now might be the ideal time for both sides to limit the quantities of both offensive and defense material, thereby providing strategic clarity and significantly reducing each state's modernization program spending.

Finally, there is a practical imperative for both Russia and the United States to seek cooperation. Communication and cooperation on ABM, short of a new treaty, open the way for improved relations in general; more specifically, it is vital that a new framework for ABM be put in place now. The very essence of nuclear deterrence requires a basic clarity regarding opponent capabilities. David Kearn's MET framework convincingly argues that when the "expected military impact of technological chang e was 'low,' leaders were able to successfully negotiate cooperative arms limitations agreements" (Kearn 2015, 7). Clearly, this will not be the case forever. The time to find a long-lasting and stable equilibrium on the question of missile defense is before ABM systems acquire the technical capability to threaten strategic deterrence. That moment is now.

What are some practical ways in which cooperation could proceed? A new ABM Treaty is highly unlikely given American ABM preponderance and its threat assessment of rogue states. But in other areas, progress seems possible. Both sides have an incentive to increase the transparency and predictability of their strategic forces. To that end, both states should establish a permanent forum for "information exchange, consultation, and to establish criteria controlling the technological development, quantity, and location of MD [missile defense] systems" (Sokov 2016). A permanent forum to exchange data, and to share command and control system information, will also go a long way in reducing the risk of accidental war.

A more ambitious program has also been proposed, hinting that "the construction of a joint missile defense system could be a way out of" the current deadlock (Shevtsova 2010, 150). Putin made a similar argument at the Valdai Club in 2015:

"On the serious issue of missile defense, we have already made past proposals and I say again that we could work together as a threesome—the USA, Russia, and Europe. What would this kind of cooperation entail? It would mean that all three parties agree together on the direction missile threats are coming from, and have equal part in the system's command and in other secondary matters" (Putin 2015).

NATO member states in Eastern Europe will likely be reluctant to engage with Russia to this extent, likely because they perceive the absence of a credible commitment re-

garding regional security. Nevertheless, the exchange of technical information, radar site data sharing, and observer exchanges are relatively low-cost, low-risk pathways to cooperation that can be adjusted to suit current trust levels.

Efforts to cooperate on ABM will reduce tension in US-Russia relations. Increasing transparency and mutual surveillance capabilities now increases the chances of an agreement later: "For arms control cooperation to be successful, the leaders of a state must be confident that they can adequately assess the capabilities of their potential partner over time, and that any cheating will be detected long before a potential breakout could be achieved" (Kearn 2015, 27). This basic mutual comprehension is a prerequisite for any strategic cooperation. Reaching a simple understanding in the near-term will increase the possibility of reaching a long-term agreement. The continued success of nuclear deterrence depends on decisions made on missile defense now.

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6

NATO AND US-RUSSIA RELATIONS: A ROADBLOCK OR AN OPPORTUNITY?

VI. Conflict Resolution Working Group

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Abstract

Although the Cold War is over and the Warsaw Pact is gone, the North Atlantic Treaty Organization (NATO) remains a key third player in US-Russia relations. And yet, we argue that the assumed influence of NATO, as an international institution, on US-Russia relations is exaggerated. This paper argues that the asymmetry and tension between these two countries results not directly from NATO, but rather from misinterpreted narratives propagated throughout history in the context of NATO. Using the schematic narrative template method, in conjunction with legal theory, we identify and analyze three distinct themes among narratives about US-NATO-Russia relations: broken promises, the use of force, and conflicting conceptions of world order.

1. INTRODUCTION

Though the Cold War is over, the relationship between Russia and the United States remains in a state of vacillation. The two countries have found common ground on some policy areas, such as nuclear proliferation, but failed to agree on others, like regional security and spheres of influence. Despite years of scholarly debate and policy observation, few scholars have succeeded in adequately describing this critical relationship and the ways in which conflict between the two countries has evolved. Moreover, international organizations add an additional layer of complexity, as states must appease and abide by opinions or rules enforced by bodies such as the United Nations Security Council (UNSC) or the North Atlantic Treaty Organization (NATO).

Created in April 1949 in response to increasing tensions between the West and the Soviet Union, NATO was not expected to last beyond the immediate conflict. However, unlike its Eastern Bloc analogue, the Warsaw Pact, the alliance continues to be an important actor on the geopolitical stage and appears frequently in both US and Russian foreign policy rhetoric to this day. In the context of a security-driven organization like NATO, the US and Russia continue to interact within the framework of threat perception and competing accusations (Joint Chief of Staff 2015; White House 2015; Kremlin 2014; Security Council of Russia 2015). Indeed, the Council on Foreign Relations' Preventive Priorities Survey put the possibility of "a deliberate and unintended military confrontation between Russia and NATO"[1] as a top international concern in 2017 (Council on Foreign Relations 2016). The days of the Cold War are long over, so why is NATO featured so often in both countries' policy narratives?

In this study, we ask what impact NATO—as a philosophy, an enforcer, or a system of codified rules—has on the nature, likelihood, and progression of conflict between Russia and the United States? We hypothesize that the asymmetry and tension between these two countries results not directly from NATO, but rather from misinterpreted narratives propagated throughout history in the context of NATO. In particular, we identify and analyze three distinct themes among narratives about US-NATO-Russia relations: broken promises, the use of force, and conflicting conceptions of world order.

The body of our paper is organized as follows: we begin with a historical overview, followed by an introduction to the methodological approaches of conflict analysis. In order to best identify and interpret narratives, our study uses the

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1 While the US has not always relied heavily on NATO troops, we argue that NATO's activities notably depend on US narrative and policy. Although the US and NATO are separate subjects in the international arena, the former is significantly more independent than the latter.

schematic narrative template method, in conjunction with legal theory. We then identify and analyze three distinct themes among narratives about US-NATO-Russia relations: broken promises, the use of force, and conflicting conceptions of world order. Since we focus on the idea that the balance in the global world order drastically shifted with the collapse of the Soviet Union and the subsequent demise of the Warsaw Pact in 1991, the paper will focus on the post-Cold War period of NATO's existence.

Understanding the legal framework and issues of enlargement, the use of force, and global order yields a useful context for analyzing the US-Russia relationship. By taking a new approach to studying this dynamic trajectory, a legal narrative approach has the potential to provide insight into the aforementioned gap in scholarship and could also lead to concrete policy proposals aimed toward averting Cold War-like NATO-Russia polarization.

2. HISTORICAL OVERVIEW

Founded by the United States as a security alliance to counter the Soviet threat, NATO's original mission ceased once its primary enemy collapsed. However, NATO demonstrated its adaptability in the post-Cold War era; with no specific, alternative, military threat to sustain the alliance, NATO's mission shifted to protecting a community of "like-minded states … [and their] common liberal democratic values" (Medcalf 2008, 14-15). In the post-Cold War period, the crux of NATO's new raison d'être became the protection of a "stable ... environment based on the growth of democratic institutions" (Medcalf 2008, 19).

According to Medcalf, NATO embarked upon a wide-ranging "process of adaption" in the 1990s that involved establishing outreach and partnership programs, as well as an enlargement program that would help to jump-start negotiations with former adversaries (Medcalf 2008, 18). This unfolding of events presented a serious threat to Russian national security, whose strength beyond its borders seemed to have "shrunken to that of a doormat" (Gaddis 2005, 41). International Relations scholar, Chris Hart, points out that NATO was formed and operated on the basis of "mutual security, protection, and military information-sharing between member countries" (Hart 1997, 68). But, with the Soviet Union in shambles, the United States—a founding NATO power—emerged at the end of the twentieth century as the only country capable of projecting military power to all corners of the world, accounting for 36 percent of global defense spending (Leffler and Westad 2010, 550). The Russian newspaper Pravda conveyed the country's fear that "eastward expansion, coupled with planned Russian military cuts, [would] result in a NATO preponderance in conventional forces of three-to-one" (Pravda 1998, 97). And while NATO seemed set on including new members, America's intentions regarding the deployment of troops and weapons to these territories remained vague; while pledging not to station "substantial" permanent forces there, NATO claimed a right to do so "temporarily" (Pravda 1998, 97). The inability to mount a sufficient defense or retaliatory action in the case of a sudden NATO attack from a neighboring territory became a significant source of anxiety for Russian policymakers. Instead of reassuring Russia of its peaceful orientation and clarifying its policies, NATO leadership kept its intentions vague, rendering Russia increasingly uneasy and reigniting an old, but well-remembered, fear of the West's military superiority (Leffler and Westad 2010, 523).

NATO's expansion prompted Russia to view NATO expansion as a direct threat to its safety and policymakers emphasized increasing Russia's military power abroad. As a result, contemporary Russia operates primarily within the realm of offensive realism, using the "fear for survival" as a motivator for "conquest and expansion" (Lobell 2009, 228). The threat of NATO expansion has been a stated or implicit justification for most of Russia's major foreign policy actions, from its intervention in South Ossetia and subsequent war with Georgia, to the present conflict over the Crimean peninsula. From the perspective of Russian leadership, NATO expansion plays an imminent threat that justifies the expansion of Russia's regional sphere of influence in order to ensure its security.

Some scholars picked up on these dynamics early. In the autumn of 1997, 17 years before the start of the Crimean crisis, Chris Hart predicted the conflict with startling accuracy, writing in the *Harvard International Review* that "an eastward expansion of a 'hostile' NATO could … prompt Russia to act more forcefully in its dealings with its neighbors to the immediate east, notably … Ukraine" (Hart 1997, 68). Two years prior, Anatol Lieven warned that any threat of NATO expanding to include Ukraine "would mean the final loss of Russia's claim to the inheritance of Kievan Rus, to the inherited leadership of the eastern Slavs, and the loss of all the territory conquered by Russia in the past 350 years" (Lieven 1995, 198). When these articles were published, the conditions were present to avert future conflict: post-Cold War peace opened up possibilities for codifying the limits of NATO expansion, re-evaluating its goals and membership criteria, or questioning the utility of the organization in the post-Cold War world altogether. That moment, however, passed; as former US Ambassador to the USSR, Jack Matlock, puts it, "dismissive actions by the United States, met by overreactions by Russia," prevented the two countries from crafting a functional model for future cooperation (Matlock 2014).

The vagueness surrounding NATO's limits of intervention remains a major source of tension between Russia and the West, as no uniform agreement exists on how to approach regional conflicts that include non-NATO states (Frear and Kulesa 2016). The authors of the European Leadership Network's 2016 Conference Report stress that disagreements regarding those conflicts stretch well beyond existing tensions between current leaders and, instead, stem from a fundamental disagreement on the meaning of sovereignty, rooted in the political and historical narratives of the states involved.

3. CONFLICT ANALYSIS

Scholars and policymakers continue to debate the specific effects of NATO expansion on post-Cold War US-Russia relations. An attempt to understand the patterns and narratives behind US and Russian policy decisions in regard to each

other will help to provide clarity on state intentions and actions, particularly on each country's utilization of NATO as an intermediary institution. In this section, we use conflict analysis as a mechanism for understanding complex dynamics. First, we discuss the literature on the narrative analysis approach and then we explore the use of legal theory as a tool for interpreting narratives.

3.1 Narrative Approach

The fields of conflict analysis and conflict resolution proceed from the idea that interdisciplinary tools help actors to better facilitate conflict mitigation at all levels. Therefore, understanding state behavior necessitates expanding beyond a classical study of international relations that focuses on grand theory, to a contemporary study of international relations that includes the analysis of non-state actors like international organizations. By increasing media for understanding, scholars can strengthen theory-building and enrich analysis (Zartman 2009)

The narrative approach, which relies on the concept of collective memory, is a fairly new methodological tool. As first articulated by sociologist Maurice Halbwachs in the early twentieth century, collective memory is "a representation of the past shared by members of a groups, such as a generation or nation-state" (Halbwachs 1980, 120). Halbwachs further suggests that the process of remembering as a collective generates different memories for different groups (Halbwachs 1980, 121). James Wertsch, adapting from Mikhail Bakhtin and Lev Vygotsky, postulates a textual understanding of narratives, where collective memories necessitate "the analysis of both textual resources and the specifics of how they are used by active agents" (Wertsch 2008, 122). With that, he advances an additional category of collective memory, the schematic narrative template, dealing less with specific stories or events, and more with patterns. "Schematic narrative templates," he writes, "produce replicas that vary in their details but reflect a single general story line" (Wertsch 2008, 122). The approach stems from the principle that narratives are integral to daily life; they exist in the media, in public discourse, in law, and in political decisions. The goal of the approach is to understand how "the stories, roles, and personalities reveal relevant actors and an understanding of who they are, what threatens them, and why and what their hopes are for the future" (DeRosa 2015). As Bacon explains, engaging with narratives is vital for understanding how states operate within their political systems (Bacon 2015, 228).

a) Russia's Narrative

Applying his development of schematic narrative templates to understanding collective memory, Wertsch discusses the example of Russia's post-Soviet transition, unearthing what he calls a "basic plot" that uses "a range of concrete characters, events, dates, and circumstances" (Wertsch 2008, 122). In the case of contemporary Russia, Wertsch identifies a schematic narrative focused on invasion, defeat, and suffering, as well as Russian heroism. Reaching a similar conclusion, cultural anthropologist Rauf Garagozov notes potential ambiguity in Wertsch's example, but demonstrates through several historical interpretations of significant events in Russian history (such as the Tatar-Mongol invasion) that Russia's historical narrative includes elements of "enemies," "hostile forces," and "sudden invasions" (Garagozov 2002, 56). He posits that ideological, political, sociocultural, economic, and psychological "mediating factors" surround such historical events and their general schematic narratives, and suggests that narratives could be "constructed" for political and ideological gains (Garagozov 2002, 56). Makarychev and Yatsyk confirm these features of Russia's so-called power narrative: sovereignty, unity or consensus, normalization, and security (Mkarychev and Yatsyk 2014). For instance, the scholars draw upon the contemporary examples of the Sochi Olympics and the Kremlin's involvement in the Crimean crisis to demonstrate how Russia's state leaders might legitimize the use of force and invasion with sentiments of securing borders from a history of threat and western influence (Mkarychev and Yatsyk 2014).

It should be noted that while these scholars argue that Russia's schematic narrative is premised on symbols of threat, invasion, heroisms, identity, and enemies, with an emphases on fear of invasion, it can also be argued that the US's schematic narrative also rests on a similar, military-focused set of ideas: security, heroism, and identity. This latter collection, however, refers to a quest for freedom and the imposition of power and influence on the 'freeing' of people and nations from British rule, communism, and religious or ideological extremism. So one actor—in this case, Russia—protects from external liberators, while the other, the US, seeks to liberate states from perceived oppression. And while domestic interests and collective identities may drive state narratives, they must not be considered solely in a vacuum; narrative themes regarding sovereignty, external threats, and security are intimately related with foreign relations among states and international institutions.

b) US Narrative

While a traditional invasion has not occurred in the US since Pearl Harbor, third-party agents—such as terrorist organizations—have posed and continue to pose threats to American security. However, given the expansive influence and resources of the US, it remains a powerful actor that uses its financial, normative, and military might to promote democracy and liberalism around the globe. In an effort to demonstrate the role of the expansion narrative in US decision-making within NATO and toward Russia, we use the following section to identify two observable themes in America's schematic narrative: freedom and democracy.

Historian Francois Furstenberg argues that freedom is autonomy or, as he describes it, "the capacity for human agency—that is, individuals' ability to act in secular time and shape their circumstances" (Furstenberg 2003, 1296). Once she willed herself free from British rule, America proclaimed itself the land of freedom, where anyone can come and build a prosperous life. Furstenberg looks to America's pride in the Declaration of Independence, arguing that while it was promulgated to declare America free from British rule, it became a symbol unto itself—one of personal freedom for all citizens (2003). American ideology quickly developed

around heroic resistance and individual freedom. Indeed, other founding documents and critical institutions promote liberty as a central value in the US: the Pledge of Allegiance serves as an oath of loyalty declaring liberty and justice to 'for all', and the Constitution acts as a written assurance of individual rights. As Political Scientist Samuel Huntington states, America's identity as a nation is "inseparable from its commitment to liberal and democratic values" (Huntington 1992, 30).

The US's determination to spread liberating ideologies, specifically democracy, can be interpreted as its dominant post-World War II trajectory. During the Cold War, democracy was viewed by many in the west as a bulwark against the analogous potential of its primary rival political system, communism. Sean Lynn-Jones of Harvard's Belfer Center argues that the US' promotion of democracy serves not only to secure individual liberties, but also to mitigate foreign threats and to promote international peace in a post-Communist era (Lynn-Jones 1998). Indeed, Democratic Peace Theory suggests that liberal-democratic states are less likely than autocracies to wage war against each other, perhaps explaining the US' justification for its pro-democracy interventions in states such as Iraq, Bosnia, and Afghanistan.

This motif of liberty, democracy, and freedom lies at the heart of the National Security Strategy of Engagement and Enlargement, which aims to transform East European and post-Soviet countries into liberal-democratic states. This can be traced back to the 1945 Truman Doctrine, in which all democratic nations facing threats from non-democratic regimes would receive political, economic, and military support, including possible intervention. Thus, one of the central themes in the US schematic narrative is that of security to ensure freedom.

3.2 Legal Approach

The narrative approach focuses on the idea that social reality is formed and driven by narratives (Berger and Luckmann 1996). In the context of US-Russia relations, the narrative approach seeks to identify the themes that form the general plot of the two countries' interactions. Within the narrative framework, conflicts can be interpreted as 'competing stories' , disseminated by opponents to legitimize their own claims while delegitimizing the claims of another party (Cobb 2004; Cobb 1993). According to this approach, no effective conflict resolution is possible without bringing competing stories to a common denominator (Cobb 1993).

There are two underlying assumptions in this argument. One, as previously mentioned, is that one aim of a story within a narrative framework is to delegitimize the story of one's opponent in conflict. The other underlying assumption is the existence of the so-called 'cultural limiter' phenomenon (Garagozov 2015, 3). The cultural limiter is based on the notion that there is a narrative truth, which is divided into 'specific narratives' and 'schematic narrative templates' (Wertsch 2002). The former offers an interpretation of events based on arguable fact, while the latter implies general patterns of behavioral correlations (Wertsch 2002).

In this context, legal theory can facilitate additional conclusions. The concept of law as a "self-organizing and self-developing psycho-sociocultural communication system," developed by Polyakov and Timoshina based on ideas of synergetics, hermeneutics, and communication theory, allows us to better understand the correlation between narrative and legal theories (Polyakov and Timoshina 2005, 103). In the simplest terms, these scholars suggest that law, as a human creation, emerges from the communicative activities that form a complex system of social interactions (Polyakov and Timoshina 2005, 80). Legal texts in this system appear to be a key element of the communications between people that inform them about the rules which are compulsory for all (Polyakov and Timoshina 2005, 86). Under this theory, a body of law can also be presented as a database of social, cultural, narrative, and legal patterns of a particular nation state. It should also be emphasized that the generally binding nature of law and legal texts, whether international or domestic, additionally entangles the matter of narrative truth, because it involves collective memory being codified into the legal system, including the bias introduced by interpretation.

In order to fully comprehend a state's behavioral patterns, one should analyze current legal framework, which offers a strong example of how narratives can be actualized by means of law enforcement. While the schematic narrative approach is 'looking for' patterns to determine and describe collective memory (such as themes of threat, security, identity, and heroism), legal theory and law partially 'provide' these patterns, since they are a result of social communications between people expressed in social norms and legal texts.

To structure our simultaneous application of narrative and legal approaches for this analysis, we use the model of chronotopic reading (Bakhtin 1981), which is defined by Garagozov as "a specific kind of reading activity that is focused on analysis of plot as a means of making sense of a story" (Garagozov 2015, 6). In the legal analysis, we define the narrative as a sequence of legal scholar's opinions and legal documents adopted by the US, Russia, and NATO in connection with the events of a significant matter in the international arena since the breakdown of the Soviet Union. Garagozov describes the procedures for chronotopic analysis: (i) division of the narrative into episodes; (ii) characterization of each episode; (iii) reorganization of episodes and establishment of the meaning; and (iv) discovery of the general narrative's idea (Garagozov 2015, 6).

Analysis of media articles, scholarly literature, legal doctrines, international legal instruments, and opinio juris, domestic legal documents that establish the dictates of foreign policy, all of which constitute sources of narratives, raise three categories that generally describe the schematics of US-Russia bilateral relations: first, the debate over NATO's international obligations regarding eastward expansion; second, states' contemporary practices of the use of force in regional conflicts; and third, the struggle for regional dominance by challenging the post-Cold War global order. We will demonstrate how discrepancies in the interpretation of these aspects by the US and Russia point to a narrative dissonance later in the paper.

4. NARRATIVES

Narrative One: NATO's Expansion/Enlargement and Legal Implications

One way that NATO serves US interests is by holding potential member states accountable to certain preconditions for membership in the reciprocal-security community. In 1998, the US Senate debated NATO enlargement as the Clinton Administration pushed for more cohesive security measures. President Clinton pushed for the acceptance of three former Soviet Bloc nations into NATO by 1999: the Czech Republic, Poland, and Hungary. "Enlargement will mean extending the most solemn security guarantees to our allies—a new commitment to treat an attack on one as an attack on all" (Clinton1996). In the same breath, Clinton urged Russia to view NATO expansion to former Warsaw Pact countries as an arrangement that will "advance the security of everyone" (Clinton 1996). In a 1998 editorial, the American political scientist and academic Peter Schramm asserted that the American public supports NATO expansion and a commitment by America to defend lives in other member states. At the same time, he insisted that NATO enlargement would not result in a fearful and aggressive Russia because of "unprecedented" concessions and reassurance that NATO troops would not be stationed in new member states (Schramm 1998). While insightful on many points, Schramm did not take into account the influential perception of NATO expansion as an extension of the US narrative of freedom, alliance, and collective defense against a Russian influence in Europe. Indeed, NATO has become the ideal reservoir for expanding US interests in Europe, and by doing so, providing legitimacy to the US narrative.

Russia's perception of NATO expansion has been affected by its history of numerous wars and invasions. The proximity of any troops to its borders, let alone their gradual encroachment into Russia's sphere of influence, signals a potential danger for the Russian territory and an urgent need for its self-defense. Thus, President Clinton's enthusiastic support for NATO's enlargement in the late 1990s was read by the Russians as active disregard not only for Russia's post-Soviet sphere of influence, but also for the post-Cold War sense of mutual trust. As Pavel Zolotarev pointed out in a meeting at the Institute for US and Canadian Studies (ISKRAN), the existence of NATO war plans plays a key role in how Russia formulates its defensive stance toward NATO enlargement (2016). As a result, ardent disapproval of NATO expansion has been a recurring theme throughout Russian President Vladimir Putin's tenure at the head of the country. In his 2007 speech, he stressed that "NATO expansion does not have any relation with modernization of the Alliance itself or with ensuring security in Europe. On the contrary, it represents a serious provocation that reduces the level of mutual trust" (Gaddy and Hill 2015, 307).

In their book Mr. Putin, Russia experts Fiona Hill and Clifford Gaddy illustrate how the Russian president mobilizes popular support for specific decisions, especially pertaining to NATO expansion, by cleverly reminding his nation of their 'identity'. Aware that Russia is sensitive to threats and security, it is rather easy for the government to validate legislature in defense of a greater and stronger Russia. This can partially explain Russia's sensitive position on NATO expansion. NATO's existence, coupled with historically rancorous relations with the US, might exacerbate Russian themes of enemy-imaging and external threats, both real and perceived. In this respect, the Russia-NATO equilibrium is in a state of defensive discourse. Thus, it is not necessarily NATO alone that induces Russia's preemptive aggression in its discourse and decisions, but rather its long history of invasion deterrence.

In proceeding with a legal analysis, it is important ante omnia to identify the schematic narrative of NATO perception by US and Russian international law scholars. In an in-depth analysis of work by Russian legal scholars described in his book Russian Approaches to International Law, Lauri Mälksoo comes to the conclusion that, since the breakdown of Soviet Union and the time of great power competition, the comparative approach and contraposition of contemporary Russia and the US (as well as NATO, since the US is a major organization member) prevails (Mälksoo 2015, 19). This also holds true for security and geopolitics in practice, where the US and Russia see each other as opponents (Mälksoo 2015, 20).

It is important to acknowledge that the question of NATO's alleged commitment not to expand eastward has not been directly addressed by international law scholars, which forms a gap in scholarly literature. This is due to the fact that NATO did not provide the Soviet Union with a codified obligation of this promise against expansion in the context of German reunification in 1990. Even today, there is no agreement in connection to the factual side of the problem—was there actually a promise not to expand at all? The prevailing consensus among many holds that the West did everything it could to give the Soviets the impression that NATO membership was out of the question for countries like Poland, Hungary, and Czechoslovakia (Der Spiegel 2009). The basis for such a conclusion lays in two conversations that took place during the negotiations on German reunification contained in declassified German records of conversations. The first was between German Chancellor Helmut Kohl and Soviet Premier Mikhail Gorbachev, and the second was between German Foreign Minister Hans-Dietrich Genscher and Soviet Foreign Minister Eduard Shevarnadze. In the former, Kohl told Gorbachev: "naturally NATO could not expand its territory" into East Germany. Similarly, Genscher assured Shevernadze that "one thing is certain: NATO will not expand to the East" (Der Spiegel 2009). However, NATO and its member-states do not acknowledge making such a promise. The West points to the fact that the Soviet Union had a chance to fix such an obligation on paper, but did not do so, as a qualified silence (Der Spiegel 2009). Consequently, such uncertainty has led to a controversial interpretation of the 1990 assurances, where Russia appeals to a "broken promise" by NATO, and NATO calls such promise a myth.

This narrative episode demonstrates the existence of two separate questions of fact and law. We assume, for the purpose of this analysis, that a 'broken promise' has been made in relation to NATO. Both Russian and Western doctrines of

international law recognize the possibility for actors to undertake international obligations by unilateral acts (MPEPIL 2013). However, such acts shall at least provide an intent to produce international obligations and be conducted by the authorized person (MPEPIL 2013). There is no clear and obvious answer whether NATO's 'broken promise' meets these criteria. The question of intent is also paramount; what exactly did German officials promise Soviet leaders? More important is the question of whether German officials could have made such a promise on behalf of NATO as an international organization. Why does an international organization have to keep a promise that it did not give? As such, under these circumstances the 'broken promise' looks like a gentlemen's agreement that a priori is not legally binding. Therefore, it becomes obvious that Russia, by constantly citing this episode, most likely appeals to its offensive nature rather than to a breach of any kind of obligation by NATO and the West for the purpose of strengthening its security claims and concerns. Under this rationale, Russia has no legal arguments against NATO's position relevant to Article One of the Helsinki Final Act, which provides every member state the right "to belong or not to belong to international organizations, to be or not to be a party to bilateral or multilateral treaties including the right to be or not to be a party to treaties of alliance" (NATO 2016). It must be acknowledged that the Soviet officials who received this 'broken promise' should have understood the absence of legal consequences of such an act and no doubt should have assessed all possible risks.

The narrative of NATO's enlargement and expansion was presented recently within Russia's domestic legal system. One of the latest examples is the Federal Law 381-FZ, which suspended the US-Russia bilateral Treaty Concerning the Management and Disposition of Plutonium (2000). Experts evaluate this suspension decision as a dangerous break in US-Russia relations that threatens the viability of other disarmament agreements (Carnegie 2016). A matter of significant importance for the purpose of the narrative analysis is Article 2(2)(1), which sets forth a condition for the Treaty's restoration and states that a:

> reduction of military infrastructure and troop levels of the United States of America, located on the territories of NATO member-states, that joined NATO after September 1, 2010, to the level when the Treaty and Protocols thereto took effect.

From this we conclude that Russia suspended the bilateral treaty between Russia and the US, and limited America's power to restore it. This might seem unconventional, since the US and NATO are two different actors within the international arena with distinct decision-making procedures. However, by doing this, the Kremlin sent a strong signal that Russia no longer believed in gentlemen's agreements and sought to secure its position on a unilateral, legal basis. As an explanatory memorandum to the Federal Law Number 381-FZ further reveals, the decision to suspend the Treaty was made in response to the increase of US troops and infrastructure in Bulgaria, Latvia, Lithuania, Poland, Romania, and Estonia. Russia believed that these troops could have supported NATO deployments in Eastern Europe in the case of conflict. The US responded officially to Russia's suspension of the treaty by saying that it was "disappointed" (Kramer 2016).

Despite the uncertainty of its legal basis, the consequences of a 'broken promise' have served in this case "to register political dissatisfaction" (Filipov 2016). By conditioning its international obligations on US attitudes toward NATO member-states, Russia shows that it not only perceives NATO as a threat, but as one that is closely associated with the US, thereby affecting bilateral relations.

That being said, both Russia and the US are persistent in their attitudes toward defending their core interests and principles. Despite holding opposing views on the validity of spheres of influence, both countries employ similar legal and political approaches. These legal and political approaches are latent responses to narratives, have a questionable influence on rational diplomacy, and dampen the possibility of conflict resolution. The problems of NATO's eastward expansion and the suspension of the 2000 Plutonium Treaty demonstrate the above-mentioned incompatibilities.

Narrative Two: The Use of Force and Legal Implications

With a vast and porous border, the potential of powerful and possibly threatening neighbors helps to explain Russia's investment in protecting its borders. In "How to Avoid War with Russia," published in the National Interest (Bezrukov et al. 2016), the scholars note that

> Russia is a status quo player focused predominantly on its nearest abroad. Neither Russian security priorities nor its resources compel Moscow to project power beyond one thousand kilometers from its borders. The basics of Russia's security strategy are simple: keep the neighboring belt stable, NATO weak, China close, and the United States focused elsewhere.

The country's focus on its near-abroad is complicated by the Westphalian principle of non-intervention. In recent years, this principle was broken by the West in both Kosovo and Iraq, both unapproved by the United Nations Security Council (UNSC). However, Russia's also broke this principle through active interventions in conflicts in Georgia and Ukraine. While it chose not to recognize the state of Kosovo, Russia still used it as a precedent in recognizing self-proclaimed independence by Abkhazia, South Ossetia, and later Crimea (Torkunov 2012). On the other hand, the tactic of insisting on UNSC backing could also be interpreted as a move to protect its interests via the Security Council, which seems to be the most legitimate of legal ways (if not the only one) for Russia to justify actions in the name of defense of its borders from real or potential threats.

During his annual press conference in 2015, Putin highlighted Russia's unwillingness to engage in conflict, while underscoring its readiness to respond to hostile activities against its sovereignty, national interests, and allies. Illustrative of Russia's longstanding themes of defensive sovereignty and territorial integrity, Russia claims not to see any country or organization as an enemy and that only terrorists and criminals are considered such. This may explain how Russia's operation in Syria, although far away from its bor-

ders, is closely tied to its domestic policy. Because Russia is a country with the largest Muslim population in Europe, Russian leadership is concerned about Islamist radicalism spreading to its citizens. Indeed, many of the recent, regional conflicts—in Nagorno-Karabakh or Chechnya, for example—have been along religious or ethnic divisions.

On the other side, intervention and the subsequent use of force is almost an endemic trait of US foreign policy; when its interests concern democratization and security, the US intervenes with little self-control. In the 1980s, the Reagan administration enthusiastically jumped in to support the regime of El Salvador, and invaded Panama in 1989 to oust Manuel Noriega. Shortly thereafter, the US invaded a hotspot, Kuwait, and deployed troops to Somalia under the auspices of a 'humanitarian intervention'. The US government claimed it was protecting the innocent and defending their inalienable rights, including that of democracy and freedom, aligning US action neatly with the nation's 'freedom for all' narrative. NATO's first major operation was in Bosnia, assisting the US in disarming an aggressive Serbia. Former President Clinton sent 20,000 American troops to the Balkan nation as part of a 60,000-member NATO peacekeeping force. (Sloan, 1995). While the US has an independent presence in the nations in which it intervenes, it also makes use of the alliance with NATO. As NATO official website states:

> "NATO is an active and leading contributor to peace and security on the international stage … [it] promotes democratic values and is committed to the peaceful resolution of disputes … [it] has the military capacity needed to undertake crisis management operations".

Concerning the US and NATO's use of force in regional conflicts, the state of international law scholarly analysis seems to be deeper and more precise. Post-Cold War Russian doctrine of international law traditionally depicts the US and NATO as systematic violators of the international obligation, established by UN Charter, to refrain from using the force in international conflict (Mälksoo 2015, 134). Russian scholars see conflict in former Yugoslavia as the starting point of US and NATO's illegal military involvement in regional politics close to the Russian border (Biryukov 2011, 449). In addition, Russian scholars do not recognize opinio juris, according to which the US' involvement in Yugoslavia shall not be deemed a precedent, as it does not survive subsequent US and NATO practices (Biryukov 2011, 449). Furthermore, Russian doctrine of international law highlights a dominant school that supports a strict prohibition on the use of force (Velyaminov 2015, 596-99; Chernichenko 2010, 99-103). A minority of international law scholars stand for a liberal approach to the use of force, which endorses such acts as humanitarian interventions and the protection of citizens abroad (Shumilov 2012, 199). Russian international law scholars explain such a pattern by arguing that the US has shifted and formed a new order of the international legal system (Get'man-Pavlova 2013, 232), ,and that Russia has no choice other than to copy US behavior (Shumilov 2012, 199). This US predominance in international relations arguably led to a crisis of international law in which Russia is harmed by obeying the rules of a 'broken' system (Mälksoo 2015, 133-35).

Western international law scholars are also divided into several groups depending on their perception of NATO and the US military activities in foreign countries. One group conceives these actions as violations of international rules and customs, while another group recognizes the positive effects of US and NATO interventions, like humanitarian responses (Bilder 1999; Henkin 1999, 824). Some scholars stated that intervention was technically illegal, but justifiable by purpose of UN Charter to guarantee human rights and international security (Wedgwood 1999, 828). Others advocate that the humanitarian intervention in Kosovo had legitimate grounds (Reisman 1999, 93). A few scholars supported the idea that the Kosovo precedent, itself, expanded international law and formed a new custom of humanitarian interventions (Zacklin 2001, 41). Finally, many scholars offered a nonstandard analysis of the situation, saying that, in relation to Kosovo, "other plausible options were available to give the action taken a higher degree of legality" (Falk 1999, 847).

The analysis presented in this section demonstrates the existence of both Russian and so-called Western doctrines of international law (Mälksoo 2015). Some legal scholars recognize that the US, along with other NATO members and Russia, keep bending international rules, scripting contemporary customs, and, in some cases, overriding 'classic' international obligations (Chinkin 1999, 841).

Narrative Three: Challenging the Post-Cold War Global Order

Keeping in mind the two narratives discussed above, we conclude that there is a third that rests on the fundamental incompatibilities and conflicting (although generally similar in nature) vital interests that preclude both US and Russia from finding common grounds: Russia's dissatisfaction with its role and position in international global order and its demand for transformation. During the Stanford US-Russia Forum semi-annual segment that took place in Moscow and Tyumen in December, 2016, professor Dmitry Suslov[2] described the basis of the third narrative as "the fight for uniformity and the struggle for regional dominance." Both of these concepts share a core idea—they are directed *ad extra*. The US fights for uniformity by means of democratization, while Russia defends its regional dominance by engaging other methods of influence, but both imply involvement in third states. Consequently, all kinds of conflicts and narratives arise when Russian and US interests collide along these points of overlap. During the same conference, Fyodor Lukyanov[3] added: "history shows … [that] international re-

2 Dmitry Suslov is Director of the Valdai Club's "Globalization and Regionalization: General State of the World Economy and Global Governance." He is also Deputy Director of the Center for Comprehensive European and International Studies at the National Research University—Higher School of Economics, Moscow, Russia.

3 Fyodor Lukyanov is Editor-in-Chief of Russia in Global Affairs, Chairman of the Presidium of the Council on Foreign and Defense Policy, and Research Director of the Valdai International Discussion Club.

lations are predetermined by systematic factors." Therefore, we argue that this third narrative of dissatisfaction in the global order contextualizes the aforementioned narratives. The suspension of the 2000 Plutonium Treaty serves as a key example of this; accompanied by a federal law that sets forth a list of preconditions, this document makes the line between NATO and US responsibilities indistinguishable, perhaps justifying Russia's desire for a global paradigm shift.

Examination of the issue becomes even more complicated when taking into account the indeterminate limits of America and Russia's global engagement. The ideal expressed by John F. Kennedy in 1963—"Freedom is indivisible, and when one man is enslaved, all are not free"—remains an ideal that determines US foreign policy (Kasparov 2016). And Russia has a very similar approach, demonstrated in President Putin's remark during a 2016 broadcasted Moscow award ceremony for students, when Putin asked a nine-year-old boy: "Where does Russia's border end?" The child responded, "at the Bering Strait with the United States." To this, the Russian leader replied that Russia's borders "do not end anywhere" (Embury-Dennis 2016). Putin stated that his answer was a joke, but also that, "there is a grain of truth in every joke." The notion of undefined borders was reinforced by Major General Zolotarev in a 2016 ISKRAN meeting, in his discussion of Russia's moral responsibilities. The Major General suggested that Russia cannot stay on the sidelines whenever such 'moral responsibilities' are in play. However, as with the idea of 'democratization for all', the concept of 'moral responsibilities' is vague. In regard to this grey-zone, Major General Zolotarev stated: "maybe such 'moral responsibilities' cover former states of the Soviet Union," however he defined neither the limits of 'moral responsibilities', nor where Russia's borders actually end. Alexey Korjouev of the Ministry of Foreign Affairs of the Russian Federation, further reinforced this sentiment in a 2016 meeting in Moscow, when he stated that the Ministry will consider "whoever defines themselves as a Russian" to be Russian no matter whether they live within the country or abroad and whether that person holds Russian citizenship. The context of moral responsibility and the self-imposed obligation to defend the people of Russian origin help to legitimate Russia's claim of endless borders.

Moreover, we must say that this analysis will be most likely affected by Donald Trump's current administration, which is still in its early months. We argue that Presidents Trump and Putin resemble each other most in their pragmatic approach to international relations: both consider their respective countries' interests to be a priority, particularly when it comes to membership in international organizations. As the American journalist John Judis points out, Trump has referred to US membership in NATO as "obsolete" and "expensive" multiple times throughout his campaign, indicating a degree of unwillingness to comply with a member's obligations lest they prove beneficial to US interest in gaining a profit (Judis 2016, 66). As Professor Suslov pointed out in a 2016 meeting, a Trump win signifies a fundamental shift toward bargain-driven foreign policy—one in which the US no longer provides services without reciprocity. Based on this approach, the possibility of US withdrawal from NATO is not far-fetched. Were Trump to pursue that path, a US exit would not only upset the structure of the alliance itself, but would also impact the world security climate as a whole, causing, as Fyodor Lukyanov pointed out, many European nations that currently rely on US assistance to seek support from other sources, such as Russia. However, the outline of President Trump's foreign policy strategy still lacks enough clarity, on which to base predictions. Regardless of what lies in NATO's future, the conclusions derived from this analysis point to a much more fundamental incompatibility between the US and Russia, which originated pre-NATO.

CONCLUSION

The purpose of conflict analysis is to evaluate existing conflicts through an interdisciplinary framework, with the goal of formulating comprehensive solutions. In this paper, we used the narrative lens and legal analysis to review US-Russian relations in the context of the North Atlantic Treaty Organization (NATO). This study concludes that NATO influences behavior to the extent that its existence exacerbates themes of security and invasion in Russia, and freedom and security in the United States. Moreover, our use of legal analysis leads us to conclude that NATO expansion in the post-Cold War era continues to be a threat to Russia as it excites the state's readiness to defend its interests and remove itself from vulnerability.

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7

DANCING AROUND SANCTIONS: OPERATIONS AND STRATEGIES OF ENERGY FIRMS IN RUSSIA

VII. Energy Geopolitics Working Group

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Abstract

As a consequence of the 2014 Ukraine conflict, domestic and multinational energy companies in Russia face a new operating environment, defined in large part by the sanctions imposed by the United States (US) and European Union (EU). These companies reacted in different ways and employed a variety of strategies to adapt to the new environment. We operate on the assumption that there is no objective tool available to assess the impact of sanctions on Russia. To fill this gap, we propose a new methodology—the Sanctions Impact Indicator—, which models the effect of sanctions on domestic operations. In particular, we focus on those companies that operate within the energy sector. The findings indicate a correlation between strengthened foreign ties—namely, cooperation between domestic and multinational firms—and a reduced impact of sanctions on domestic firms. The outcome of our study is valuable for both domestic and global policymaking; the trans-national nature of the contemporary global energy industry allows for successful partnerships between firms that render trade limitations and political risks, such as sanctions, less effective. We believe that this methodology can be applied to sanctioned economies beyond the Russian case, in order to improve our understanding of the effect of sanctions on a domestic energy market.

1. INTRODUCTION

Since the outbreak of the political crisis in Ukraine in 2014, international and Russian energy firms operating in Russia have been presented with a unique set of challenges. Apart from commodity market fluctuations, exchange rate volatilities, and regulatory changes, the economic sanctions imposed by the United States (US) and the European Union (EU) affected the Russian operating environment substantially. While the perceived impact of sanctions on the domestic Russian energy market dominates public discourse, a deeper look into firm financials indicates a more nuanced effect. Indeed, firms are developing new assets, replacing production volumes with reserves, and attracting new investors. How can we understand this variation in sanction impact? The aim of our research is to find and illustrate the effects of sanctions on energy companies. Further details on the operations of major domestic and international firms in the Russian energy sector are provided in the appendix.

The Russian energy sector prior to sanctions

Due to major developments in hydrocarbon production, processing, export, and distribution, Russia remains one of the globe's major oil and gas producers.[1] And yet, the strong presence of state-controlled companies quintessential to the Russian energy sector has, to some degree, curtailed growth by limiting price liberalization and competition (IEA 2014). Even prior to the western sanctions, the energy sector in Russia faced a number of difficulties regarding adjustment and restructuring. The abundance of oil and gas in Russia, combined with high global energy prices, resulted in a general apathy toward the modernization of exploration and production technologies on the part of Russian energy giants. Likewise, Russian companies lacked motivation to search for unconventional energy resources or to expand to new markets (Russia Direct 2015).

On 1 January 2015, Russian authorities rebalanced the oil tax regime in order to address both the need to force oil companies to meet their downstream obligations and also to support the upstream profitability of Russian oil compa-

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1 According to the International Energy Agency (IEA), in 2013 Russia was the world's second largest producer of the crude oil (IEA 2014).

Abbreviations and Units of Measurement

BP - British Petroleum
CNOOC - China National Offshore Oil Corporation
CNPC - China National Petroleum Corporation
ESPO - Eastern Siberia - Pacific Ocean pipeline
EU - European Union
IEA - International Energy Agency
LNG - Liquified Natural Gas
MET - Minimum Effective Taxation
MNC - Multinational Company
OPEC - Organization of Petroleum Exporting Countries
SII - Sanctions Impact Indicator
XOM - Exxon Mobil Corporation

nies (Henderson 2015, 37). The overall structure of this tax regime remained intact, but the top rate of crude oil export tax was reduced from 59 percent in 2014 to 30 percent in 2017. In addition, the new plan compensated budget planning via increased royalties (MET). By December 2016, the Russian government sold 19.5 percent of Rosneft to a consortium of foreign commodity traders that include Glencore and a Qatari state-owned fund (Mazneva and Arkhipov 2016).

Finally, the Kremlin's so-called 'Pivot to Asia' and its attempt to fast-track politico-economic relations with Asian countries such as China, promised large scale developments in the oil and gas industry that consequently failed to materialize (Gabuev 2016). These delays can be attributed to both commodity market dynamics and the volatilities underlying long-term agreements, such as those in the 'Power of Siberia' infrastructure project.

Many of these challenges are mentioned in the Energy Strategy 2030 plan, adopted by the Russian government in 2009 and later replaced in part by the Energy Strategy 2035 plan, which outlines the need to develop human capital, technologies, and infrastructure in order to strengthen the domestic energy market (Ministry of Energy of the Russian Federation 2009, 2015). These strategies both envision the government's decreasing, regulatory role in the sector by target date. In practice, however, under Western sanctions, the role of the government could be seen as increasing. Not only have we observed an increase in the number of energy companies turning to the Central Bank for additional loans to replace the foreign money that has become largely unavailable to them, but the government also plays an increased role in energy regulations in its recent compensation of sanctions-related losses.

Sanctions

In this study, we use the term sanctions to denote sectoral economic sanctions imposed on the Russian Federation in 2014 by the US and the EU. These sanctions can be categorized into four types:

I. Travel bans and asset freezes on a number of individuals and entities deemed responsible for specific violations in Ukraine;

II. Restricted access to Western financial markets and borrowing services for a number of Russian, state-owned enterprises in the energy, defense, and banking sectors, including transaction bans on Rosneft, Novatek, Gazprombank and Vnesheconombank;

III. Restrictions on the exports of designated technologies for oil exploration and certain types of production equipment; and

IV. An embargo on military exports as well as on dual-use goods and technologies to Russia.

In September 2014, the US imposed additional sanctions on Sberbank, Rostec, Gazprom, Rosneft, Lukoil and a number of other major enterprises. In particular, these sanctions restricted cooperation between Russian oil firms and international energy giants such as British Petroleum (BP) and Exxon.

Multinational energy firms

Most active oil and gas reservoirs in Russia were explored during the Soviet era. In more recent years, new energy deposits have been difficult to explore due to a lack of appropriate knowledge and resources. These barriers have been mitigated, in part, by the western investments and technologies that played a key role in restoring production volumes in Russia (Sidorova 2016, 144). Seeking to maximize their profits in oil-and-gas-abundant Russia, many multinationals from America, China, and EU countries—British Petroleum, E.N.I., Exxon Mobil, Royal Dutch Shell, Statoil, and Total, for example—have begun to partner with Russian energy companies. However, many of these energy firms had to adjust their strategies and operations in Russia due to the nature of sanctions.

2. LITERATURE REVIEW

The effectiveness of economic sanctions as a foreign policy tool is debated vigorously. Defined as the withdrawal of customary trade and financial relations for foreign and security policy purposes (Masters 2017), the World Bank's Multilateral Investment Guarantee Agency highlights that sanctions are a political risk (World Bank 2009, 28). We know that sanctions can have deleterious effects on domestic firms. After all, the ability of a country to impose sanctions effectively is dependent on the degree to which it can induce its national firms to abide by sanctions (Morgan and Bapat 2003). Likewise, the willingness of national firms to violate said sanctions is dependent on the value placed on their business activity in the sanctioned country, as well as the perceived probability of being punished. This calculation is further complicated by the complex ownership structures of firms. Indeed, many firms classify as both national and international due to the nationalities of their leaders, the locations of their headquarters, and the locations of their operations. In the following literature review, we organize current scholarship on how sanctions affect firms that operate across jurisdictions.

Overall, firms' strategies are motivated by stakeholder commitment, for whom long-term profitability is imperative. This calculates heavily into a firm's perception of political risk, as explored by Eaton and Gersovitz (1984), in their assessment that firms classify firm by both observable conditions such as 'country risk'—political and environment

threats—, as well as intangible factors such as potential reputational damage. Frynas (1998) expands upon this concept of 'country risk' by describing it as a macro-risk that affects all business in the jurisdiction, as opposed to a micro-risk that only impacts a specific industry. For example, in the case of Russia, Western economic sanctions coincided with a drop in oil prices, a depreciation of the local currency, and a number of sweeping regulations (such as counter-sanctions and data collection laws) that sought to constrain the activity of all local and international economic agents operating within Russia. And yet, Robock and Simmonds (1973) argue that political risks faced by one company may not be risks for another, an assessment that holds relevance in the context of the current sanctions regime, as it is imposed by separate entities like the US and the EU through separate laws. We suggest that this logic leads to the conclusion that a British company sanctioned from operating in Russia under EU law may perceive risk differently than an American company.

The concept of uncertainty—as theoretically distinct from the concept of risk—provides a useful framework for analyzing a firm's response to sanctions. Political uncertainty refers to changes in the political system such as a coup d'état, revolution, or political upheaval, while policy uncertainty refers to specific government actions that may affect the business operations, such as nationalization of assets, counter-sanctions, or changes in tax policy (Miller 1992). In our case, multinationals operating in Russia can react to economic sanctions as a policy risk, implying uncertainty about the future rules of the game, as well as political risk, where economic sanctions are a possible sign of regime change or political unrest. Variability in firm responses to risk is also dependent on its portfolio of assets, for example, whether it deals in natural resources which require large capital investments (Vernon 1971).

Firms attempt to manage risk follow a variety of strategies to recoup investment. Some change their capital structure over time with increased leverage and decreased equity ownership (Kesternich and Schmitze 2010). Others lobby and form strategic alliances (Keillor, Wilkinson, and Owens 2005). The latter is observable in the case of former Exxon Mobil CEO Rex Tillerson, who recently joined the Trump Administration as Secretary of State and serves as a potentially important foreign policy interlocutor (Gidadhubli 2003). John Chipman goes so far to suggest that a so-called "corporate foreign policy" has become a tool for comprehensive risk and policy analysis (Chipman 2015). This is different than the sheer economic perspective of how multinationals are expected to act when facing political risks. If the risk responses of such firms-cum-geopolitical players are driven by a number of factors that produce dissimilar risk perceptions, a sum total assessment of the impact of political risk is problematic and in need reassessment.

3. RESEARCH QUESTION AND METHODOLOGY

There is a need for a comprehensive and comparative analysis of the firms impacted by the sanctions regime. The oil and gas firms operating in Russia have varying degrees of risk perception and response capabilities, which cannot be obtained and subjected to research due to corporate confidentiality protections. The result of such perceptions and capabilities are meaningful, however, and should be aggregated in order to decipher overarching industry trends, potential exceptions, and correlations between firms operating in Russia's oil and gas industry. Indeed, our goal in this paper is to better understand the effect of sanctions on energy firms. Considering this context, we present the following hypotheses:

Hypothesis One: Firms that respond to sanctions demonstrate better political risk management capabilities and, therefore, yield superior results in the mid- to long-term.

Hypothesis Two: The inability to divest from investments necessitates that firms deploy high risk-return strategies, often resulting in successful partnerships and ventures over a medium term in an under-saturated market.

Hypothesis Three: Divergent impacts weathered by international and domestic oil and gas firms undermine claims regarding the uniform effects of sanctions on the industry.

The number and size of the stopped projects are a natural and most evident consequences of sanctions. Companies either take an immediate financial hit or must liquidate their positions with local partners at a considerable discount. Thus, the ability to replace annual production with new reserves is an indication of a company's successful adaptation. So, too, is the ability to cut costs, to focus on adaptable business models, and to respect existing project deadlines. Despite restrictions on long-term financing from western sources, a number of alternative options exist with certain preconditions attached to them. As a result, the ability to attract financial support from the Far or Middle East is another measurement of success post-sanctions. Collectively these components develop the Sanctions Impact Indicator (SII)—the heart of our research.

3.1 Methodology

In order to present a comprehensive analysis of firms operating in Russia, we employ the Sanctions Impact Indicator (SII) formula. In order to use this approach, we rely on both quantitative and qualitative data. In particular, we examine ongoing projects, investment expenses, and the sale of shares reported in the Global Economy Survey.[2] A set of semi-structured expert interviews complement these data and help us to form a more complete understanding of the effect of sanctions on energy firms.

The target companies of our study fall into two categories: multinational oil and gas companies, such as British Petroleum (BP), Eni SpA, Statoil, Exxon Mobil, Royal Dutch Shell, and Total SA, and Russian oil and gas companies, such as Novatek, Rosneft, Gazprom, and Lukoil. Both categories of companies are alike in that they operate in Russia or conduct business with Russian firms.

The SII formula accounts for the following seven components in regard to both categories of companies:

2 This survey was conducted by the Institute for Industrial and Market Studies, Higher School of Economics.

1. The number of stopped or frozen projects
2. Investments recorded as a result of sanctions
3. A company's ability to replace assets as production diminishes
4. A company's ability to cut costs by shifting production to low cost venues
5. A company's ability to avoid delays in ongoing operations
6. A company's ability to attract long-term project finance loans
7. A company's ability to obtain new technologies post-sanctions

Each component operates on a point scale that ranges from 0 to 10. For example, BP's equity in Rosneft gives the former enough cash flow to offset the effect of sanctions. Alternatively, Exxon does not have any equity in Russian firms, which gets it the negative maximum of 10 points. Each component along the point scale factors into an overall weight coefficient. The weight coefficient rests between 0 and 1 for each component, where 1 means that this component plays the main role in an outcome.

In order to avoid the influence of unrelated factors, we have introduced a sanctions coefficient that helps to differentiate the effect of sanctions from an overall economic situation. The coefficient might be anywhere between 0 and 1, where 1 means that the component is the result of introducing sanctions only. An example of the measurement process is the following:

The first component identified is the number of stopped or frozen projects. This component is given two coefficients: a weight coefficient and a sanctions coefficient . Then, each company, out of *k* companies that we evaluate, gets assigned a number in the range of this component. For example, if Company One is XOM, it has the assigned range in Component One as = 10. In order to calculate an overall impact for XOM using only this component we need to multiply the range by two coefficients: . Following this step, we repeat this procedure for Company One using all *N* components:

For the first company in the sample:

$$SIIc_1 = W_1 * S_1 * R_1c_1 + W_2 * S_2 * R_2c_1 + \ldots + W_n * S_n * R_nc_1$$

For the second company in the sample:

$$SIIc_2 = W_1 * S_1 * R_1c_2 + W_2 * S_2 * R_2c_2 + \ldots + W_n * S_n * R_nc_2$$

For the *k-th* company:

$$SIIc_k = W_1 * S_1 * R_1c_k + W_2 * S_2 * R_2c_k + \ldots + W_n * S_n * R_nc_k$$

More on the Weight Coefficient and Sanctions Coefficient

As discussed before, each component must be tested and corrected in two ways. First, how important is this factor compared to other factors? Second, do other economic uncertainties affect this component?

Our first question is resolved by the weight coefficient *W* that gets assigned for each component. The prioritization of factors based on expert interviews led us to note that the number of stopped and frozen projects is one of the most important factors on the list. Thus, it gets the highest weight coefficient possible: . We then looked through the literature and noted that written down investments also have a valuable input compared to the first factor, which means that this component also gets the weight coefficient that equals to 1. The ability to replace assets and the ability to attract long-term finance loans came together as a second priority on the list as both factors measure the response that companies use when facing sanctions. These components were assigned a weight coefficient that equals to 0.9. Using the same logic, reinforced by our expert interviews, we formulated weight coefficients for all factors and present them in Table 1.

The second correction of each component is the sanctions coefficient, which shows the level of each component's dependence on sanctions alone. For example, the first factor indicates the number of projects that were stopped after the first wave of sanctions, due to a restriction on financial sources or technological tools. For this reason, the first factor is assigned . To the contrary, the ability to cut costs would need additional investments that were not possible due to both sanctions and lowered oil prices. As a result, we applied to Component 4.

The process of assigning coefficients and points to the companies might appear arbitrary. However, the diverse and collective, interdisciplinary expertise of the authors, reinforced by expert interviews, help to make such coefficients as accurate as possible.

4. ANALYSIS AND DISCUSSION OF FINDINGS

The ranking produced by the SII gives a uniform point grade to multinational and Russian firms, alike. It also indicates substantial variance among these firms. Our SII ranking produces a realistic snapshot of the current state of affairs in Russian oil and gas industry, whereas a similar study conducted six months earlier or later could produce a different picture altogether. For the purpose of comparing the firms of countries that imposed the sanctions and those from countries uninvolved in the sanctions, we have included three state-owned energy giants from China in the target list of companies.

On average, the Russian domestic firms fare significantly better than their multinational counterparts. However, this is not to say that the strategies employed by Russian firms always worked better as both were equally subject to the fiscal and monetary measures put forth by the Russian government in order to minimize the effect of sanctions. Whereas Russian state-owned firms score relatively close to each other, private firms show much greater variety, with Lukoil as the worst performer and Novatek faring better than all other firms. Instead, we see a stronger correlation between the companies that were in strategic and commercial partnerships such as British Petroleum with Rosneft or Total with Novatek. British Petroleum's case is unique because it holds a direct equity stake in Rosneft and, through its ownership, was able to benefit on all categories despite a market capitalization decrease due to foreign exchange. Russian domes-

Table 1: *Weight and sanctions coefficients assigned to the factors*

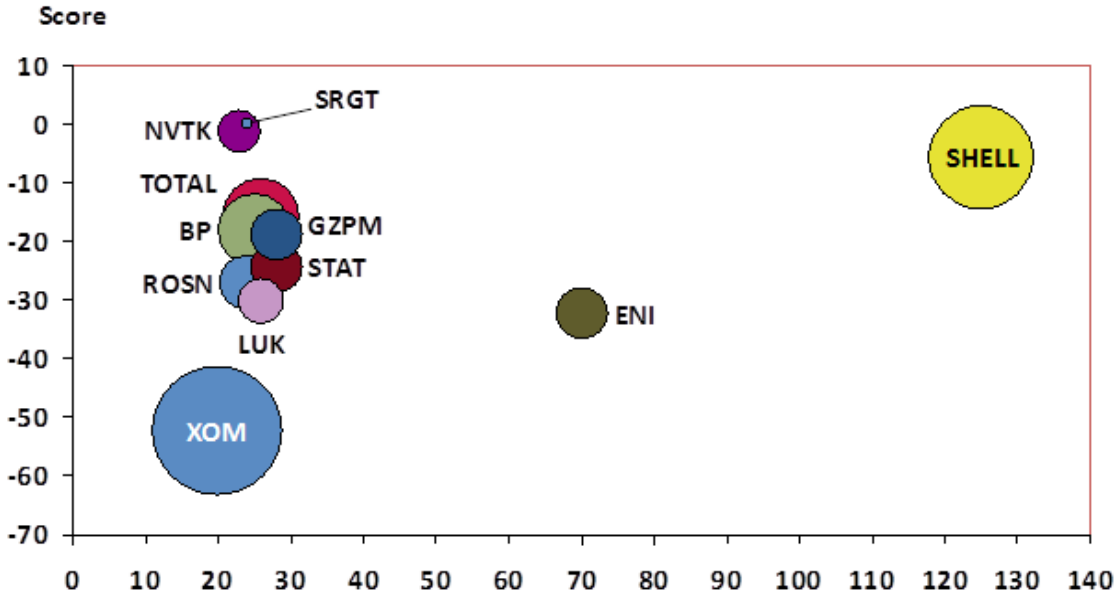
Component	Component symbol	*W*	*S*
Universal factors:			
1. Number of stopped/frozen projects	R1	1	1
2. Investments recorded as a result of sanctions	R2	1	1
3. A company's ability to replace assets as production diminishes	R3	0.9	0.8
4. A company's ability to cut costs by shifting production to low cost venues	R4	0.7	0.6
5. A company's ability to avoid delays in ongoing operations	R5	0.7	0.6
6. A company's ability to attract long-term project finance loans	R6	0.9	1
7. A company's ability to obtain new technologies post-sanctions	R7	0.8	1

Source: authors

tic firm Novatek's Yamal LNG project merits mention here because, despite delays and restrictions, its project developers attracted strategic, financial investors as well as crucial, long-term project financing from East Asian sources. Among multinational companies, the length of operational presence appears to correlate with a lower score (and, therefore, a lesser impact), whereas the size of the company in market value does not have any correlation with performance on ranking. In short, Shell did not have any significant ongoing project developments at the time of sanctions imposition, however utilized asset swap deals to obtain an interest in Russian fields.

Common features of firms with high scores (denoting the greatest impact) were the ongoing development of projects and a lack of producing assets in Russia. This led to significant capital losses and the inability to disinvest at marketable rates in time. On the other hand, certain firms were successful in completing the immensely difficult and capital-intensive projects despite delays and the divestments of some of their partners. The vast majority of such deals came during the second half of the sanctions timeline and indicate an ongoing process of learning in sanctions responses, led by companies Shell and Novatek. The recent cases of Eni and Statoil also illustrate this shift between the first and second halves of the sanctions timeline: whereas Russia's political risk appeared unmanageable in 2014, these firms recently returned after a period of activity to lobby their way back into the Russian market.

If 2015 can be characterized by mostly long-term financing, pre-export financing, and asset swap agreements, the overall trend of the last two years increased toward more consequential deals, where acquisitions, privatizations, and



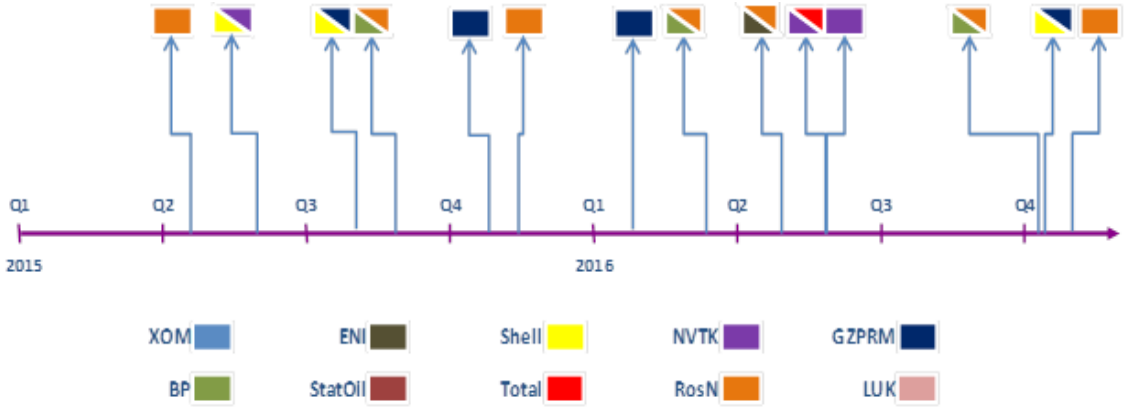
Source: Authors; Bloomberg; Individual Firm Websites

Figure 1: *Results of the firms' ranking. (The size of the balloon reflects market capitalization and, for the purposes of illustration, a negative value of ranking scores has been used. Thus the top scorers such as Novatek and Shell are ranked on the top.)*

project finance dominated. In particular, we observe that firms learned from each other and tried to practice newly-acquired knowledge with other players in the market. Only two firms, American firm ExxonMobil and Russian firm Lukoil, have not shown any major signs of altering their business activities in Russia.[3]

The international oil-and-gas firms that were most active in Russia over the last two years all made large capital investments in Russia prior to the sanctions. British Petroleum owned nearly twenty percent of Rosneft equity, Shell successfully developed fields in Russia's far-east, and Total was nearing completion of Yamal LNG with Novatek. Despite posing a significant political risk and ongoing uncertainty, we believe that the inability or reluctance of these companies to part with their investments influenced their risk perception and subsequent responses toward high-risk and high-return strategies. The ranking and deals timeline show that these international firms and their Russian partners form the better performing half of the pool, and compose most of the activities in the market.

The data demonstrate the importance of cooperation among international and domestic firms in overcoming the challenges of sanctions. Without such cooperation, firms seem doomed to undertake large capital losses and to poorly manage risk.



Source: Financial Times , Bloomberg, Individual Firm Websites

Table 3: *Deals signed by firms regarding the Russian oil and gas industry (includes acquisition, asset swaps, financing, technology, and cooperation). Mixed colors indicate deals between corresponding firms.*

5. RECOMMENDATIONS

General considerations about sanctions as a tool of foreign policy

As the international political landscape remains complicated in the years ahead, economic sanctions may play a more prominent role in the foreign policy toolbox of state actors and international organizations. This section will explore several ideas on how sanctions could become an instrument of statecraft, with the role of preventing war and augmenting deterrence.

Policymakers should deepen their understanding of the short-to-medium and long-term impacts of economic sanctions. It is important that they know how to calculate the expected behavioral changes of economic actors in response to a sanctions regime, especially as these changes may lead to a new equilibrium, that may or may not be consistent with a policymaker's initial intent. Indeed, there is a need for a more open and regular dialogue between policymakers and private sector leaders on how to involve the private sector in the design and implementation of a sanctions regime. Timely exchange and communication on the economic consequences of these measures may lead to less collateral damage and better policy outcomes. As discussed in the body of this paper, oftentimes it is multinational firms that assume greater operational losses in the target country than their domestic counterparts under sanctions. This stems in part from the fact that multinationals face not only the direct consequences of sanctions, but also the consequences of a target state's countermeasures. In addition, multinationals generally do not benefit from the same level of political and financial support as do their domestic counterparts in a targeted country, assuming that the target country has enough resources at its disposal. Last, jurisdictional heterogeneity introduces room for significant inconsistencies in the implementation of sanctions and can lead to unintended advantages for economic actors from countries with weaker support for the sanctions regime.

This leads us to our second recommendation: uniform international support for the sanctions regime should not only be considered as a foreign policy objective but also as a policy that potentially increases the effectiveness of sanctions, while minimizing situations when sanctions present a strategic advantage for one class of economic actors over another. To address unintended consequences and assess the effectiveness of the sanctions, it is imperative to imple-

3 Although it is beyond the scope of the research, we presume that ExxonMobil was reluctant to challenge the sanctions regime. Meanwhile, Lukoil was largely focused on overseas markets, such as Iran (Reuters 2017), perhaps indicating an attempt to diversify risk.

ment constant monitoring and review.

Implications for US-Russia Relations

The long-term view presents a complex picture where both multinational and local firms have greater leeway and success in circumventing sanctions. Dependent on particular jurisdictions and levels of previously-invested capital, the firm strategies that involve third parties tend to move forward with the logical conclusion of the projects despite the restrictions. The case of western sanctions on Russia shows that mega-projects have become more costly, even for big players. Shouldering the burden between more than two firms with comparable technological, financial, and operational capacities significantly reduces the risk of project cancellation or delay. Similarly, the high-risk, high-return principle can apply to a sanctions environment where government stakeholders present increased opportunities to cushion the industry from negative effects. An inability to divest from investments will likely lead to higher risk responses from firms; when correctly executed, these responses tend to pay certain dividends in the medium-term.

Further application of the methodology used in this paper can be expanded and integrated into the analysis of similar sanctions regimes targeting at bringing behavioral change in countries with considerable domestic political accountability or hybrid regimes. Expansion of the methodology into the areas of where similar sanctions are combined with restrictions on defense industries could yield useful insights in the study of international relations. Likewise, analysis of domestic reforms in public finance, industrial and trade policies, and high-tech industries could utilize the SII formula to either synthesize or support these findings.

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8

US-RUSSIA COOPERATION: UNDERSTANDING CYBERSECURITY CONTEXTUALIZATIONS

VIII. Cybersecurity Working Group

Elza Ganeeva, Ashe Magalhaes, and Susan Wen

Abstract

This paper aims to mitigate the consequences of false attribution and ensuing crisis escalation between the US and Russia by conducting a two-tiered analysis. First, we explore the current state of cybersecurity policy cooperation across three levels: unilateral, multilateral, and multi-stakeholder. Then, we examine the most discordant cybersecurity-related words used among English and Russian speakers. The contribution of this paper is its novel approach to understanding the foundational differences in how English and Russian speakers contextualize cybersecurity.

1. INTRODUCTION

According to a survey of the Pew Research Center released in October 2014, about two-thirds of technology experts expect a major cyber-attack in the world by 2025, feared to potentially lead to significant loss of life or property (Rainie 2014). The threat of militarized cyber operations places an asymmetric burden on a passive defense strategy, as the attacker need only to exploit the system once to cause significant damage. As a result, the international debate over cybersecurity necessarily includes a consideration of attack options for defensive purposes (Owens et al. 2009, 14). This offensive strategy, along with the difficulty of establishing cyberattack attribution, presents the problem of false attribution and ensuing crisis escalation.

The United States (US) and Russia, two military powers, are particularly vulnerable to the conflict escalation that results from falsely attributed cyber attacks. We suggest that the detrimental effects of false attribution can be effectively mitigated through improved understanding. Therefore, we propose a mixed-method approach that draws heavily from network analysis in order to better compare how the US and Russia each contextualize cybersecurity.

The following paper is divided into two sections: the first provides an overview of the existing cybersecurity policy landscape and its limitations; the second presents an empirical analysis that details a novel and technical approach to enhancing communication practically. Both policy- and the empirically-focused approaches are necessary in developing a new strategic framework that could prevent the breakdown of communication between the American and Russian governments. By bringing to light failure points in the way that American and Russian government officials understand and speak to each other about cybersecurity, we can assist both governments in achieving cooperation.

2. POLICY ANALYSIS: THE CURRENT STATE OF CYBERSECURITY COOPERATION

This section explores the policy challenges of cybersecurity, cybersecurity policy organization on the global stage, and the current state of American and Russia cooperation in cyberspace.

2.1 Cybersecurity Policy Challenges

The Shared Threat of Compromised Industrial Control Systems (ICS)

Most ICS components, such as Programming Control Logic (PLC) and network devices, were built on the assumption that the systems operate in "isolated environments" (Andreeva, et al. 2016, 3). As more ICS become connected to the Internet, adversaries increased their abilities to exploit this design flaw. For example, a buffer overflow attack involves an adversary taking advantage of the network services' root access to the operation system, thus granting the remote adversary control of the machine. In both the US and Russia, the vulnerability of ICS threatens large scale disruption in core infrastructure such as dams, energy systems, and transportation systems. In short, cyberattacks can cause serious physical damage.

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The threat of compromised ICS is worsened by the fact that these systems are usually embedded in physical machines. These machines have a lifespan of ten to fifteen years, as opposed to the three to five year lifespan of an information technology system (Stouffer et al. 2015, 3). As a result, even when a threatened ICS is detected, it is difficult to fix. According to IBM Managed Security Services (MSS) data, attacks targeting ICS increased over 110 percent from 2015 to 2016 (McMillen 2016).

Difficulty in Establishing Deterrence in Cyberspace

The success of global nuclear non-proliferation has inspired scholars to explore the analogy of cyberattacks to nuclear weapons. Both can operate as both defensive and offensive weapons. However, the fundamental differences between the two domains highlight the difficulty in establishing deterrence in cyberspace. We understand deterrence as an event or process that dis-incentivizes hostile actions. Deterrence includes two components: "deterrence by punishment (the threat of retaliation) and deterrence by denial (the ability to prevent benefit)" (Jasper 2015, 61).

The ability of nuclear weapons to change the "balance of power on the battlefield" and ensure "decisive victory" through "assured destruction" granted nuclear power its deterrent credibility (Cirenza 2015, 9). The perceived potential for destruction from nuclear weapons quenched the incentive for offenses from third party adversaries (Levy 1984). In contrast, cyber weapons can be acquired through research and development by both state and non-state actors. The success of cyberattacks relies on secrecy rather than the ability to destroy because once victims realize they are vulnerable, they can build patches to undermine future cyber offenses.

For deterrence by punishment to be successful, states must be able to carry out self-defense. Yet, there is currently no established consensus on necessary and proportionate response in cyberspace (Jasper 2015, 66). Unlike in nuclear warfare, escalation in cyberspace does not provide for mutually assured destruction. Difficulty in cyberattack attribution complicates the justification of self-defense. Therefore, the nuclear analogy does not hold because cyberspace does not deter hostile actions through deterrence by punishment or deterrence by denial.

2.2 Current Global Efforts in Establishing Confidence-Building Measures (CBMs)

On the global stage, cybersecurity solutions are organized into unilateral, multilateral, and multi-stakeholder approaches. On the unilateral level, countries enforce a legal framework on cyber activities. On the multilateral level, states enact treaties and agreements among themselves, identify acceptable and illegal actions, and propose norms and opportunities for cooperation. On the multi-stakeholder level, states engage private sector organizations and professionals to participate. Below is an outline of existing confidence-building measures, implemented on the unilateral, multilateral, and multi-stakeholder levels.

Unilateral Cybersecurity Policies in the US and Russia

In 2016, hacking allegations surrounding the US elections, attacks against government bodies, and theft of official government records led to tense US-Russia relations. Despite becoming a priority for both countries, there is no legal regime or governmental regulation of cyberspace at the present time (Ciglic 2016). While the US and Russia are both incentivized to reduce ICS vulnerabilities, enhance cybersecurity forces, and avoid conflict escalation, they have different cybersecurity policy approaches. Generally, Russia perceives cybersecurity as a part of broader information security dimension, which includes a wide range of issues such as import substitution policy, the Internet of Things (IoT), and the protection and sale of personal data. While the Obama administration had a global approach toward cybersecurity that emphasized US leadership, the Trump administration is likely to focus on defending US national interests in every domain, including cyberspace (Suslov 2016).

United States

In 2015, the US adopted the National Security Strategy from a document that describes security, prosperity, American values, and international order (White House 2015). It focuses on the US maintaining a position of leadership in international affairs; the words "lead," "leader," and "leadership" appear 94 times in the context of the country's role in the world. In the same year the Department of Defense (DoD) released "Cyber Strategy," which listed three cyber missions of the US government: to defend DoD networks and information; to defend the US and its interests against cyberattacks; and to provide integrated cyber capabilities to support military operations and contingency plans.

In 2016, the Obama administration released the Cybersecurity National Action Plan (CNAP) which includes:

- The creation of a national cybersecurity commission and information technology modernization fund;
- The founding of a national cybersecurity alliance with leading technology firms such as Microsoft, Google, and Facebook, along with financial services companies such as MasterCard, Visa, and PayPal;
- The launch of the administration's National Cybersecurity Awareness Campaign;
- Over $19 billion investments in cybersecurity-related ventures in 2017; and
- The building of a Cyber Mission Force, which operates under the purview of US Cyber Command.

In 2017, the American political landscape on cybersecurity issues remains vague as President Donald J Trump transitions into power. During his campaign, President Trump announced his plans to review all US cyber defenses and vulnerabilities, while also creating a Joint Task Force to coordinate federal, state, and local law enforcement responses to cyber threats. President Trump has also spoken about his plans to develop America's offensive cyber capabilities in order to deter attacks by both state and non-state actors.

Russia

Russia's Information Security Doctrine (Security Council of the Russian Federation 2016), published in 2016, describes the state's official information and cybersecurity approach. It presents information security as the protection of the indi-

vidual, society, and state from internal and external threats in the information sphere. The doctrine lists a number of threats to the state, including an increased number of cyberattacks on critical information infrastructure, foreign intelligence operations against Russia, and operations that seek to destabilize the state through cybercrime. In contrast to an earlier document published in 2000, the 2016 doctrine focuses on the military-political components that allow for Russian sovereignty in the informational space. It addresses threats to the state rather than to people and businesses, and includes the idea of a national Internet management system.

Another key document that influences Russia's cybersecurity policies is the Strategy for the Development of Information Society in Russia for 2017-2030, published by the Russian Security Council. The document outlines the problems caused by cyberattacks on critical infrastructure and proposes solutions. The draft law on Critical Information Infrastructure (CII) introduces a legal definition of critical infrastructure and obliges subjects of CII to share information regarding cyberattacks and computer incidents.

In 2016, President Putin introduced a number of specific orders which influence Russian cybersecurity policy. These orders include provisions regarding the following points:

- The use of Russian cryptographic algorithms and encryption tools by government bodies;
- Prioritization of Russian software (import substitution);
- Development of domestic technologies for the industrial Internet;
- Monitoring of information threats by the Federal Security Service and other agencies; and
- Regulation of personal data storage and transfer.

Multilateral Approach

Most influential multilateral efforts in cybersecurity cooperation come from a series of reports from the United Nations Group of Governmental Experts on Developments in the Field of Information and Telecommunications in the Context of International Security (UN GGEs). UN GGE discusses international norms on cybersecurity in detail and proposes confidence-building measures. The UN GGE encourages transparency in sharing points of views on information technology, recommends that states create a directory for sharing points of contact in addressing cybersecurity emergencies, and suggests that states "strengthen cooperative mechanisms" by encouraging research institution exchanges (UN GGE 2015).

Another example of international multilateral efforts is the US and Russia's bilateral agreement of 2013, which pioneered bilateral efforts to establish shared trust between states. The agreement details confidence-building measures for the two countries and encourages stronger collaboration between the national Computer Emergency Response Teams (US-CERT and RU-CERT) through regular information sharing. The agreement includes the establishment of a communication hotline between the White House and the Kremlin in the case of a cybersecurity crisis. It also expands the responsibility of Nuclear Risk Reduction Centers in both the US and Russia to also incorporate cybersecurity incidents.

Multilateral efforts include the following:

- The Organization for Security and Cooperation in Europe (OSCE)'s set of confidence building measures, "aimed at increasing transparency, cooperation, and stability in the cyber ecosystem" (Neutze and Nicholas 2015, 11);
- The Association of Southeast Asian Nation (ASEAN) Regional Forum (ARF)'s work plan and workshops designed to address the actors and practical operations of cyber-confidence building measures (Pawlak 2015, 141);
- The Tallinn Manual, which is an effort among North Atlantic Treaty Organization (NATO) countries to research how international humanitarian laws apply to cyber warfare and general cyber offenses (Schmitt 2013); and
- The Organization of American States (OAS), which has a set of confidence building measures that aim to enhance trust within cyberspace, build a technical and legal capacity for its states, and expand participating states' emergency response teams and law enforcement agencies on issues regarding cybersecurity (Pawlak 2015, 138).

Multi-Stakeholder Approach

In the multi-stakeholder approach, corporate entities and academics establish platforms for enhancing communication and consult among themselves and with states regarding best practices. As an example of private sector efforts, Microsoft proposed six cybersecurity norms, addressing the state's relationship with private companies, products, and services. Microsoft also discussed the state's responsibility to assist the private sector with responding to cyberattacks and refraining from the production of cyber weapons (McKay et al 2014). The purpose of these norms is to improve defense from cyberattacks and to limit offensive operations.

Furthermore, under information sharing and confidence-building measures, organizations such as the Forum of Incident Response and Security Teams (FIRST) have been established as private-sector channels with which the national CERT and other international organizations can cooperate. FIRST also created an open source project aimed to provide public Application Program Interface (API)s to the Computer Security Incident Response Team's database of real time updates across the globe. As a result, databases of cyberattacks are available for public use and analysis.

2.3 Effect of Current CBMs

The norms and confidence-building measures outlined above serve mostly as recommendations for countries to follow voluntarily. With minimal political commitment, confidence-building measures do not address the technical difficulty in establishing attribution of cyberattacks, making it impossible to determine when treaty agreements are breached. Furthermore, while these confidence-building measures intend to prevent crisis escalation as a result of misconceptions, they do not address intentionally offensive

events. In spite of these limitations, confidence-building measures serve as tools for international politics by "defining acceptable behavior and de-escalation mechanisms in inter-state relations" (Ziolkowski 2013, 28).

3. IDENTIFYING DISCORDANT CYBERSECURITY TERMS BETWEEN ENGLISH AND RUSSIAN SPEAKERS

US-Russia Cybersecurity Policy Differences

Generally, Russia perceives cybersecurity as a part of broader information security dimension, which includes a wide range of issues, such as import substitution policy, the Internet of Things (IoT), and the protection and sale of personal data. The US viewed cybersecurity as a critical domain that reflects its ability to maintain international order, but that is likely to change as the Trump administration introduces new policies (Suslov 2016). The East-West Institute offers some insight into institutional differences in how the US and Russia handle issues related to cybersecurity. The Russian view of information security emphasizes the "holistic span of information, where cyber is one component along with others" (Godwin 2014, 11). In other words, the Kremlin considers cyber a subset of information. In the Russian language, the closest synonym to the English word 'security' translates to the English word 'protection.' In contrast, the White House does not view cyber as a subset of information security, but rather its own domain, such as land, sea, or air.

Both the US and Russia agree on the emerging threats caused by cyberattacks and the need for confidence-building measures (The Russian Ministry of Foreign Affairs 2016). In fact, in 2015, President Barack Obama and President Vladimir Putin signed an agreement on US-Russia Cooperation on Information and Communications Technology (ICT) security that was meant to facilitate a regular exchange of technical information on cybersecurity risks to critical infrastructure. However, the agreement has been largely ineffective due to geopolitical tensions caused by Edward Snowden's asylum, the Ukrainian crisis, and western sanctions on Russia. In October 2016, the United States' formal accusation that Russia interfered with its election led to "normal channels of communication" being "frozen," according to Russian ambassador to the US Sergey Kislyak (Gaouette and Labott 2016). Communication withdrawal is unproductive for conflict resolution (Gulyaeva 2015) and has a potential to be catastrophic in the domain of cybersecurity, where the risk of false attribution and proportional response could compromise critical infrastructure and lead to devastating economic losses or civilian casualties.

The lack of uniformity in understanding cybersecurity terminology, along with the threat of communication withdrawal, begs the question: what are the most contentious cybersecurity-related terms, or terms that prevent American and Russian officials from communicating effectively because they mean different things across cultures? To answer this question, we turn to 'big data', or an extremely large data set that may be analyzed computationally to reveal patterns, trends, and associations, especially relating to human behavior and interactions.

We aim to inform the problem of attribution of offensive cyber operations by adapting existing algorithms for network comparison to create a tool that identifies the most contentious cybersecurity terms between English and Russian speakers. We leverage the Global Database of Events, Language, and Tone (GDELT) to create pairs of co-occurrence networks of cybersecurity terms with related themes from content produced in the US and in Russia. The co-occurrence network pair with the most distant network similarity metric can be understood as the most contentious cybersecurity term. Upon identifying contentious cybersecurity terms, we offer a policy recommendation to tailor language to accommodate the trends found in big data.

3.1 Background

This section outlines the GDELT database, the concept of a co-occurrence network, and network distance.

1) GDELT Database: The GDELT Database came from a desire to better understand global human society and the connection between communicative discourse and large-scale behavior. Its goal is to codify the entire planet into a computable format using all available open information sources.

To date, the GDELT database has been used in projects that visualize the past 24 hours of global conflict and protest; perform rapid triaging and assessment of the most important 'influencers' in an industry, topic, organization, or geographic region; and provide visibility into global trends and emerging social, political, and economic risks.

This research leverages the GDELT 2.0 Global Knowledge Graph (GKG). GKG organizes a catalog of global events in over 300 categories into an annotated metadata graph over the worlds news each day. Totaling over 200 million records and growing at a rate of half a million to a million articles a day, it is perhaps the largest open data graph over global human society. It includes the GDELT Translingual feature to provide translation coverage of all monitored content in 65 languages.

2) Co-occurrence Network: A co-occurrence network allows us to analyze the connections among entities in a database. For a selected term, the network shows all the terms to which it is most connected to during a particular time period or in relation to a particular topic. The weight of a given edge in the network is computed as the count of that term divided by the total counts of all terms. The larger the weight, the closer the node is in the network to the selected term.

3) Network Distance: Given a set of networks of possibly different sizes, how can we efficiently provide a measure of structural similarity? This concept of network similarity (or distance) can be approached by forming graph signatures through feature extraction. After signatures are generated, a distance function can be applied to provide meaningful network distance metrics. We rely on the work of Berlingerio et. al to use an algorithm modeled after their NETSIMILE distance algorithm in order to arrive at an effective and scalable solution. NETSIMILE is attractive because it gives similarity scores that are size-invariant and because it is scalable.

3.2 Methodology

This section provides an overview of the data collection pro-

cess, the formulation of co-occurrence networks, additional graph processing, and the design choices for our network distance function.

1) Data Collection Process: The GDELT 2.0 Global Knowledge Graph (GKG) is available in BigQuery, Google's enterprise data warehouse for analytics. GKG's complex multi-delimiter fields are accessible with Structured Query Language (SQL) but require advanced string manipulation features of BigQuery to generate final data results that are downloadable as a spreadsheet. BigQuery provides users with one free TeraByte (TB) every month to query data. Because GKG has over 2.5 TB of events generated from February 2015 to February 2016 alone, we quickly exceeded our quota during the data collection process. For this reason, only two networks are complete graphs in the data processing step of our experiment. This is acceptable because we can use these two networks to populate all other graphs to more than 50 percent of their full edge capacity. Because we conduct further graph processing to diversify the networks, each of our networks will consist of around the same number of significant term correlations.

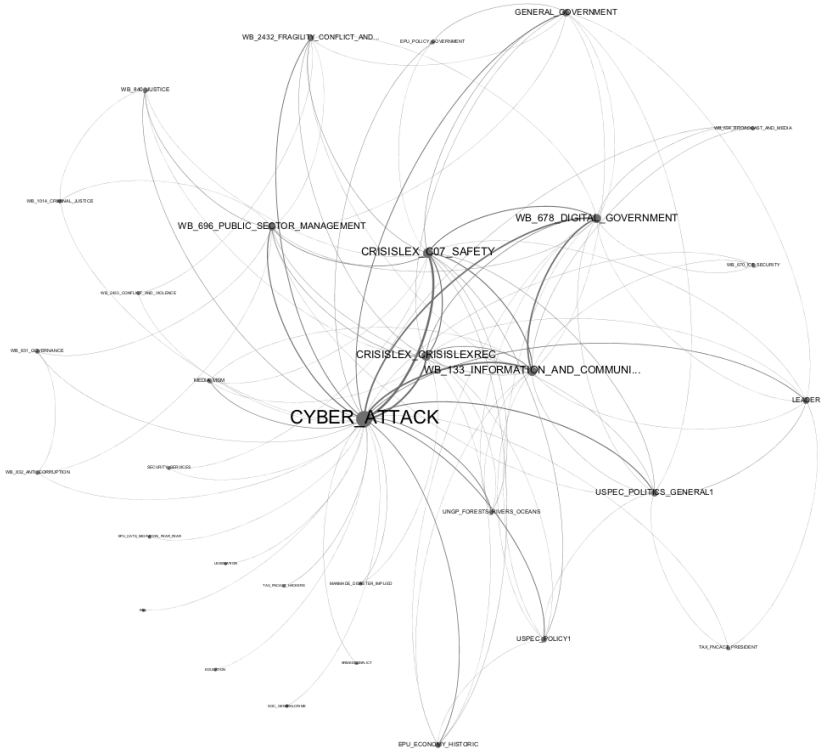
We choose our terms of interest by running a query that returns the top ten themes associated with the term CYBER _ATTACK in the last year.[1] In our query, we specify that the count variable should indicate the number of documents that mention a given theme, rather than the number of mentions of a theme (i.e. a theme that appears 100 times in a given article is only counted as one appearance). This query provides a list of the top ten cybersecurity-related terms across all content published in the last year, written in over 65 different languages.

2) Co-occurrence Network: Given this list of terms, we next form a query that returns a co-occurrence network. This is essential, as it is the connections among themes that are of interest, rather than the frequency of occurrence. This query compiles the list of themes from each matching article and records the number of articles in which each pair of names appears. It only considers content published from November 1, 2015 to November 1, 2016 and limits the number of edges to 100 in order to maintain a computationally tractable problem. The final results of this query is a histogram of all pairs of themes and the number of articles in which they appear together. We conduct this query twice, once for content originally written in English and once for content originally written in Russian. For specifying language, we rely on the GDELT Database's Translingual feature which allows us to constrain queries to news coverage in a specific language. The result is a pair of co-occurrence networks from English content and Russian content for each cybersecurity term. See Figure 1 for an illustration of this, in which edge thickness is proportional to edge weight and node size is proportional to node degree.

After receiving the results of each query, we download the data into a CSV file. We use the python interface for Scalable Network Application Package (SNAP) to load the data into a graph data structure. SNAP is a general-purpose, high-performance system for analysis and manipulation of large networks.

3) Additional Graph Processing: We consider that each network has a similar structure because they are all co-occurrence networks (i.e. many edges connect a central node to every other node). In order to create distinct networks, we conduct additional graph processing. We begin by focusing on the English and Russian network pair of the term CYBER _ATTACK, the term we used for our initial query to find other cybersecurity-related terms. We make each of those networks a complete graph, or a graph in which every node shares an edge with every other node. To do this, we develop a script that automates the process of iterating through each pair of nodes in the network and querying for their co-occurrence

Figure 1: *Co-occurrence Network Visualization of English Term CYBER_ATTACK*



1 We choose this term after contacting GDELT's creator Kalev H. Leetaru, who recommended that we use CYBER _ATTACK and provided documentation that lists all themes. GKG is still in development and there is no documentation that provides more information on a given theme (i.e. it is not completely clear what a theme titled TAX _FNCACT _WRITER means). Based on Kalev's feedback, we operate under the assumption that GDELT will provide this documentation by Spring 2017, thereby rendering the database even more useful for projects like ours.

count. We then create an edge between the pair of nodes.

Next, for every other English-language co-occurrence network, we add edges between nodes if those nodes are linked by an edge in any other English network. For example, if we are looking at the English co-occurrence network of the term GENERAL _GOVERNMENT and find that nodes ARMED _CONFLICT and ELECTION exist but are not linked by an edge, we can search all of our other English networks to find the edge between these two terms because all edges between two of the same nodes are the same. If we find the edge between ARMED _CONFLICT and ELECTION in another network, we then add that edge to the GENERAL _GOVERNMENT English co-occurrence network. We do the same for the Russian networks.

This technique successfully increases the number of edges in our co-occurrence networks. For our English networks, the number of edges increases to 51 percent of the edges present in the complete graph, on average. For our Russian networks, the number of edges increases to 58 percent of the edges present in the complete graph, on average.

To further diversify our networks, we find the average of the edge counts for each network and use that as a threshold. For each edge in a network, if the edge count is less than our threshold, we delete it from the graph. The result is a network with edges that represent a significant correlation between nodes, or terms in our dataset. We conduct our analysis on a set of ten structurally-unique network pairs of English and Russian cybersecurity terms. See Figure 2 for a visualization of all data processing.

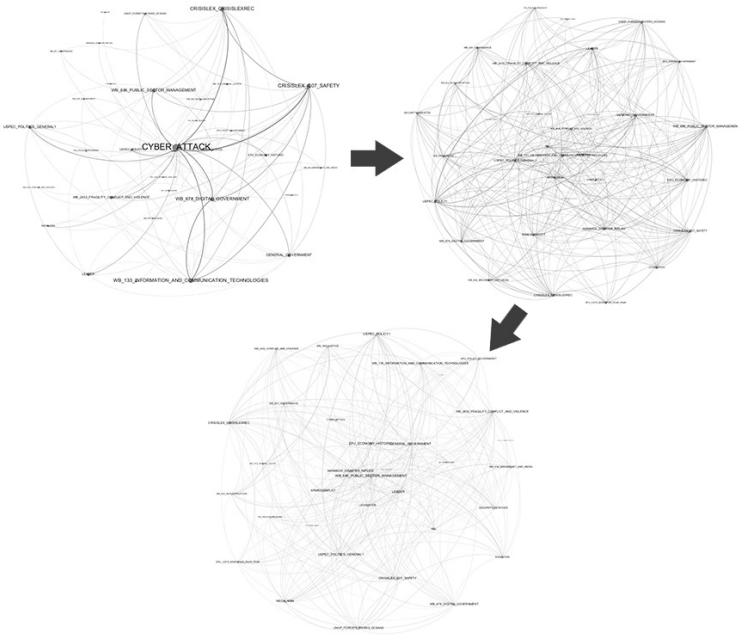


Figure 2: *Graph Processing Visualization of English Term CYBER_ATTACK*

3.3 Network Distance Function

Our network distance function consists of three parts: feature extraction, feature aggregation, and network comparison.

Feature extraction. Based on the work of Berlingerio et. al, we generate a set of structure features for each node based on its local features. Specifically, we compute the following four features: the number of neighbors, the clustering coefficient of node, the average number of a node's two-hop-away neighbors, and the average clustering coefficient.

Feature aggregation. After the feature extraction step, we have a set of feature matrices {F_G_1, F_G_2, ...,F_G_k} . We now generate a single 'signature' vector for each graph to produce efficient and effective comparisons. We use the following five aggregators on each feature: median, mean, standard deviation, skewness, and kurtosis. For each node, we append these aggregators to a single list, our signature vector.

Center node features. After adding the aggregators for each feature, we compute the same features for the center node specifically and append them to the signature vector. Because our networks started off as co-occurrence networks, the center node has a significance that should be represented in our network distance function.

Network Comparison. After the aggregation step, we have a signature vector $ vec{s_{G_j$ for each graph $G_j in {G_1, G_2, ..., G_k $. We conduct a pairwise comparison between the English and Russian signature vectors $ vec{s_{G_{j, ENG, vec{s_{G_{j, RUS$ for each graph. We use the Canberra Distance function,

$$d(\vec{s}_{G_{j,ENG}}, \vec{s}_{G_{j,RUS}}) = \sum_{i=1}^{d} \frac{|(\vec{s}_{G_{j,ENG}})_i - (\vec{s}_{G_{j,RUS}})_i|}{\vec{s}_{G_{j,ENG}})_i + (\vec{s}_{G_{j,RUS}})_i}$$

because it is discriminative, a good property for distance measure. This is because the Canberra Distance function is sensitive to small changes near zero, as it normalizes the absolute difference between graphs.

Computational Complexity. As Belangario et al. (Berlangario et al. 2012) demonstrate, the runtime complexity of this algorithm is

$$O(\sum_{j=1}^{k}(fn_j + fn_j log(n_j)))$$

where k is the number of graphs, n_j the number of nodes, and f the number of structural features extracted. In real world networks,

$$f << n_j << m_j$$
$$n_j log(n_j) \approx m_j$$

where m_j is the number of edges. In other words, the algorithm is linear on the number of edges when used on our GDELT database.

3.4 Results

This section provides the empirical results and evaluations of our experiments.

Cybersecurity Terms. We began by finding the top ten cybersecurity terms across all languages. They are enumerated in Table 1 along with their counts.

Terms that include information and communication, digital government, public sector management, general politics, general government, conflict and violence, and policy

Algorithm 1 Generate Signature Vectors

procedure
$\{F_{G_1}, F_{G_2}, ..., F_{G_k}\}$ = *GetFeatures*
for all $x \in \{F_{G_1}, F_{G_2}, ..., F_{G_k}\}$
  centerNode = *getCenterNode(x)*
  $s_{G_x} = []$
  for all *feat*$\in F_{G_x}$
    $s_{G_x} \cup$ {*median(feat), mean(feat), stdev(feat), skewness(feat), kurtosis(feat)*}
  end for
  $s_{G_x} \cup$ *getNeighborNo(centerNode)*
  $s_{G_x} \cup$ *getNodeCC(centerNode)*
  $s_{G_x} \cup$ *getAvgTwoHop(centerNode)*
  $s_{G_x} \cup$ *getAvgCC(centerNode)*
end for
return $\{s_{G_1}, s_{G_2}, ..., s_{G_k}\}$

TABLE I
CYBERSECURITY TERMS

TERM	COUNT
CYBER_ATTACK	1888964
CRISISLEX_C07_SAFETY	1251265
CRISISLEX_CRISISLEXREC	1070679
WB_133_INFORMATION_AND_COM.	1022871
WB_678_DIGITAL_GOV	991150
WB_696_PUBLIC_SECTOR_MAN	776948
USPEC_POLITICS_GENERAL1	733939
GENERAL_GOVERNMENT	689712
WB_2432_FRAGILITY_CONFLICT	687723
USPEC_POLICY1	684035

are expected, as cybersecurity policy has become a significant area of concern for both governments in the past year.

Network Distance. The network distance results of English-Russian word pairs associated with the cybersecurity-related terms can be seen in Figure 3. The median distance score is five while the mean distance score is 4.64. Interestingly, rather than being a discordant word, CYBER_ATTACK is well below our median, with a score of 0.54. The term CRISISLEX_C07_SAFETY has a negative distance metric. We conclude that these two terms must have especially similar network structures between the English and Russian translations of the term. In other words, these terms are contextualized similarly in English and Russian content. Terms that indicate policy, public sector management, information, and communication technologies are above average in discordance. This suggests a fundamental difference in how English and Russian speakers understand the role of government in regulating information and communication technologies.

Modularity. US and Russian policymakers benefit from further analysis on what exactly contributes to the different viewpoints suggested above. Analyzing community structure within our networks has the potential to inform policymakers on the themes that drive discordance. We explore this by running a community detection algorithm (Vincent et al. 2008) on our most discordant term, WB_678_DIGITAL_GOVERNMENT. For our parameters, we choose to consider edge weight and set the resolution to 0.5, where 1 represents an algorithm that prefers large communities and 0

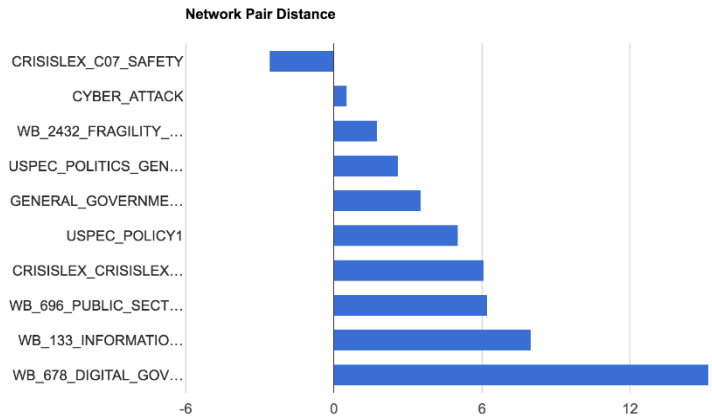
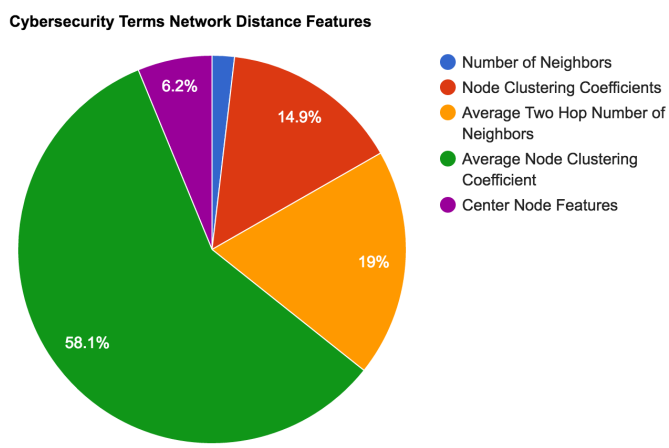


Figure 3: *Network distances of English-Russian Cybersecurity Term Network Pairs*

represents an algorithm that prefers small communities. For our English network, the result is four communities. For our Russian network, the result is six communities. A conclusion we draw from our modularity findings is that more themes go into the concept of digital government in Russian content than in English content.

Network Distance Features. Finally, we explore our network distance features and hypothesize which features drive network distance. For each of our signature vectors, we compute the Canberra Distance function of each of our feature values and analyze which features contribute the most to the total distance. Figure 4 demonstrates that the feature Average Node Clustering Coefficient contributed the most while the feature Number of Neighbors contributed the least. It is expected that center node features do not contribute much to the distance score because additional graph processing reduced the degree of the center node.



The significance of the feature Average Node Clustering Coefficient may stem from its interpretation as a global clustering coefficient. A graph is considered small-world if its average clustering coefficient is significantly higher than that of a random graph. We hypothesize that a high average clustering coefficient and a high average two-hop number of neighbors metric indicate a network is a small-world network, meaning that all nodes have a low degree of separation. This suggests that between English and Russian translations of a

term, one network is highly connected while the other is not. This may be because a word is either highly contextualized in content, with many links to other words, or not contextualized very much. In other words, either a word means something very specific to an English or Russian speaker, or it is not well-defined at all.

4. CONCLUSION

Our policy analysis demonstrates a clear danger in false attribution because of the challenges inherent to cybersecurity policy and the weak communication channels that exist between the US and Russia. Without a willingness to communicate, existing American and Russia organizational structures meant to avoid conflict escalation are rendered ineffective. As both states unilaterally implement nationally-oriented laws, there exists a heightened threat of proportional response and conflict escalation.

With no clear international legal code or lead cybersecurity organization in place, a policy recommendation that centers around strengthening American and Russian communication strategies is needed now more than ever. Our recommendation to policymakers is, when dealing with discordant terms, to attempt to understand the exact definition of the term from both perspectives at the start of negotiations in order to avoid confusion or conflict escalation later. Our empirical analysis findings include the following:

Terms that indicate that policy, public sector management, information, and communication technologies are highly discordant. This affirms a difference outlined in Section II, which states that there is a fundamental difference in how English and Russian speakers understand the role of government in regulating information and communication technologies. While cybersecurity falls under the umbrella of information security in Russia, in the US it is its own military domain and, perhaps, is less likely to affect civilians than it is in Russia.

Russian networks demonstrate a high degree of modularity, or community structure. We conclude that more themes go into the concept of digital government in a Russian context than in English context. Practically, this may mean that to a Russia speaker, an understanding of cybersecurity is more nuanced that to an English speaker.

Due to the significance of the Average Node Clustering Coefficient as a driver of network distance, we conclude that for both English and Russian speakers, cybersecurity terms are either highly contextualized or not well-defined. This suggests specific definitions for each term in both cultures, which could promote conflict escalation if these definitions are not understood by both sides at the start of negotiations.

While these suggestions are useful in building a foundation for understanding the effect of bias on policy, further work can be done on contextualizing cybersecurity terms among English and Russian speakers. Future work in this area involves expanding our signature vector to include more features and expanding our exploration of community structure.

Ultimately, the future of global cybersecurity depends on policies made now. US-Russia communications serve as an important model for other countries. It is critical that the foundation of negotiations operate within a strong communication channel and with a comprehensive understanding of different cybersecurity contextualizations across cultures, so that both governments can operate with a high likelihood of successful cooperation.

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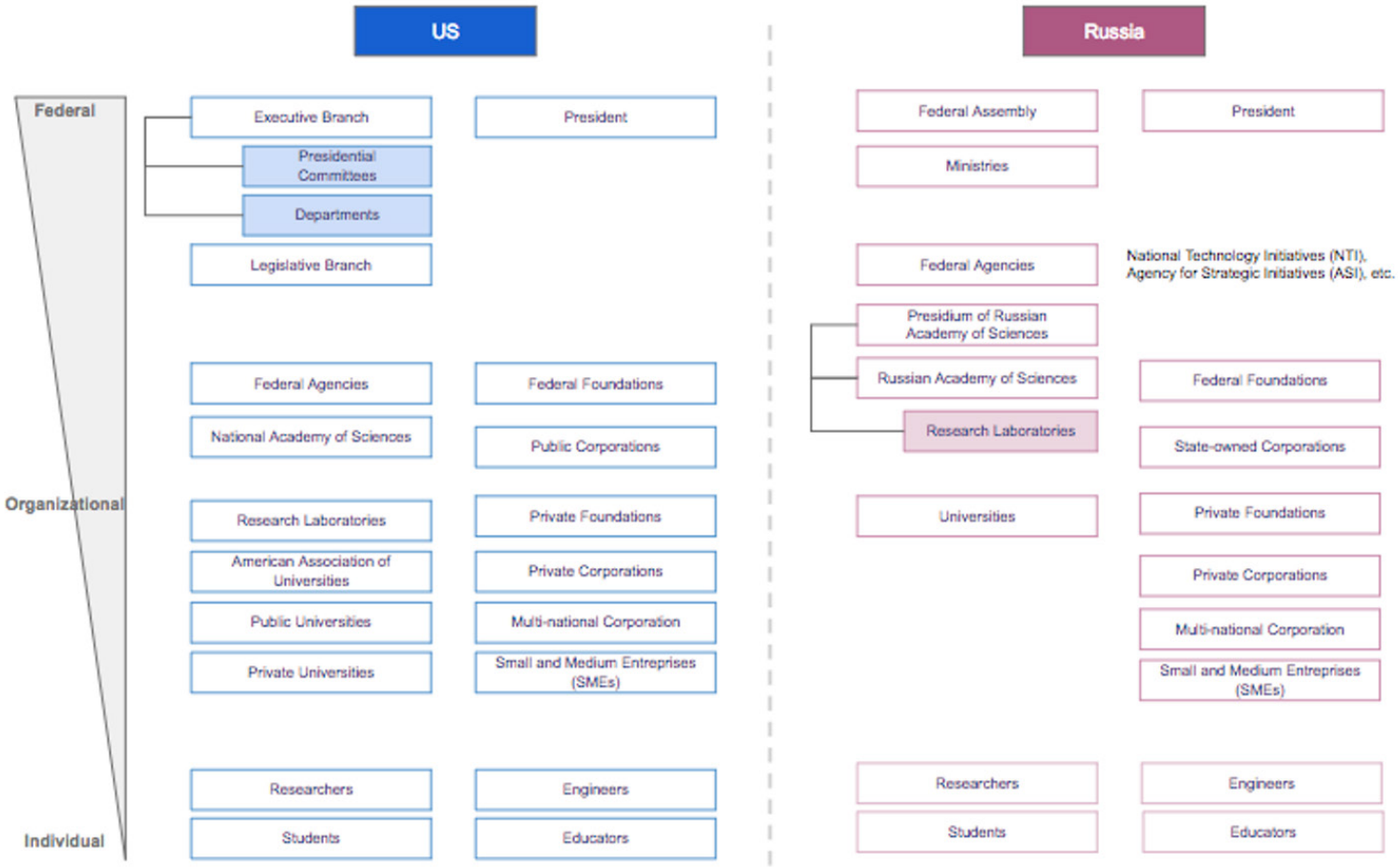
APPENDIX

APPENDIX A

ARTICLE 1: SCIENCE AND TECHNOLOGY COLLABORATION

Figure A1: *Macro-level stakeholders involved in US-Russian collaboration in science and technology (field independent):*



APPENDIX B

ARTICLE 2: BORN GLOBALS IN RUSSIA

The following questionnaire was used for the second part of the research to receive the qualitative results. The questions were asked in Russian and the position of incentives on the list was randomized. Every incentive could be evaluated from 1 (least important) to 5 (the most important) by the interviewee.

1) What startup do you work at?
2) Why did you move your business to the US? Please rate the following incentives from 1 (less important) to 5 (more important)
    a) The size of the market in the US is considerably larger. It has more potential clients for our services.
    b) Venture capital market in the US is larger and more mature.
    c) Russia does not have the proper conditions for the development of startups.
    d) The strong Silicon Valley brand helps to attract the best professionals on the market.
    e) The market has clients that are more mature or at a stage better suited for our product.
    f) Another important incentive no in this list (please elaborate).

APPENDIX C

ARTICLE 3: EVALUATING US-RUSSIA ACADEMIC EXCHANGE OUTCOMES

Appendix A: Survey Questions (in English)
For a PDF-version of the above-described survey that was distributed to participants of exchanges from US to Russian universities, please see the following link.

https://drive.google.com/file/d/0Byr8EglW_jDaMW9EbldVcjI0eFk/view?usp=sharing

Appendix B: Survey Questions (in Russian)
For a PDF-version of the above described survey that was distributed to participants of exchanges from Russian to US universities, please see the following link.

https://drive.google.com/file/d/0Byr8EglW_jDaX294MHhwRHItMG8/view?usp=sharing

Appendix C: Handbook analysis (full)
For the full version of exchange program handbooks analysis, please see the following link.

https://docs.google.com/document/d/1KK-WBhfuuMzlGfL_vlkbaLqT0A1iQxkacAjPGyRJ7xQ/edit?usp=sharing

Appendix D: Survey data
For an Excel spreadsheet with the results of the abovementioned survey, please see the following link.

https://docs.google.com/spreadsheets/d/1vqZelEyS4ml2oMtuXqaVv4I-tDo7aScRaCI9xqfz4Pg/edit?usp=sharing

Appendix E: Stata Do-file
For the Stata code for the quantitative analysis, please see the following link.

https://drive.google.com/file/d/0Byr8EglW_jDaVjFrSDJVSVNNZ0E/view?usp=sharing

APPENDIX D

ARTICLE 4: BOEING IN RUSSIA: AN ANALYSIS OF THE AIRCRAFT INDUSTRY

Figure 1: Structure of US's exports to Russia in 2014
Source: http://atlas.media.mit.edu/en/visualize/tree_map/hs92/export/usa/rus/show/2014/

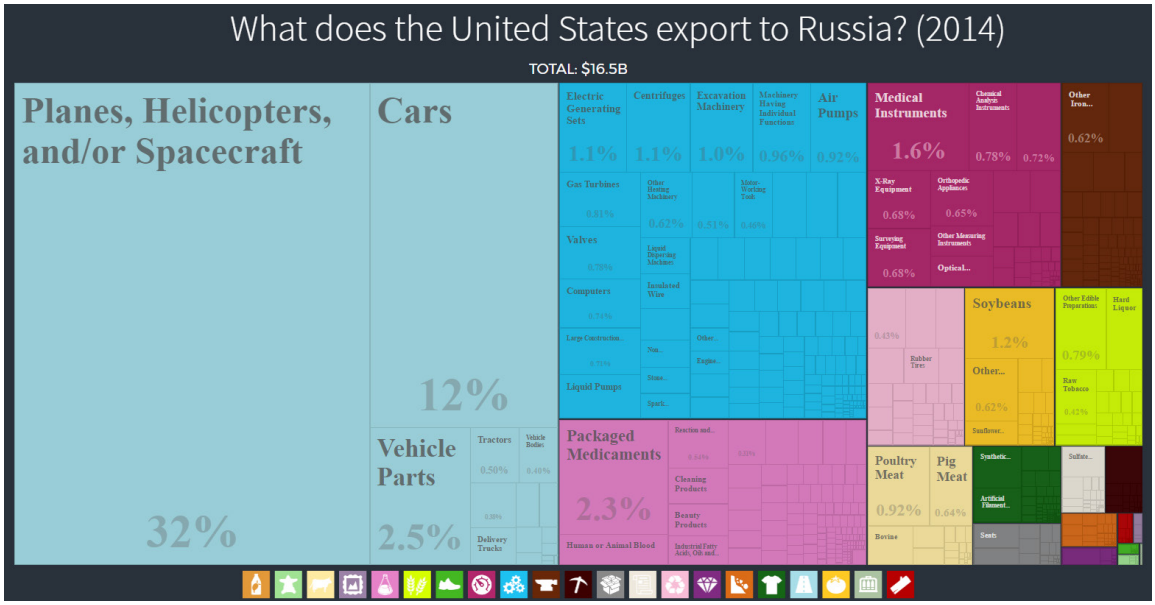


Figure 2: Structure of Russia's exports to the US in 2014
Source: http://atlas.media.mit.edu/en/visualize/tree_map/hs92/export/rus/usa/show/2014/

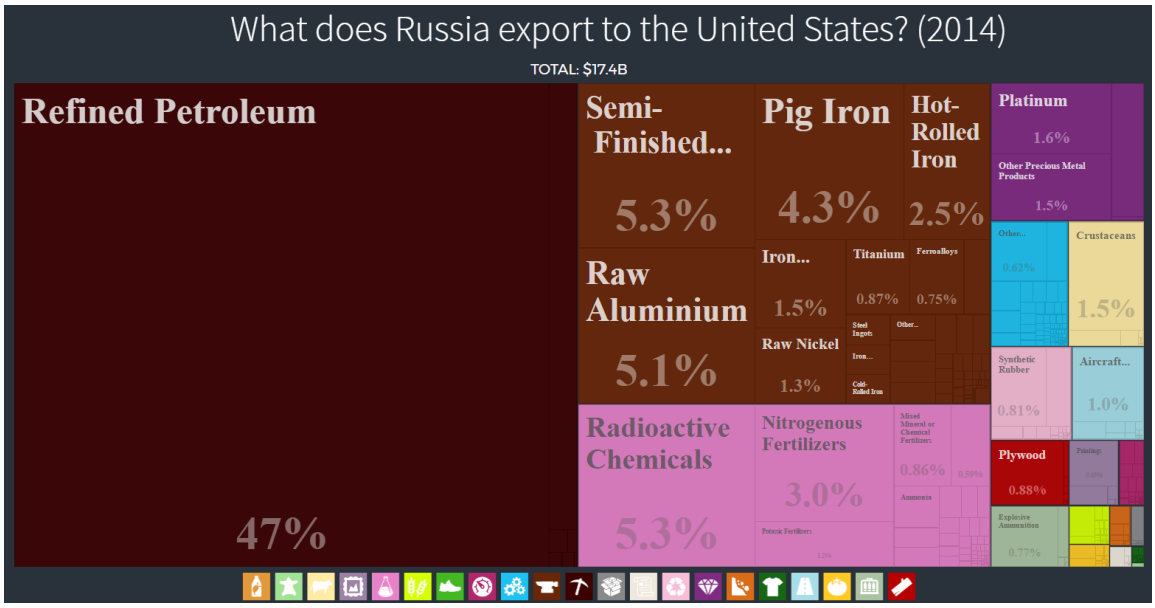


Figure 3: American exports in time (1995-2014)

Source: http://atlas.media.mit.edu/en/visualize/stacked/hs92/export/usa/rus/show/1995.2014/

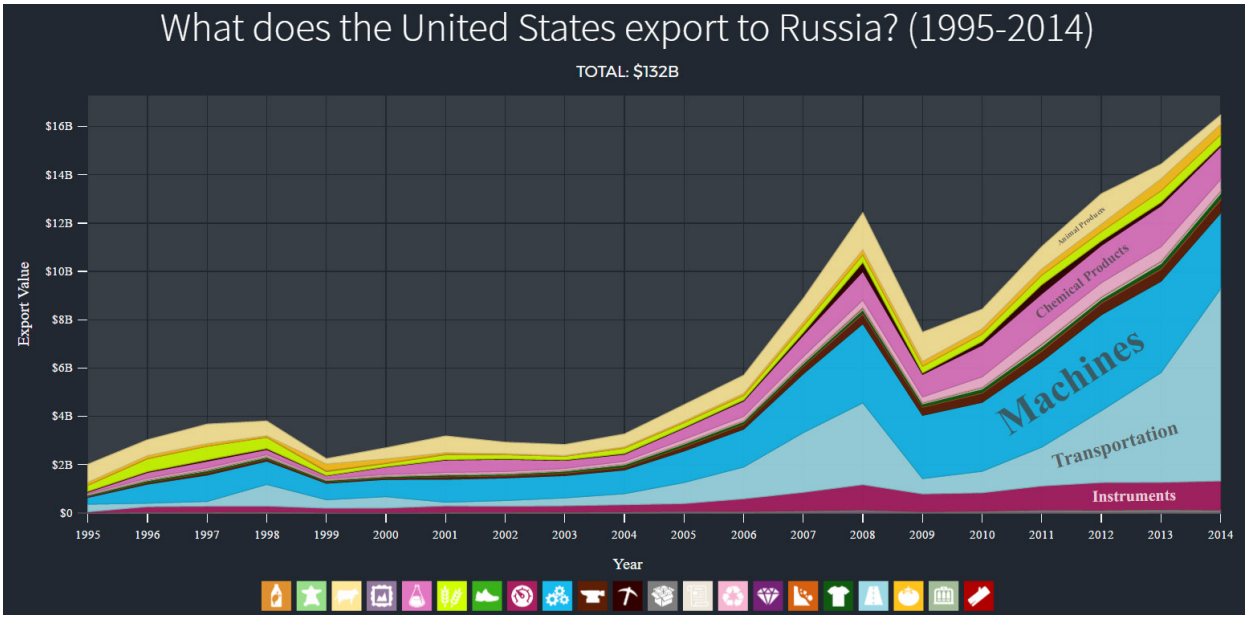


Figure 4: US's exports to Russia in time (1995-2014), Planes, Helicopters and/or Spacecraft isolated

The fastest rising segment represents Fixed Wing Aircraft, Unladen Weight > 15,000

Source: http://atlas.media.mit.edu/en/visualize/line/hs92/export/usa/rus/show/1995.2014/

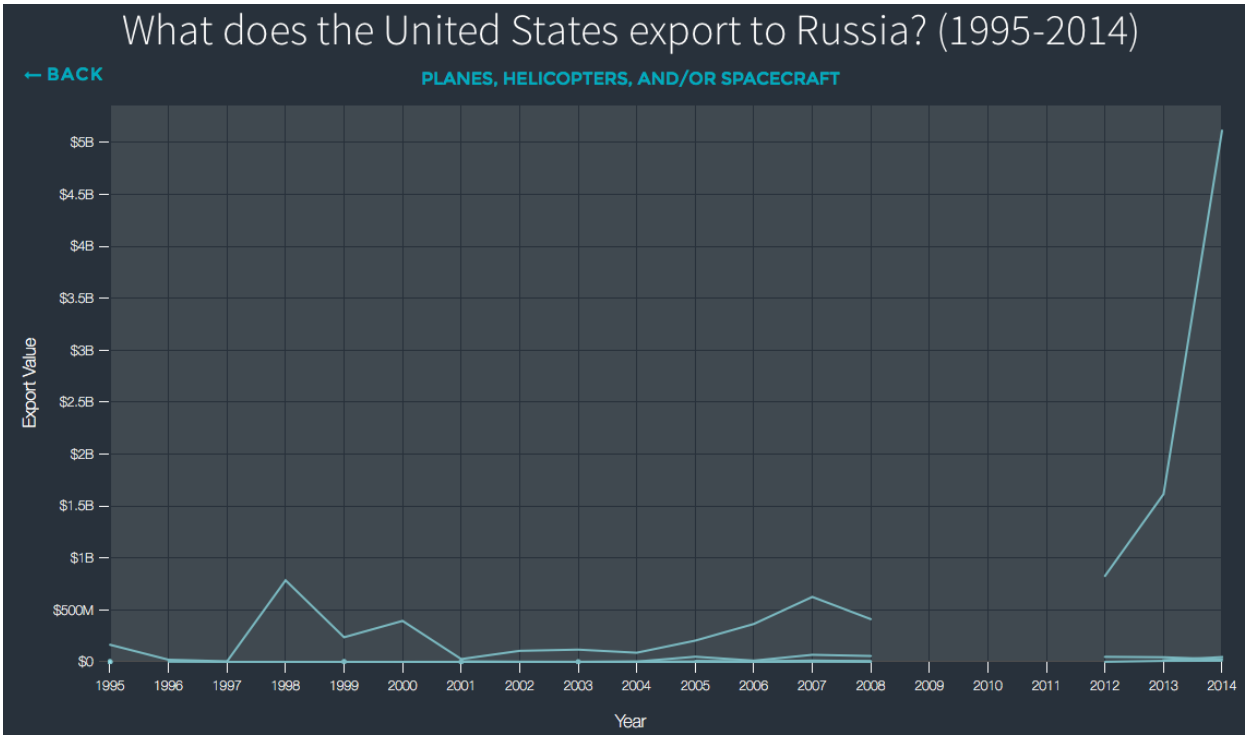


Figure 5: Time Series of Aircraft in Russia
Source: Ascend Fleets online database http://www.ascendworldwide.com/

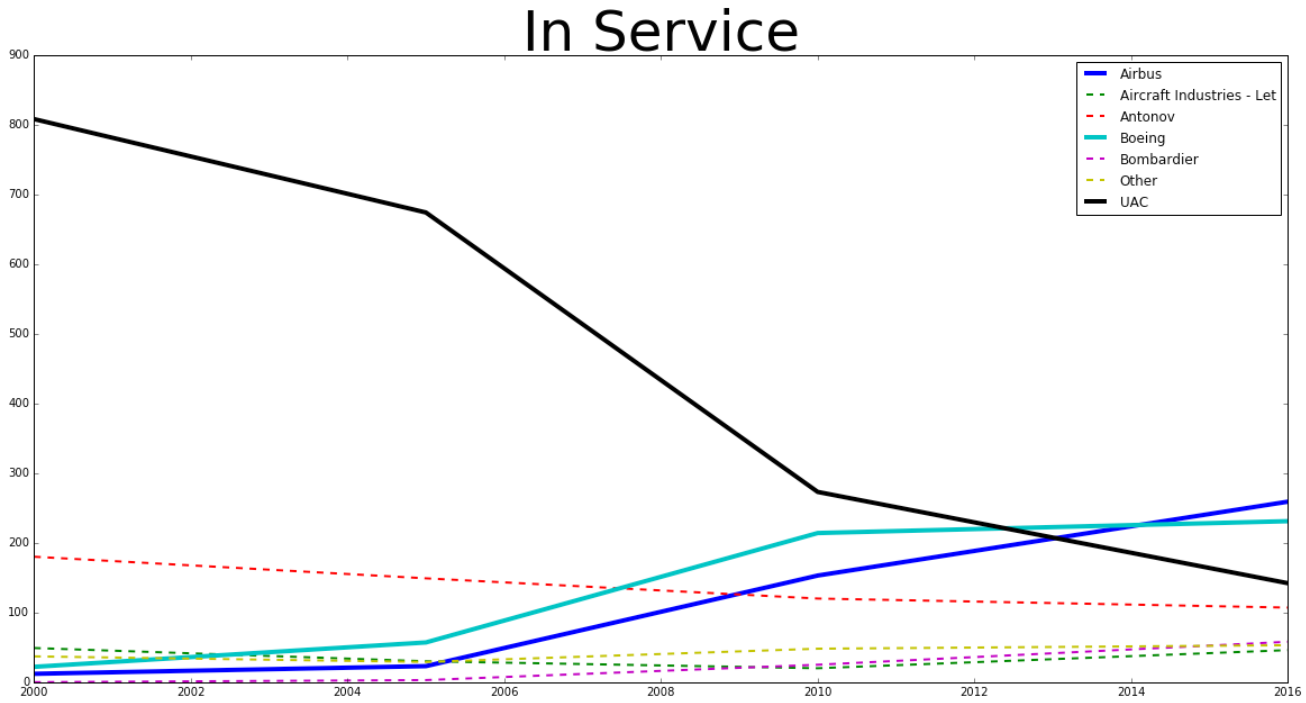


Figure 6: Time Series of Aircraft in Russia
Source: Ascend Fleets online database http://www.ascendworldwide.com/

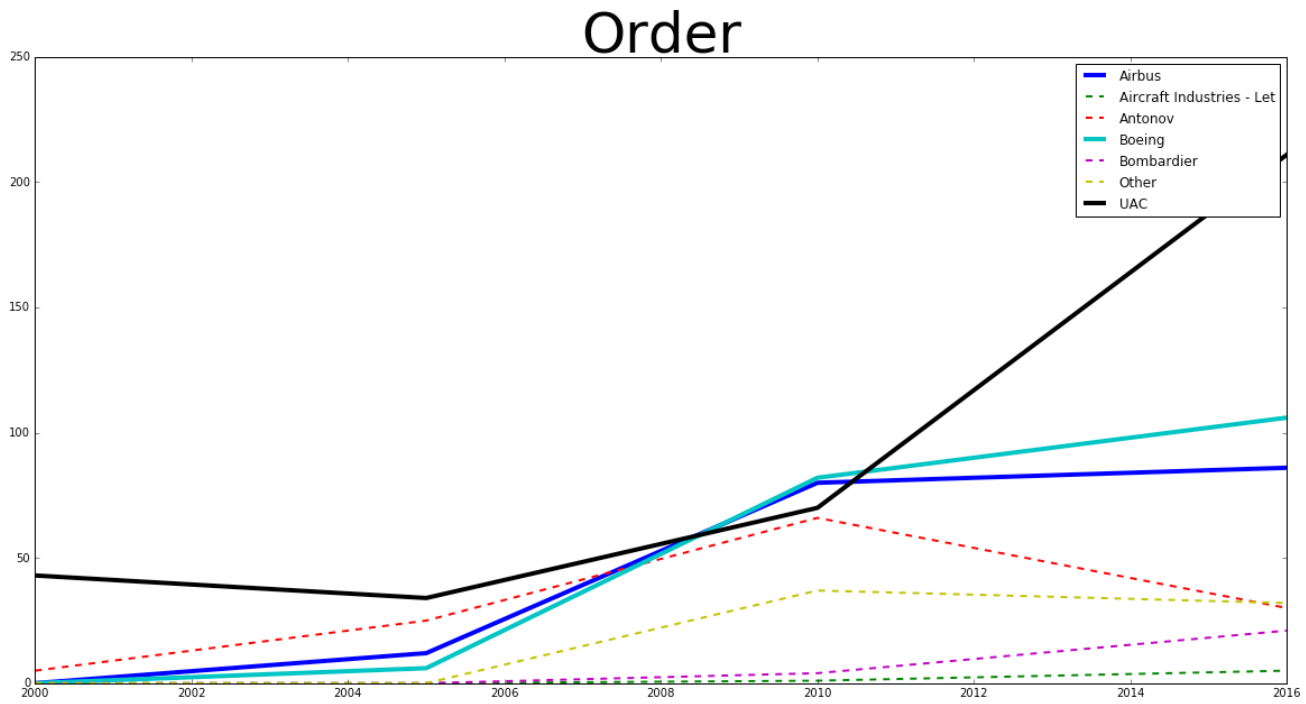


Table 1: Trends in the number of planes ordered
Source: Ascend Fleets online database http://www.ascendworldwide.com/

% change by comparison to 5 years before			
Manufacturer	**2005**	**2010**	**2016**
UAC	-20.93%	105.88%	201.43%
Other	-	-	38.10%
Boeing	-	1266.67%	29.27%
Airbus	-	566.67%	7.50%
Antonov	257.14%	164.00%	-54.55%
Total	**54.00%**	**341.56%**	**44.41%**

Table 2: Number of airplanes ordered by Russian companies
Source: Ascend Fleets online database http://www.ascendworldwide.com/

Number of airplanes ordered					
	2000	**2005**	**2010**	**2016**	**Total**
UAC (Irkut)				175	175
Boeing		6	82	106	194
Airbus		12	80	86	178
Other			42	58	100
UAC (Sukhoi)			64	36	100
Antonov	7	25	66	30	128
UAC (Ilyushin)	26	7	4		37
UAC (Tupolev)	10	27	2		39
UAC (Yakovlev)	7				7
Total	**50**	**77**	**340**	**491**	**958**

Table 3: Number of planes in service
Source: Ascend Fleets online database http://www.ascendworldwide.com/

Number of planes in service (largest manufacturers on the Russian market)									
Manufacturer	**2000**		**2005**		**2010**		**2016**		**Total Number**
	Number	**Average Age**	**Number**	**Average Age**	**Number**	**Average Age**	**Number**	**Average Age**	
Airbus	12	10	23	5	153	6	259	8	447
Boeing	22	6	57	14	214	16	231	13	524
UAC (Total)	822	18	680	20	275	24	144	20	1921
Antonov	201	26	176	29	144	32	127	35	648
UAC (Sukhoi)	-	-	-	-	-	-	50	2	50
Bombardier (Canadair)	-	-	-	-	22	10	46	15	68
Aircraft Industries - Let	49	13	30	17	20	19	46	12	145
UAC (Yakovlev)	223	21	155	24	87	27	45	31	510
UAC (Tupolev)	460	17	426	20	166	22	37	26	1089
UAC (Ilyushin)	139	16	99	17	22	27	12	39	272
Total	**1145**		**997**		**851**		**868**		**3861**

Table 4: Structure of aircraft market in Russia (including orders)
Source: Ascend Fleets online database http://www.ascendworldwide.com/

Passenger aircraft total in Russia, percentage by manufacturer									
Manufacturer	**2000**		**2005**		**2010**		**2016**		**Total Number**
	Number	**Average Age**	**Number**	**Average Age**	**Number**	**Average Age**	**Number**	**Average Age**	
UAC	67.14%	19	66.53%	21	40.77%	24	31.16%	23	49.38%
Boeing	1.43%	6	4.69%	15	18.46%	15	22.25%	14	12.81%
Other	8.46%	12	6.53%	17	9.38%	18	18.37%	15	11.13%
Airbus	0.75%	10	2.38%	5	11.69%	6	17.67%	9	8.97%
Antonov	22.22%	27	19.86%	30	19.71%	32	10.55%	35	17.71%
UAC (Sukhoi)	-	-	4.04%	-	4.63%	-	7.74%	3	4.09%
UAC (Irkut)	-	-	-	-	4.77%*	-	7.59%**	-	3.16%
UAC (Tupolev)	21.33%	17	22.22%	20	12.04%	23	3.91%	26	14.73%
UAC (Yakovlev)	11.36%	22	8.21%	25	4.99%	28	3.49%	33	6.98%
UAC (Ilyushin)	7.48%	17	5.47%	19	2.53%	23	1.02%	31	4.09%
Total	**100.00%**	**19**	**100.00%**	**22**	**100.00%**	**21**	**100.00%**	**18**	**100.00%**
*** First letters of intent**					**** First orders**				

Table 5: Structure of plane orders
Source: Ascend Fleets online database http://www.ascendworldwide.com/

Percentage by manufacturer					
Manufacturer	**2000**	**2005**	**2010**	**2016**	**Total Number**
UAC	86.00%	44.16%	20.59%	42.97%	37.37%
UAC (Irkut)	-	-	-	35.64%	18.27%
Boeing	-	7.79%	24.12%	21.59%	20.25%
Airbus	-	15.58%	23.53%	17.52%	18.58%
Other	-	-	12.35%	11.81%	10.44%
UAC (Sukhoi)	-	-	18.82%	7.33%	10.44%
Antonov	14.00%	32.47%	19.41%	6.11%	13.36%
UAC (Yakovlev)	14.00%	-	-	-	0.73%
UAC (Tupolev)	20.00%	35.06%	0.59%	-	4.07%
UAC (Ilyushin)	52.00%	9.09%	1.18%	-	3.86%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 6: Current customers of Irkut (MC-21)
Source: Ascend Fleets online database http://www.ascendworldwide.com/

Number of orders	
Total	**175**
Aeroflot Russian Airlines	50
Aviakapital-Servis	35
Ilyushin Finance Company	40
IrAero	10
Red Wings Airlines	10
UTair	10
VEB-Leasing JSC	20

APPENDIX E

ARTICLE 7: DANCING AROUND SANCTIONS: OPERATIONS AND STRATEGIES OF ENERGY FIRMS IN RUSSIA

TARGET COMPANIES OF THE STUDY

a) Multinational energy firms

BP plc

Presence in Russia before sanctions	*Impact of sanctions*	*Recent activities*[1]
Present in Russia for 25 years. In 2013, BP bought 19.75 percent of Rosneft. In 2014, BP profited from Rosneft over $1.6 billion US Dollars.	Limited to no negative impact. Profits from a share in Rosneft grew from approximately 16 percent to approximately 22 percent in 2015 as the ruble kept falling. BP could still buy shares in Rosneft's projects (for example, in the Taas-Yuriakh field).	In June 2016, BP and Russian Yermak Neftegas LLC signed a binding agreement on the joint venture of exploration in East and West Siberia ($300 million US Dollar investment). BP acquired 20 percent of the field. In September 2016,Rosneft, BP, and Schlumberger announced agreements for collaboration on seismic research and development.

Eni S.p.A.

Presence in Russia before sanctions	*Impact of sanctions*	*Recent activities*
work in the Exploration & Production in the Russian offshore in the Barents Sea, the Black Sea and the Mediterranean Sea, in partnership with Novatek 2007 -ENI purchased 49% stake in Arctic Russia B.V. 2012 - started production of natural gas in Samburg site in West Siberia (ekv. 43.000 b/d) 2014 - sold its stake in Arctic Russia to Novatek and Gazprom Oil[2]	Sold 20% shares in 'South Stream" to Gazprom stopped operating in JVs in shelf development in Fedynsky and Central Barents licences (owned 33.33%) ENI's Saipem suffered appr. 1.2.bln EUR leaving "South Stream" wasn't able to replace assets and keep projects on schedule still holds 50% in "Blue Stream" and is able to generate profits	obtained permissions from the EU to resume a number of exploration activities in Russia[3]

Statoil

Presence in Russia before sanctions	*Impact of sanctions*	*Recent activities*
Statoil and Rosneft entered into a strategic partnership in 2012. Most of its local partnerships are with Rosneft had 30% shares in Kharyaginskii oilfield operated in various Arctic shelf, Volga region, and Siberian projects	pulled out operations in Northern Russia drilled two onshore wells with Rosneft in Siberia in 2015 as it is not under the sanctions continues with small business rather than bigger deals to maintain relations	Statoil and Rosneft began drilling an exploration well in the Sea of Okhotsk in the summer of 2016. Unlikely to agree on new investments under the current sanctions' regime[4]

Exxon Mobil

Presence in Russia before sanctions	*Impact of sanctions*	*Recent activities*
Feb 2013 - ExxonMobil and Rosneft announced plans to increase the scope of their strategic cooperation by adding seven new blocks in the Russian Arctic.[5] was to spend $3.2bn over 3 years on exploration drilling in the Russian Arctic in a JV with Rosneft. The JV is 33% owned, operated and financed by Exxon[6] The Sakhalin 1 project developed in 90's under affiliate Exxon Neftegas Ltd. Is the company's flagship project in Russia, where it has been present for over 20 years.	left projects in the Arctic region (Universitetskaya-1) and in the Black sea.[7] lost over $1 bln due to sanctions[8] owned 49% of a joint venture on the Arctic shelf and in the Black Sea, joint-venture on shale oil in Western Siberia, and in the Far East and curtailed most of these activities in Russia	2015 - Despite sanctions, Sakhalin began production Sep 2015 - Rosneft announced that Sakhalin Island and Kara Sea production will continue without Exxon.

Royal Dutch Shell

Presence in Russia before sanctions	*Impact of sanctions*	*Recent activities*
Had 27.5 percent in the Sakhalin-2 project. 50 percent in Salym group of oil fields. 50 percent in the Khanty-Mansiysk oil alliance.	postponed and halted many activities initially but then restarted them on new conditions (Salym project)[9] Used an asset swap, that helps Shell obtain an interest in Russian reserves as well as cut costs.[10]	2016 - Shell and Russia's gas major Gazprom will jointly invest $13 billion in three projects in Russia (Yuzhno-Kirinskoye gas field offshore; the Baltic Sea Liquefied Natural Gas plant and in the Sakhalin-2 LNG plant expansion.)[11]

Total S.A.

Presence in Russia before sanctions	*Impact of sanctions*	*Recent activities*
Total group has been present in Russia since 1991 with a number of business ventures operating in the segments of Exploration & Production, Marketing and Trading. since 2011- owns around 18% of Novatek[12]	suffered losses due to Novatek loosing 43% of its worth continued to get a cash flow due to the ownership of Novatek left joint-ventures with Lukoil and Gazprom sold 20% of their shares in other projects with Novatek[13] keeps the part in Yamal project by seeking various international permissions. funding issues were solved by Chinese banks thus Yamal project has found ways to attract investments outside the sanctions regime[14]	2015 - Total announces the start-up of gas and condensate production from the onshore Termokarstovoye field (49% by Total)[15] 2017 - full start of Yamal project is expected

CNOOC

Presence in Russia before sanctions	*Impact of sanctions*	*Recent activities*
was not involved in projects in Russia prior to 2014.	took over some project shares from the Western companies, operating in Russia sanctions opened opportunities for Chinese energy companies to finance projects in the absence of traditional Western investors (especially in Arctic)[16]	2016 - a subsidiary of CNOOC has signed a $1.6 bln deal to build core modules for the liquefaction process on the Yamal project.[17] Gazprom Neft has offered the CNOOC partnership on two Arctic Shelf licence blocks -- the Heysovskiy in the Barents Sea and the Severo-Vrangelevskiy (North-Wrangel) in the Chukchi Sea.

CNPC

Presence in Russia before sanctions	*Impact of sanctions*	*Recent activities*
Since 2003 - Oil and gas cooperation between CNPC and Russia's oil sector[18] 2013 -signed a framework agreement with Novatek to purchase a 20% stake in the Yamal LNG Project.[19] 2014 - CNPC signed a technical agreement on the construction and operation of the eastern route of Russia-China Gas Pipeline with Gazprom[20] have been focused on extending existing cooperation in oil trade via Transneft's pipeline and new projects in the natural gas sphere.	contracted with Rosneft to survey three areas of the Arctic in the Pechora and Barents Seas.[21] Although not finalized, the CNPC's interest in Rosneft's Vankor oilfield has been inching towards equity ownership since 2014.	2015 - CNPC and Gazprom signed an agreement to design and construct the crossborder section of the Eastern Route of Russia-China Gas Pipeline[22] CNPC also holds 20% interest in Novatek's Yamal LNG project, which is has received 12 billion USD in loans from Chinese banks.[23]

Sinopec

Presence in Russia before sanctions	*Impact of sanctions*	*Recent activities*
relative newcomer Sinopec focuses on downstream and private players in the Russian market.	Buys into dowstream and non sanctioned companies	2015 - Sinopec bought 10% of Sibur, Russia's largest privately held mid and downstream player in a 2-phase deal that would add another 10% 3 years after the first portion of equity 2016 - Chinese Silk Road Fund, a state owned entity has supported the expansion by acquiring Sibur's 10%[24]

b) Russian energy firms

Novatek

Impact of sanctions	*Recent activities*

Sanctions hurt the Yamal project, but it is on schedule nevertheless, with investments from China manages to hold onto Total as a strategic investor but looks out for other investors Debt financing is provided by Russian state owned banks as well as JBIC.	continues explorations - Gydan Peninsula License Areas[25] intends to develop other assets on its own or with less involvement of foreign partners. increases assets[26]

Rosneft

Impact of sanctions	*Recent activities*
was subject to both individual and sectoral sanctions was affected through capital market restrictions and attempted to repay its corporate debts by asking for 2 trillion rubles assistance from the Russian government. Rosneft's joint venture partners were forced to suspend or halt their participation in the join projects. (Exxon Mobil) was forced to postpone all deep-water projects in the Arctic until 2018[27]	is currently enhancing its own technological capabilities and buying assets from Western companies in Russia 2015 - bought 100% of Trican Well Service Ltd was able to cut costs was able to replenish assets - bought Bashneft[28] 2016 - Commodity trader Glencore Plc and Qatar's sovereign wealth fund agreed to buy a 10.2-billion euro ($11 billion) stake in Rosneft[29]

Gazprom

Impact of sanctions	*Recent activities*
together with its subsidiaries are subject to both sectoral and personal sanctions A number of multinationals abandoned joint projects, some halted and frozen took a path for technological independence and import substitution. continues its biggest projects with foreign investors - Sakhalin I, II and III-, even after the imposition of sanctions, but moved dates for exploration to 2021 mitigated the impact of sanctions but was affected by sunk oil prices[30]	2016 - Gazpromneft is continuing consultations with international companies who have the competence to work on the Arctic shelf.[31] started to look out for China and in general Asian markets to diversify. 2016 - changed its capital investment program, reducing it from planned 18 bln to 11 bln USD

Lukoil

Impact of sanctions	*Recent activities*

lost in its credit ratings and experienced many difficulties in obtaining necessary financing for its projects - bad luck with alternative Chinese loans (in contrast to other Russian energy companies) as the loans are way too expensive to be affordable for Lukoil. A joint project with Total - Bazhenov rock development in Khanty-Mansyisk district - was worth over $120 bln. After their imposition, Total transferred its share of the project to Lukoil.[32] Relied on local funding[33]	plans to invest in other projects and countries, such as Iran after the sanctions against it were lifted. was able to cut costs[34] to neutralize the effects of limited financing options.

Surgutneftegaz

The company is one of the largest oil&gas producers in Russia with key lines of their business activities in exploration and production, processing and power generation. It had above all 5 marketing subsidiaries. Surgutneftegaz's ownership structure is unclear to the public, as the company never disclosed who owns the shares. The part of the narrative is that Surgutneftegaz is less affected by the sanctions than other Russian energy companies, as the company's CEO, Vladimir Bogdanov, explains in the interviews, because the company is relatively 'autarkic", using their own technologies as well as Russian contractors, Russian equipment and Russian loans. "De facto, those sanctions are irrelevant for Surgut."(Bogdanov, 2014). In the annual report for 2015, the company has not mentioned sanctions, even in the part devoted to a description of risks. It has though increased the volumes of the oil production by 0.3% compared to the previous year, showing stable results regardless sanctions.

Tatneft and Bashneft

Tatneft was not a target of the US and EU sanctions. In October 2016, Bashneft was acquired by Rosneft in a deal worth 5.3$ billion and added synergies to the state-owned company's business activities.

Notes

1 Information taken from the official website of BP

2 Information from the official website of the company

3 "EU's Russia sanctions fail to dent oil deals". 2015. Financial Times, June 14

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URL: http://www.reuters.com/article/us-russia-forum-gazprom-shell-idUSKCN0Z223G

12 This information was taken from the official website of Total Group

13 "Sanctions scupper Total/Lukoil venture". 2014. Financial Times, September 24
URL: https://www.ft.com/content/49fba004-424d-11e4-a9f4-00144feabdc0

14 Ibid.

15 Information from the official website of Total Group

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17 “China, Russia Sign $1.6Bln Deal On Siberian LNG Project”. 2014. The Moscow Times
URL.: https://themoscowtimes.com/articles/china-russia-sign-16bln-deal-on-siberian-lng-project-37187.

18 This information was taken from the official website of the CNPC

19 Ibid.

20 Ibid.

21 “China, Russia Sign $1.6Bln Deal On Siberian LNG Project”. 2014. The Moscow Times
URL.: https://themoscowtimes.com/articles/china-russia-sign-16bln-deal-on-siberian-lng-project-37187.

22 This information was taken from the official website of the CNPC

23 CNPC Website. 23.10.2013.

URL.: http://www.cnpc.com.cn/en/nr2013/201310/9678e446590544dd93ef7c104e9734d1.shtml

24 “China’s Silk Road Fund set to take 10% stake in Russia’s Sibur petrochemical company”. 2016. Platts London, December 14
URL:http://www.platts.com/latest-news/petrochemicals/london/chinas-silk-road-fund-set-to-take-10-stake-in-26620136

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26 “NOVATEK announces consolidated IFRS results for third quarter and nine months 2016”. 2016. Novatek, October 26
URL:http://www.novatek.ru/en/press/releases/index.php?id_4=1353

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32 “Sanctions scupper Total/Lukoil venture”. 2014. The Financial Times, September 22
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33 “Fitch Affirms Russia’s LUKOIL at ‘BBB-’; Outlook Negative”. 2016. FitchRatings, June 14
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APPENDIX E

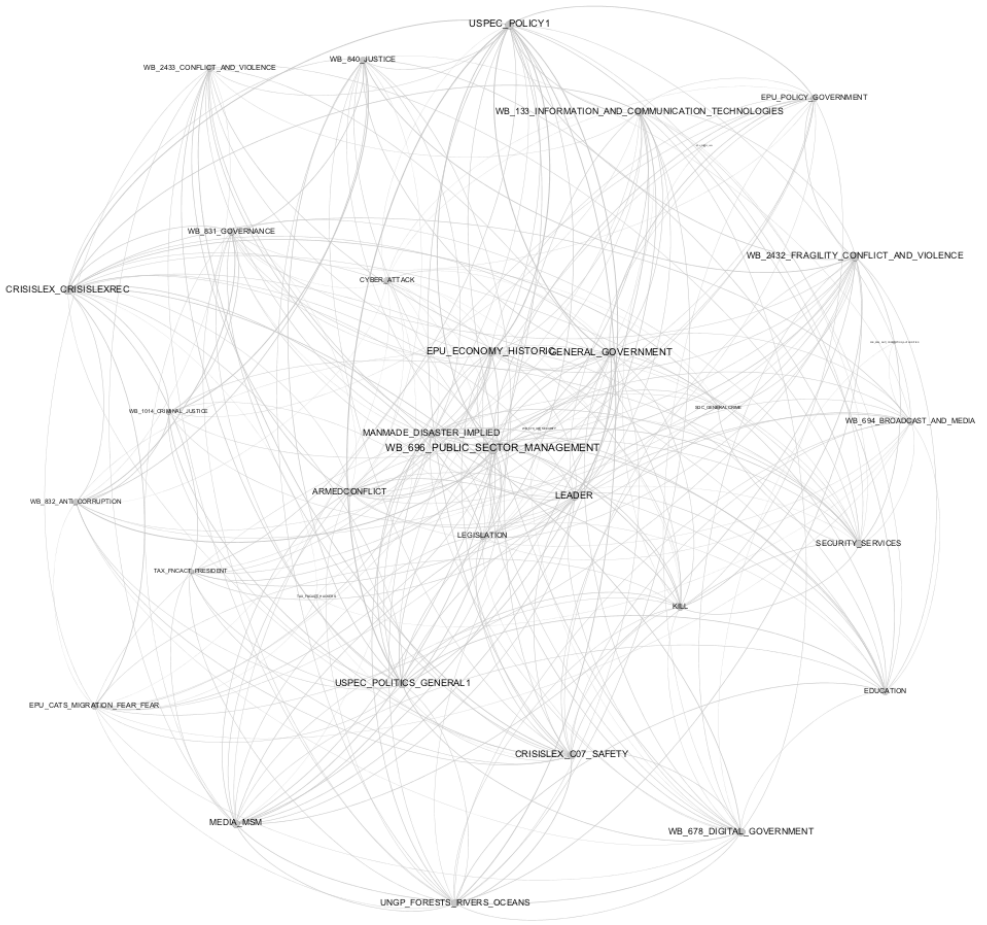
ARTICLE 8: UNDERSTANDING CYBERSECURITY CONTEXTUALIZATIONS

Appendix I
Code

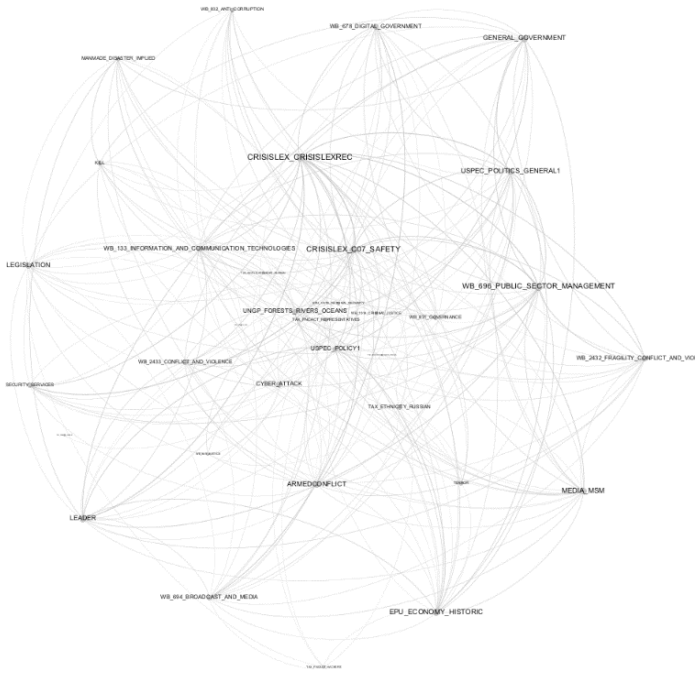
Implementation can be found at https://github.com/ashemag/CybersecurityContextUSRussia

Appendix II

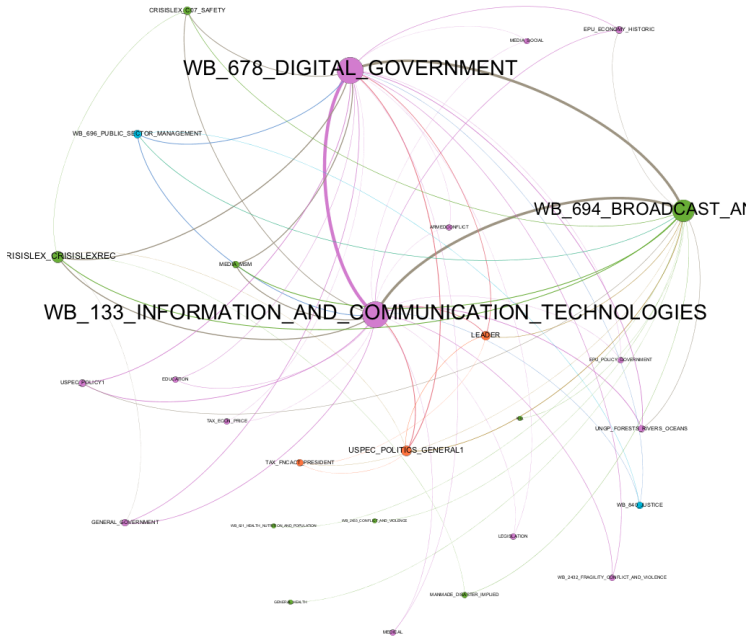
Appendix III
Final Network for English Term
cyber_attack



Appendix IV
Final Network for Russian Term
cyber_attack



Appendix V
Community Detection Network for English Term
WB_678_digital_government



Appendix VI
Community Detection Network for Russian Term WB_678_digital_government

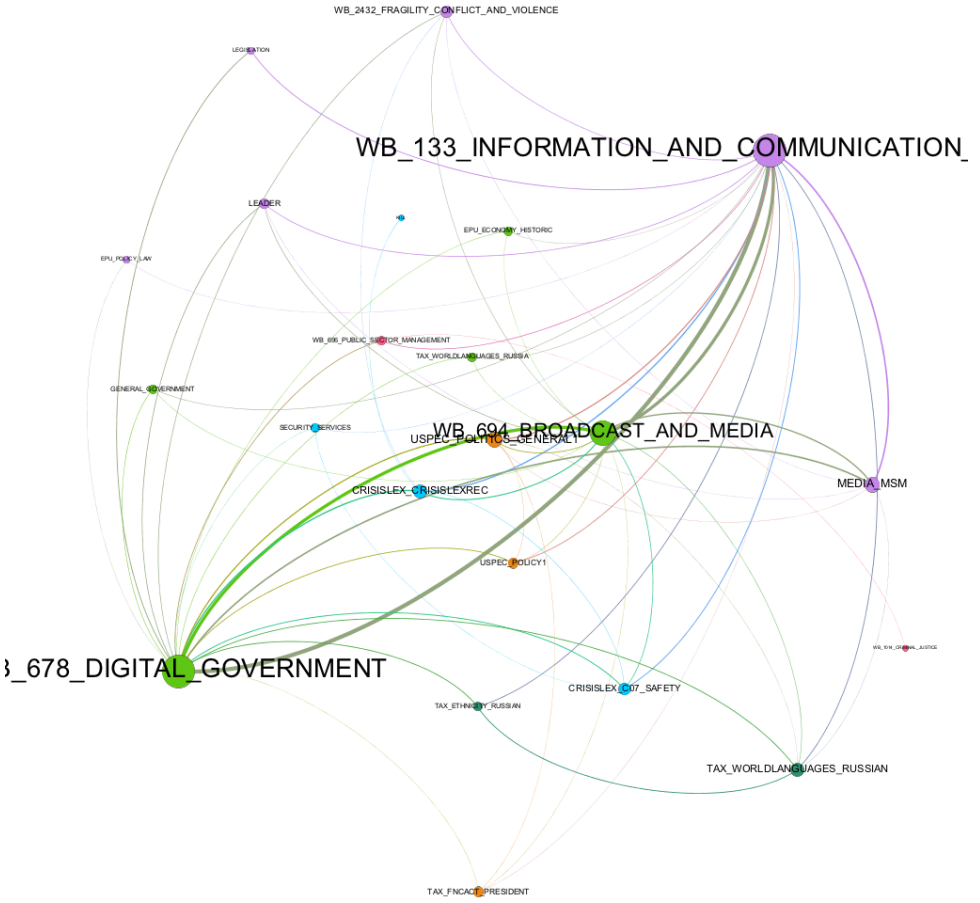


FIG 2: (a) Schematic figure of the functions f(r) which is non-monotonic. The inner media (0 < r< R) is RHM, while the media in the coating (R1 2< r < R) is LHM. The fold (R0 < r < R2) indicates the hidden region. (b) Field distribution of the same plane wave incident upon the coating when a conductive sphere with radius 1.5 cm is placed at the position A in the hidden region of coating. (c) Field distribution of this plane wave incident upon a conductive sphere with radius 6 cm placed at the position B in free space. (d) Field distribution of an Ex polarized plane wave incident upon the coating when there are no scatterers inside the coating.

About the Contributors

Evelina Akimova is currently finishing a master's degree in sociology at Oxford University, where she studies educational inequality in Russia. Her research addresses the problem of access to preschool education and barriers to obtaining high-quality education. She earned her undergraduate degree at Moscow State University, where, as a student of the sociology department she focused on socio-economic inequality and the effects of globalization on Russia. As a quantitative sociologist, she has done research both in academia and in the private-sector.

Andrey Bakalenko is a doctoral candidate at the Institute of Economics of the Russian Academy of Sciences and holds bachelor of arts and master of arts degrees in economics from Moscow State University. Andrey has conducted research on economic inequality in Stockholm University. His current research focuses on crowd-sourcing and the sharing economy as liberalizing instruments of modern societies. Andrey also works at Sberbank, where he leads the development of the most popular financial mobile application in Eastern and Central Europe.

Grace Ballor is a doctoral candidate in European economic history at the University of California, Los Angeles. After earning her bachelor's degrees from the University of Dallas in history and politics with a concentration in international studies (Phi Alpha Theta, Phi Beta Kappa), Grace focused her attention on the driving forces of postwar European integration. Her doctoral dissertation, which analyzes the role of large multinational firms in the creation of the European Union's single common market, reveals not only the interest of large corporations in close economic and trade relations between countries, but also the ways in which those firms can become partners in promoting closer relations, especially in the case of the US and Russia. Her work on major banks, retailers and manufacturers has required her to spend time in archives across Europe, including the BNP Paribas bank in Paris, BMW headquarters in Munich, VW headquarters in Wolfsburg and the HAEU in Fiesole, support for which has been made possible by the European Union Studies Association, Center for European and Russian Studies, Global Health Institute and Center for Economic History.

Mugi Bayarlkhagva is a Fulbright Scholar and a graduate of the Paul H. Nitze School of Advanced International Studies at Johns Hopkins University, where he focused on the Middle East and Eurasia. His research experience includes time at the Center for Strategic and International Studies in Washington, D.C., and at the Institute for Political and International Studies in Tehran, Iran. Prior to his graduate studies, Mugi worked on infrastructure and industrial ventures in Mongolia as a project finance specialist and also served as an election observer for the Organization for Security and Cooperation in Europe's Office for Democratic Institutions and Human Rights. He received his bachelor's degree in international economics from Universita Commerciale Luigi Bocconi in Italy. He is an alumnus of Stanford's Center on Democracy, Development, and the Rule of Law (CDDRL) Summer Fellows Program.

Joel Beckner is a master of arts candidate in Russian, East European, and Eurasian Studies at Stanford University. Joel is a graduate of Wheaton College, Illinois, with a bachelor of arts in international relations. A Foreign Area Officer in the US Army, Joel received his first commission in 2008 and has served in various capacities in Germany, Iraq, and South Korea. He studied Russian at the Defense Language Institute in Monterey, California, and subsequently spent 15 months traveling throughout Europe, the Caucasus, and Central Asia. At Stanford, Joel's studies focus on the emerging Arctic and its implications for US-Russia relations.

Tatti Currey is a graduate student at the School for Conflict Analysis & Resolution at George Mason University, where she focuses on ethno-territorial nationalism and terrorism in the Balkans and North Caucasus. She holds a bachelor of arts in history with a focus on Eurasian political history, as well as a juris doctor degree with a concentration in international humanitarian law and human rights. She has worked at the Carter Center, UNICEF, and Nuclear Age Peace Foundation. Her interest areas include post-conflict transitions, with specific attention to marginalized groups in the North Caucasus, Russia.

She recently concluded a fellowship with the International Peace & Security Institute in Washington, DC.

Alexander Dorofeev is a senior in the joint bachelor of arts program in economics at the Higher School of Economics and the New Economic School in Moscow. As a research assistant and a teaching assistant at both of his universities, his work focuses on topics in macroeconomics, political economy, and the economics of the media. He has conducted research in a number of fields, including a study of desegregation in American music, an analysis of journalist characters in cinema, and a comparison of post-modernist discourses in Michelangelo Antonioni's and Jean-Luc Godard's films.

Ziba Dzhafarova is a master's student studying educational policies at the Higher School of Economics (HSE) and holds a bachelor of arts in international relations from the department of world economy and international affairs at HSE. After graduating from her bachelor's program, she spent a year studying politics and philosophy at Middlebury College in the US as an exchange student.

Elza Ganeeva is a second-year master's student at the Higher School of Economics pursuing a degree in governance in science, technology, and innovation. She studied political science as an undergraduate at Kazan Federal University and European Union law at the Deusto University in Spain as an Erasmus Mundus grant recipient. After completing her specialist degree, Elza started her career as a business journalist and became interested in the impact of technology on business. She later became a communication manager at Kazan's High Technology IT Park. Elza joined Microsoft as a government relations manager in 2016. Her current research interests include breakthrough technologies, including the blockchain, cloud computing and artificial intelligence.

Irina Gavrilova is a senior at Yale University, majoring in theatre studies while maintaining a focus on international relations and world politics. To supplement her academic study of theatre, she has worked as an education intern for Steppenwolf Theatre and a casting assistant for Remy Bumppo Theatre. At Yale, she directed three plays and has served as editor-in-chief of Accent, Yale's only multilingual magazine. Irina is also currently enrolled in Yale's Grand Strategy Program led by Elizabeth Bradley, John Lewis Gaddis, and Charles Hill; her project for the program focuses on the intersection of theatre and politics in modern Ireland, with the #WakingTheFeminists movement as her case study.

Eugeniu Han is an assistant policy analyst at the RAND Corporation and a doctoral candidate at the Pardee RAND Graduate School. His research addresses R&D investment in the public and private sectors, technological innovation and the development of capital markets, and national security. Prior to joining RAND, Eugeniu served in research and consulting roles for the European Union delegation to China, the Administration of the President of Romania, and the Paulson Institute at the University of Chicago. He has worked on Chinese innovation policy, dynamics and distribution of Chinese FDI in the US, and fiscal policy in the European Union. Eugeniu received a master's degree from the University of Chicago Harris School of Public Policy Studies, specializing in economics and data analysis, and a master's degree in public administration from Tsinghua University in Beijing.

Kirstyn Hevey is a doctoral student at the University of Toronto in political science, with a focus on comparative politics and international relations. Her research interests include post-Soviet democratic transitions, nationalism, violence, and the power of diplomacy and soft power in effecting change. Kirstyn completed her master's degree in political science, specializing in post-communist politics, at the Central European University in Budapest. Kirstyn has presented at conferences and has published her findings in both academic and popular journals. Kirstyn currently works at the University of Toronto as a research and teaching assistant covering topics of corruption, violence, democratization, and theories of international relations.

Ian Johnson is a postdoctoral fellow at the Clements Center for National Security at the University of Texas-Austin. Originally from Edina, Minnesota, he completed his bachelor's degree in 2009 at Claremont McKenna College. From 2009 to 2010, he worked as a consultant at the Rose Institute of State and Local Government, specializing in political cartography. In 2010, he began his doctoral program in the history department at the Ohio State University, working on Russian and German history. He spent the 2014- 2015 academic year in Russia on a Fulbright-Hays DDRA Fellowship. The following year, he was a predoctoral fellow with International Security Studies at Yale University. He finished his doctoral program in May 2016 with a dissertation entitled "The Faustian Pact: Soviet-German Military Cooperation in the Interwar Period," scheduling for publication as a book by Oxford University Press.

Tanveer Karim is a senior majoring in physics and astronomy and a Take Five Scholar at the University of Rochester. As a student of physics and astronomy, Tanveer has been involved with four different research projects related to stellar and galactic astronomy, two of which have resulted in a first-authored publication. As a Take Five Scholar, he studied abroad at Saint Petersburg State University and is concentrating on the topic "Islam in Russia" to understand the role of Muslim Russians in Russian society.

Aliya Khayrullina is a doctoral candidate in energy storage at the Skolkovo Institute of Science and Technology. Aliya is also

a graduate of Bauman Moscow State Technical University's power engineering program. Part of her program took place at Newcastle University, where she enjoyed taking new approaches to energy-related issues such as energy geopolitics. Her interest led her to become a teaching assistant for an MIT-led course at Skoltech. She has also worked as a field engineer for Schlumberger in northern Siberia in order to understand oil and gas systems from the inside.

David Kurkovskiy is a senior at Yale University, where he is pursuing degrees in computer science and Russian and Eastern European studies. Through his two majors, David explores interests ranging from the intersection of technology and the humanities to the culture and politics of post-Soviet Ukraine, Belarus, and Russia. David has worked on a number of research projects, ranging in topic from the study of language politics in Belarus and Ukraine to LGBT activism in the post-Soviet space.

Ashe Magalhaes is a senior at Stanford University, where she studies computer science with a concentration in artificial intelligence. On campus, she conducts research on target surveillance in adversarial environments using deep reinforcement learning and is on the Aerodynamics Team of the Stanford Solar Car Project. Ashe has worked with the Stanford Space Development Laboratory, the Data Infrastructure team at Facebook, and the Intelligent Robotics Group at NASA Ames. In winter 2016, she studied abroad at Oxford University, where she took courses on philosophy and literature. She has co-authored a peer-reviewed paper on a decision-theoretic approach to designing cyber resilient systems, and is interested in pursuing further research on policy approaches to cybersecurity conflicts.

Nikita Melashchenko holds an LLM from Vanderbilt University, where he focused on international and intellectual property law as a Fulbright Scholarship recipient. He also holds a bachelor of law degree from Saint Petersburg State University. Following his undergraduate education, he participated in a research group working on legal issues of circulation of goods via the internet. Nikita has conducted research on international legal regulation of jurisdictional relations between national judicial institutions, including Russia and the United States. Nikita practiced intellectual property and technology law as part of the Dentons Saint Petersburg legal team for nearly two years. His professional experience includes advising major international IT and media clients on transborder accountability with respect to intellectual property rights and mediating use provisions regarding software, databases, and copyrighted works.

Katia Paramonova is pursuing a master of science at Ecole polytechnique fédérale de Lausanne in energy management and sustainability, where she is the co-president of the EPFL Energy Business, Policy and Technology Group. Katia completed her bachelor of science degree at the Massachusetts Institute of Technology (MIT) in nuclear engineering with a minor in public policy and a two-year certificate in engineering leadership. During this time, she brought a group of MIT students to Russia for a student exchange with the Moscow Engineering and Physics Institute (MEPhI). After her undergraduate studies, she moved to Moscow to work for the president of the Skolkovo Institute of Science & Technology, an innovation-focused university developed in partnership with MIT. She also launched a startup called Hexagon to adapt best practices in engineering leadership programs to Russian universities.

Amber Heng Qin is a junior pursuing an undergraduate degree in political science at Wellesley College. Amber is passionate about quantitative as well as qualitative social science research, and has written research papers on topics such as counterinsurgency strategies and nuclear non-proliferation. She also worked as a research assistant at the Sloan School of Management at MIT. Amber has visited and participated in debates with policy leaders at governmental and non-governmental institutions such as the US Congress, USAID, and various think tanks.

Elena Rodina is a doctoral candidate at the department of media, technology, and society at Northwestern University. She obtained her master's degree in Slavic studies from the University of Oregon and received her bachelor of arts in Romanic-Germanic philology at Kazan State University. Elena worked as a print journalist in Russia for over eight years, including as a full-time special correspondent for Esquire in Russia and the weekly illustrated magazine Ogoniok. She covered a diverse range of social and political topics, such as the consequences of the Beslan school hostage crisis, political change in post-Castro Cuba, and interethnic marriage and ethnic conflict in the Far East. At Northwestern University, she developed and taught a junior writing seminar on political and social aspects of mass media, covering such questions as journalistic freedom, societal norms, and the historical and cultural factors that affect journalistic production globally. She is currently doing research on journalistic practices and media culture in Russia, focusing on the region of the North Caucasus.

Katarina Sabova is a second-year MBA student at Columbia Business School. Prior to business school, Katarina spent three years at McKinsey & Company, a management consulting firm, working for senior client executives across Europe and Africa in industries ranging from telecom and media to energy and financial services. She has also worked for the Office of the Slovak President, helping to define the president's strategic and organizational priorities. She recently concluded an internship as a mobile product manager at Symphony, a Silicon Valley startup that provides secure messaging solutions for financial institutions and other organizations. Katarina holds a bachelor's degree in international management and German studies from Comenius University in Bratislava. She went on to graduate from the Global Alliance in Management Education in International Management (CEMS MIM) program as the valedictorian, with a joint degree from the University of Economics in

Prague and the Louvain School of Management in Belgium.

Katherine Schroeder is currently a master of arts student in Russian, East European, and Eurasian Studies at Stanford University. Katherine graduated from the University of Washington in 2015 with a degree in international studies and a minor in Russian. Her senior undergraduate thesis focused on online protest groups in post-Soviet Russia. She was also a summer Foreign Language and Area Studies grant recipient in 2014 in Kazan, Russia, which allowed her to collect data for her thesis and to study the Russian language. In 2015, Katherine spent nine months in Ufa, Russia, with a Fulbright English Teaching Award. While in Ufa, she taught pre-law students and researched constitutional law with Russian faculty.

Sofia Shchukina is a sophomore pursuing a bachelor of arts degree in economics at Harvard University. Having lived and studied in Russia and the United Kingdom, Sofia is interested in international relations and globalization, as well as public policy. She is also passionate about learning languages and has studied German, French, Italian, Spanish, Latin, and Ancient Greek. At Harvard, Sofia is involved with the Institute of Politics, and she enjoys taking part in various research projects. Sofia is also a keen women's rights activist, having attended the UN's 58th Commission on the Status of Women as a youth delegate from the National Alliance of Women's Organizations in 2013.

Nadezhda Smakhtina is a Fulbright Scholar pursuing her master of arts degree in international affairs at American University in Washington, DC, studying governance and security issues in Russia and Europe. In 2015, she joined the comparative and regional studies program at the School of International Service. She is also currently a 2016 Edmund Muskie fellow and an intern at the National Security Archive, where she works on issues of nuclear disarmament in former Soviet republics, chemical and biological weapons in the USSR and Russia, and NATO enlargement. Prior to coming to the US, Nadezhda obtained her bachelor's and master's degree in constitutional law from Tyumen State University. As part of her research, she spent a semester abroad at Albert-Ludwigs University of Freiburg in Germany as a visiting scholar at the department of constitutional economy.

Timur Sobolev is a third-year undergraduate student of economics at Moscow State University (MSU). His research focuses on macroeconomics, namely the effect of inflation has on household consumption and ways of measuring this effect. He has won a number of academic olympiads, including the national competitions in economics, French, and English. He also received the "Presidential Award in Support of Talented Youth" three times, an MSU scholarship, and a summer study course at the London School of Economics for excellent academic results at MSU. Timur has also taken part in several case championships. He has worked as a permanent staff member at the Laboratory of Informatics and Analytical Resources at MSU. He also has two years of experience teaching economics as a volunteer at the Economic-Mathematical School (EMSCH) at MSU and is part of the school's Council.

Daria Stepanova is a master's student at the Skolkovo Institute of Science and Technology in the space systems department. Previously, she earned a master's degree at the Moscow Institute of Physics and Technology in mathematics. She has dedicated her life to space engineering, with research focused on laser communications between satellites and, more specifically, on pointing and tracking issues. During her studies, Daria has also worked on developing satellites and satellite kits.

Daria Vikulova is a sophomore at Moscow State Institute of International Relations majoring in international trade and commerce. She has spent a year in Colorado as a Future Leaders Exchange (FLEX) participant for the 2013-2014 academic year. Daria's research interests are in compromises between states in cases of conflicting economic interests as well as discrimination, gender equality, and cultural differences. In her spare time, Daria has organized online English courses serving more than 10,000 students. At MGIMO, Daria has participated in and helped to organize a number of conferences and forums while also studying foreign languages.

Susan Jieya Wen is a senior at Rice University, pursuing bachelor of arts degrees in computer science and political science. As a way to combine her two areas of interest, she has conducted research in the computer science department using Twitter data to analyze public sentiment toward the 2014 Hong Kong Umbrella Revolution. She also worked as a research assistant at the Baker Institute for Public Policy, with a focus on Chinese shale gas development and the maintenance of a digital archive of advertisements in metropolitan public spaces. This past summer she interned at Google, where she used natural language processing to improve data quality in Google Maps.

Anastasia Zabusova is an Erasmus Mundus master's student in global public policy, a program hosted by Institut Barcelona d'Estudis Internacionals in Spain and the Central European University in Budapest. Her studies focus on energy policy, energy governance and the role of energy in development. Anastasia received her undergraduate degree in international relations and diplomacy with honors from Kazan Federal University. As a member of the team of the Kazan Model United Nations Youth Club, she was involved in organizing Kazan's first model United Nations event. She has also been a project coordinator and a member of the board at the Alumni Association of the German-Russian Youth Parliament DRJUG e.V., a platform for youth from Germany, Russia and other countries to discuss important issues with experts, define common challenges, and ways to overcome them.

About the Stanford US-Russia Forum

SURF is a platform for American and Russian university students to work together on some of the most important issues that our nations face today. Participants team up in a two-plus-two format to collaborate on research themes such as international relations, the sciences, business and entrepreneurship, regional and humanitarian issues, and others. These delegates travel to Russia for a week-long conference in the fall to launch their projects under the guidance of subject experts. They continue to collaborate with their working group peers over the academic year while based at their home universities. The capstone of the program is a week-long research symposium at Stanford University in the spring. The working group format fosters critical thinking and consensus-building, as it leverages a cooperation-based approach to produce innovative and viable solutions.

SURF welcomes applications from graduate, professional, and undergraduate students in all academic disciplines and majors, regardless of prior exposure to Russia or the United States. Delegates for the 2016-17 program were selected from over 600 applications from 168 universities, which is a 5.2 percent acceptance rate. Our alumni have gone on to work in national governments, major consulting firms and banks, and tech companies like Facebook, Google and Yandex. Others have built careers in medicine, law, entrepreneurship, and have entered PhD and professional programs at some of the world's most prestigious universities.

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SURF seeks to recruit talented students regardless of financial considerations. Our program covers most expenses, including housing, meals, and local transportation, and there are no registration or participation fees. If you would like to donate to SURF or learn about how you can contribute as a mentor or speaker, please reach out using the contact form on our website at https://usrussia.stanford.edu/Contact.

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