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Моделирование и оценка национальной силы разных стран мира

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Аннотация

В статье продолжается работа по оценке, мониторингу и прогнозированию интегральных показателей национальной силы. Национальная сила - наиболее информативный и популярный показатель, характеризующий совокупный потенциал той или иной страны, позволяющий сравнивать уровень ее военной силы и социально-экономического развития с другими странами. Моделирование и оценка показателя национальной силы чрезвычайно важны для корректировки

стратегических документов, касающихся долгосрочного развития страны, а также ее внешней политики. Во многих странах показатель национальной безопасности оценивается узким кругом экспертов или с использованием средних результатов опросов, проведенных с более широким кругом респондентов. Субъективность - недостаток такого подхода. В этой статье авторы предлагают научно обоснованную методологию моделирования и оценки национальной силы. Результаты расчета интегральных показателей национальной силы были получены с использованием методов многомерного статического анализа. В заключение дадим прогноз индикатора национальной силы до 2025 г. в зависимости от наиболее вероятного, с нашей точки зрения, сценария мировой динамики.

Ключевые слова: национальная сила, географические характеристики, природные ресурсы, население и рабочая сила, экологические показатели, вооруженные силы, наука и инновации, факторный анализ, интегрированный индекс, многомерный статистический анализ

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Introduction

The indicator of ***national power*** is currently the most informative and popular indicator in the world that integrally characterizes the aggregate potential of a particular country and at the same time makes it possible to compare the level of its power and socio-economic development with other states. So, RAND corporation¹ in its report “Measuring National Power” notes the extreme importance of regular assessment and analysis of the national power indicator for the adjustment of strategic documents related to the country's long-term development, as well as its foreign policy [15].

² At the same time, the value of national power according to the RAND corporation model is estimated on the basis of eight blocks of drivers: domestic sociopolitical, international political, population, economic, agricultural, energy, technology, and environmental resources. The results obtained demonstrate the hegemony of the USA over the rest of the world, and the indicator of Russia's national power is about 10 times inferior to that of the USA.

³ However, not all assessments of national power give similar results. It should be noted here that one of the first formulas for calculating national power was proposed in

1741, and at the moment there are several dozens of them.

⁴ A lot of publications proposed one variable (for example, land area, GDP, military spending, government spending, production of electricity, steel, etc.) to assess national power, and the main argument in favor of this approach is that when a set of dissimilar components is reduced to a single indicator, their original meaning is lost, and the integral value is difficult to interpret due to the subjectivity of the set of influencing factors and their weights. On the other hand, according to the adherents of this approach, such large aggregates as GDP or steel output implicitly include many secondary indicators, so the use of multivariate data sets and mathematical methods of statistical analysis is redundant [8]. Nevertheless, most researchers adhere to the opposite point of view, since the modern world is complex, and its complexity is constantly increasing, as well as relations between countries, therefore the use of one variable to measure national power is a deliberate simplification and greatly limits its objective assessment, since it should be multilateral and cover various aspects of the country's development (social, economic, military, territorial, etc.).

⁵ Coefficients of correlation between national power integral values given in the most cited works were calculated in the paper [7]. The average value of the correlation coefficients turned out to be 0.796: for countries with high indices of national power the average value of the correlation coefficient was 0.821, and for countries with low indices it was 0.459. The authors of the study put forward a version that analysts have more information about the situation in powerful states than in weak ones. Also, the following hypothesis was proposed as an explanation: for countries with different levels of development it is incorrect to use the same set of indicators with the same weights.

⁶ Andrew Marshall, a mathematician, foreign policy strategist and director (from 1975 to 2013) of the United States Department of Defense's Office of Net Assessment, the Pentagon's think tank, foresaw several key moments in world history (for example: 1) the demise of the USSR, which, in his opinion, should have happened with high probability after the preliminary weakening of the Soviet economy in the process of an arms race; 2) the emergence of China as a world power, etc.). Although most of Marshall's works are put into the secret archive for obvious reasons, in publicly available works he wrote many times about the need to carry out a comprehensive assessment of national power and its components of potential opponents, predominantly the USSR. In particular, he noted that due to the difference in methodologies and understanding of priorities in the country's development, Soviet assessments differ significantly from American ones, and in order to plan an effective US military strategy, it is necessary to take into account differences in the corresponding assessments [5].

⁷ American geopolitician and one of the founders of the school of political realism Nicholas John Spykman in his work "America's Strategy in World Politics: the United States and the Balance of Power" proposed eleven factors belonging to the following five categories: (1) geographical (area, type of borders, natural resources); (2) demographic (population size, ethnic homogeneity); (3) military (size of the armed forces); (4) economic (integral indicator of economic and technological development, integral indicator of financial stability); (5) psychological (indicators of social integration, political stability and the level of patriotism). As you can see, he paid great attention to psychological factors and considered them key in intercountry confrontation

noting that an effective means of weakening the state is to undermine national cohesion, but at the same time he emphasized that these components of national power are extremely difficult to formalize [14].

⁸ Founder of political realism and one of the leading experts in the USA for foreign policy issues Hans Morgenthau in the first edition of his bestseller in the theory of international politics “Politics Among Nations. The Struggle for Power and Peace” proposed the following elements of national power [10]: (1) geography, (2) natural resources, (3) industrial potential, (4) military potential, (5) population, (6) national character, (7) national morale, (8) the quality of diplomacy, and in the second edition he added one more element - (9) the quality of government [11]. Noting the importance of each of the listed components of national power, Morgenthau emphasized that the first five of them can be directly determined based on statistics, and the remaining four - only through surveys.

⁹ Famous American political scientist, founder of the theory of neorealism Kenneth Neal Waltz defined national power as an aggregator of several factors: (1) population size, (2) size of territory, (3) resource endowment, (4) economic capability, (5) military strength, (6) political stability; and (7) political competence [16]. As you can see, the first five elements practically correspond to the factors proposed by Morgenthau, and the remaining two can also be identified with indicators reflecting national character, national morale and the quality of diplomacy. At the same time Waltz noted that to be a world leader it is necessary to lead in all seven areas, and superiority in only some of them cannot compensate for the lag in others. In addition, he emphasized the need to use non-linear formulas for assessing the integral indicator using weights of individual factors that change over time.

¹⁰ Author of the theory of offensive realism, American political scientist John Mearsheimer, unlike Waltz, considered only material factors of national power and in 2001 proposed the following components: (1) GDP, (2) population size, (3) size of the armed forces, (4) the number of nuclear weapons [6].

¹¹ Based on the analysis of more than 600 publications in some way or another related to the measurement of national power, German researcher Höhn Karl Hermann in his work evaluated the corresponding formulas in terms of the method of calculating them, as well as the country of the authors [1]. Table 1 provides information on the most famous authors of the corresponding formulas, the countries they come from and the number of variables used to assess national power. So, the weighting coefficients of 73% of the formulas were assessed by experts, 10% through surveys, and statistical analysis procedures were used for 17%. As for the countries, 37% of the formulas were offered by specialists from the USA, 16% from China, 7% from Germany, 6% from Japan, 5% from Brazil, 5% from Poland, 4% from Russia (and the USSR), 4% from India, 3% from South Korea, 3% from the UK, 2% from Canada, 1% from Taiwan, 1% from France, 1% from Iran, 1% from Australia, 1% from Argentina, 1% from Kuwait, 1% from Turkey, and 1% from Azerbaijan. As you can see, most researches were and are carried out in the USA and China, which means that the most powerful countries measure this indicator more often than others.

¹² Table 1². Information on the most famous methods of assessing national power

Author(s) of the methodologies	Country of origin of the author(s)	Number of variables
<i>Johann Peter Süßmilch</i> , 1741	Germany	2
<i>Ferdinand Friedensburg</i> , 1936	Germany	2
<i>John Quincy Stewart</i> , 1945, 1954	USA	3
<i>Philip Quincy Wright</i> , 1955	USA	2
<i>Frank Clifford German</i> , 1960	UK	20
<i>Harold Steere Guetzkow</i> , 1963	USA	5
<i>John Peter Cole</i> , 1963	UK	3-6
<i>Shimbori Michiya</i> , 1963	Japan	5
<i>Saul Bernard Cohen</i> , 1963	USA	7-9
<i>Wilhelm Fucks</i> , 1965	Germany	2
<i>Simon Schwartzman, Mora y Araujo Manuel</i> , 1965	Brazil, Argentina	3
<i>Allen Mayhew Shinn</i> , 1969	USA	3
<i>Norman Zinkan Alcock, Alan G. Newcombe</i> , 1970	Canada	2-3
<i>Joel David Singer</i> , 1972	USA	6
<i>Rudolph Joseph Rummel</i> , 1972	USA	236
<i>Wayne Harry Ferris</i> , 1972	USA	8
<i>Robert Warburton Cox, Harold Karan Jacobson</i> , 1973	Canada, USA	5
<i>Richard Newton Rosecrance, Alan Alexandroff, Brian Healy, Arthur Stein</i> , 1974	USA	25
<i>Richard Ernest Muir</i> , 1975	UK	5
<i>Ray Steiner Cline</i> , 1975	USA	12
<i>Manus I. Midlarsky</i> , 1975	USA	7
<i>Jonathan Udell</i> , 1975	USA	3
<i>Thomas Lorie Saaty, Mohamad W. Khouja</i> , 1976	USA, Kuwait	5
<i>Abramo Fimo Kenneth Organski, Jacek Kugler</i> , 1978	USA	9
<i>Liu Ben-Chieh</i> , 1978	Taiwan	5
<i>Lancelot L. Farrar</i> , 1981	USA	2
<i>Peter R. Beckman</i> , 1984	USA	3-5
<i>The Economic Planning Agency</i> , 1987	Japan	17
<i>Ding Fengjun</i> , 1987	China	7
<i>Huang Shuofeng</i> , 1989	China	7
<i>Richard J. Stoll</i> , 1989	USA	6-22
<i>Yu Hongyi, Wang Youdi</i> , 1989	China	4
<i>Michael P. Sullivan</i> , 1990	USA	3
<i>Mirosław Sulek</i> , 1990	Poland	3
<i>Zhang Wenkui</i> , 1991	China	12
<i>Stephen Barcia</i> , 1993	USA	5
<i>Wang Songfen</i> , 1996	China	64
<i>Yan Xuetong</i> , 1996	China	6
<i>Ou-yang Guo-hua, Wang Qihua</i> , 1997	China	38
<i>Vladimir Rubenovich Khachaturov</i> , 1997	Russia	4
<i>Jean-Yves Caro</i> , 1998	Франция	4
<i>Zhu Xian, Xiao Lazhen</i> , 1999	China	11
<i>Chin-Lung Chang</i> , 1999	Taiwan	5
<i>Ashley J. Tellis, Janice L. Bially</i> , 2000	USA	25
<i>The Indian National Security Index</i> , 2002	India	8-17
<i>Hu Angang, Men Honghua</i> , 2002	China	23
<i>Hai Ping, Yun Ping, Wang Jingtao</i> , 2003	China	6
<i>John D. Sparks, Guilbert Gates</i> , 2003	USA	22
<i>Thomas John Volgy</i> , 2003	USA	2

<i>The National Institute for Research Advancement</i> , 2004	Japan	103
<i>Alexander Ivanovich Ageev</i> , 2004	Russia	48
<i>Arvind Virmani</i> , 2004	India	2
<i>Sodekawa Yoshiyuki</i> , 2004	Japan	39
<i>Global Firepower</i> , 2005	USA	55
<i>Gregory F. Treverton, Seth G. Jones</i> , 2005	USA	5
<i>Reinaldo Gonçalves</i> , 2005	Brazil	3
<i>Wang Defa</i> , 2006	China	128
<i>Sayed Hadi Zarghani, Mohammad Reza Hafeznia</i> , 2006	Iran	86
<i>Höhn Karl Hermann</i> , 2006	Germany	8
<i>Kim Hyung Min</i> , 2007	The Republic of Korea	6
<i>Dave McCool, Ralph Gerth, Niall Ferguson</i> , 2007	USA, UK	4
<i>Witold Maciej Orłowski</i> , 2007	Poland	8–11
<i>Andrey Yurievich Melville</i> , 2007	Russia	13
<i>Zbigniew Lach, Julian Skrzyp, Andrzej Łaszczuk</i> , 2008	Poland	8
<i>The Hansun Foundation for Freedom & Happiness</i> , 2009	The Republic of Korea	13
<i>Dhruva Jaishankar</i> , 2009	Индия	4
<i>Ahmet Davutoğlu, Kenan Aslanli</i> , 2009	Turkey, Azerbaijan	10
<i>Danny Zahreddine, Nathália Ribeiro Gomide</i> , 2009	Brazil	25
<i>Karolina Milewicz, Arne Nothdurft</i> , 2009	Poland, Germany	10
<i>Nathalie Torreão Serrão, Waldimir Pirró e Longo</i> , 2009	Brazil	186
<i>Jonathan D. Moyer, Alanna Markle</i> , 2018	USA	20
<i>Robert Białoskórski, Łukasz Kiczma</i> , 2019	Poland	5

¹³ The number of factors taken into account in the methods varies from 2 to 236, and if we conditionally divide the time period from 1741 to 2020 into two intervals: the pre-Internet era and the era of the *ubiquitous Internet*, then the average number of components taken into account in each of them will be 13 and 28, respectively. This is a consequence, firstly, of the increase in the computational capabilities of computers used to calculate, secondly, available collected statistical data and the expansion of its list, and thirdly, the increasing versatility of socio-economic systems.

¹⁴

Principles

Based on the analysis of the methods listed in Table 1, we will highlight the most frequently used factors of national power formulated as generalized components: territory, population, GDP, industrial production, military spending, armed forces, research and development costs, investment volume, energy consumption, grain production, and steel production.

¹⁵ On the one hand, it would take too much space to mentions here all the formulas used in the methods listed above and, on the other hand, it does not make much sense, since each of the dependencies is subjective and cannot be considered as fundamental for measuring national power. But to get some idea of the way of reducing the components taken into account to the integral index, we will present here information on the method for calculating the *Composite Index of National Capability* (CINC) proposed by Joel David Singer. It is used to assess national power of different countries of the world and is one of the most cited ones [13]. It is calculated using the following formula:

¹⁶
$$CINC = (ME + MP + SP + EC + UP + TP)/6,$$

¹⁷ where *ME* is military expenditure, as a percentage of the world volume; *MP* - military personnel, as a percentage of their total number in the world; *SP* - steel production, as a percentage of the world volume; *EC* - energy consumption, as a percentage of the global consumption; *UP* is the urban population, as a percentage of the global urban population; *TP* is the total population of the country, as a percentage of the total population of the world.

¹⁸ As you can see, the index does not take into account a lot, and the following question immediately arises - why do all the components of national power have the same weight?

¹⁹ It does not make much sense to consider advantages and disadvantages of each of the methods for calculating national power that were developed to date, therefore, we will write down the following general **conclusions**:

- ²⁰ 1. Measuring national power, on the one hand, is of great interest to a wide range of specialists in the field of geopolitics, international relations, economics, mathematics, etc. and, on the other hand, it presents computational complexity, since this integral indicator often combines quantitative and qualitative factors, which are problematic to bring together. On the one hand, it is difficult to quantitatively express such concepts as morale, patriotism, etc. and, on the other hand, a separate problem is the correct weighing of the selected components of national power. But even after this procedure it is unclear whether it is possible to combine many factors that differ greatly in composition into a single integral indicator - for example, the population size, the number of fighters, the coal output, etc. [12].
2. Some works are theoretical and they consider components of national power that do not have a quantitative representation. Nevertheless, almost all studies note the extreme relevance of its comprehensive assessment, since for a successful intercountry confrontation it is necessary to have an objective assessment of all the resources available to assumed opponents.
3. The set of components is significantly influenced by the specialization of researchers. So, economists are primarily guided by economic indicators, representatives of the military professions to a greater extent operate with indicators related to the size of the armed forces, etc.
4. The number of components considered in the studies increases over time due to an increase in the productivity of computers used, as well as an increase in the complexity of the described socio-economic systems and the relations between them.
5. In most cases (more than 80%) factorial weights of the formulas were estimated using estimates of a narrow circle of experts or the average results of surveys carried out among a wider number of respondents. The disadvantage of this approach is subjectivity, ultimately determined by the value of the integral indicator.
6. When analyzing the results of most works, there is a clear feeling that the authors are biased in favor of the states they represent. So, American researchers often overestimate the role of their country in the global balance of power, while

others are more realistic about measuring the US national power, nevertheless recognizing the leadership of the USA in certain issues.

²¹ Considering the above, let us formulate the *principles* that we will adhere to when constructing the indicator of national power (as in [2]).

- ²² 1. Mandatory use of methods of multivariate statistical analysis. It will eliminate the problem of subjectivity (inherent in expert methods widely used in solving such problems) to some extent when assessing the contribution of factors to the integral indicator.
2. Taking into account the previous point, as well as the mechanism for calculating the components of national power, in which they are dependent on the values of similar indicators in other countries of the world, we assume the formation of a comprehensive database and the mandatory calculation of indicators of national power for all UN member states.
3. To assess national power, it is advisable to use more basic indicators that determine the country's potential (availability of resources, territory, population, etc.), rather than conjuncture variables that often change depending on the current situation. This fundamentally distinguishes them from the indicators used by various rating agencies, which assess countries in terms of living standards, ease of doing business, etc. When selecting components of national power, the best world practices will be taken into account, i.e. we will use scientifically sound parameters most commonly used by reputable think tanks and researchers.
4. A number of researchers note the importance of using the integral indicator of national power as an endogenous variable in complex simulation models aimed at both explaining historical processes (reasons for the weakening of states, their rise, etc.) and analyzing the effectiveness of the state policy, and predicting further development and development of corrective actions (for example, [9]). In this regard, we will link the integral indicator of national power and a simulator of social economic dynamics for more than 100 countries of the world (Social Economic Dynamics, SED model) developed by IT company Guangzhou Milestone Software Co., Ltd with the support of the National Supercomputer Center of China and the Chinese Academy of Social Sciences into a single software and analytical complex [3], [4].
5. Integral indicators of national power for the UN member states are supposed to be calculated for the period from 2010, which will allow both carrying out their monitoring on an ongoing basis, and also forecasting using the developed software and analytical complex.

²³

Data

Data from the sources given in Table 2 were used to construct the integral index.

²⁴ Table 2. Sources of data used to calculate the index of national power of different countries of the world

Name	Internet resource
World Bank Open Data	data.worldbank.org
<i>Global Energy Statistical Yearbooks</i>	yearbook.enerdata.net

25 It should be noted that due to the discrepancy in the work of the state statistics bodies of different countries of the world, the information necessary for the calculations is received with a significant lag. So, at the moment the most recent data is limited to 2019. On the other hand, due to the peculiarities of the indicators used, which are not particularly affected by the current conjuncture, it can be assumed that the results obtained remain relevant for several years. Nevertheless, using the SED complex developed by us, we can calculate national power indicators for 2020 and give its forecast until 2025 depending on the most likely scenario of world dynamics from our point of view.

26 We will list the proposed indicators grouped by thematic blocks:

27 1. Geographical characteristics

- 28 • Land area (sq. km)
- Agricultural land (sq. km)
 - Forest area (sq. km)

29 2. Natural resources

- 30 • Gold reserves (in tons)
- Natural gas reserves (tcf)
 - Oil reserves (billion barrels)

31 3. Population and labor

- 32 • Population, total
- Labor force, total
 - Life expectancy at birth, total (years)

33 4. Economic indicators

- 34 • GDP converted by PPP (US\$)
- Steel production (tonnes)
 - Corn production (tonnes)
 - Industry (including construction), value added (US\$)
 - Gross fixed capital formation (US\$)
 - Broad money (% of GDP)

35 5. Armed forces

- 36 • Military expenditure (US\$)
- Armed forces personnel, total

- 38 • Researchers in R&D (people)
- Technicians in R&D (people)
- Research and development expenditure (% of GDP)
- High-technology exports (current US\$)
- Scientific and technical journal articles

39

Calculations

The most suitable method of convolution of the array of indicators is factor analysis, which allows reducing the dimension of the original data set and obtain a combined variable. Principal component analysis (PCA) was applied when using this method of multivariate processing of statistical information. We would also note that all variables were standardized using a z-score before carrying out factor analysis.

40 The procedure for processing the original array consists of two stages.

Stage 1. Calculation of integral indices for each of the above groups.

Stage 2. Calculation of indicators of national power by convolution of group integral indices.

41 All the listed indices and indicators were obtained for 193 UN member states, but to save space, in the resulting tables, we will consider only the first fifteen leading countries, and we will give information for all states in the form of an information map of the world colored depending on the corresponding values. Calculations will be carried out for each year in the interval from 2010 to 2020.

42 Integral indices of the first group are given in Table 3. Numerical values are dimensionless values of the main component calculated in the process of factor analysis and further normalized so that the sum of this indicator for all 193 countries is equal to 100. So, we will clearly see the percentage of the corresponding country on a global scale, and the last row of the Table represents the sum of the integrator under consideration for 15 leading countries. Tables 4, 6, 8, 10, 11 and 12 were created according to the same principle.

43 Table 3. Integral indices of the first group of indicators (“geographical characteristics”) for 15 leading countries

Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Russia	12,57	12,50	12,50	12,50	12,50	12,52	12,52	12,52	12,53	12,35	12,35
China	7,67	7,63	7,64	7,65	7,65	7,73	7,73	7,74	7,76	7,68	7,68
USA	7,59	7,53	7,55	7,54	7,54	7,55	7,55	7,55	7,55	7,45	7,45
Brazil	7,48	7,44	7,44	7,45	7,46	7,47	7,46	7,47	7,48	7,20	7,20
Canada	6,27	6,23	6,23	6,23	6,22	6,23	6,23	6,23	6,23	6,07	6,07
Australia	6,00	6,01	5,99	5,96	6,00	5,84	5,86	5,86	5,81	5,78	5,78
India	2,53	2,51	2,51	2,52	2,52	2,52	2,52	2,52	2,52	2,49	2,49
Kazakhstan	2,25	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,21	2,21
Argentina	2,09	2,08	2,08	2,08	2,08	2,08	2,08	2,08	2,08	2,06	2,06
Democratic Republic of the Congo	1,91	1,90	1,90	1,90	1,89	1,89	1,89	1,89	1,89	1,79	1,79
Saudi Arabia	1,79	1,78	1,78	1,78	1,78	1,78	1,78	1,76	1,76	1,76	1,76

Mexico	1,70	1,69	1,69	1,69	1,69	1,69	1,69	1,67	1,67	1,67	1,67
Indonesia	1,54	1,54	1,53	1,53	1,53	1,53	1,53	1,57	1,57	1,57	1,57
Algeria	1,35	1,34	1,34	1,34	1,34	1,34	1,34	1,32	1,32	1,32	1,32
Mongolia	1,30	1,29	1,29	1,29	1,29	1,29	1,28	1,28	1,28	1,28	1,28
Total index for 15 countries	64,04	63,71	63,71	63,70	63,73	63,70	63,70	63,70	63,69	62,68	62,68

⁴⁴ The indicators of the first group are quite expectedly stable over the period under consideration, therefore they can be interpreted practically as constants, and only the shares of the leading states are of interest. Also, we would like to note that the latter covers 62.68% of the resources listed above.

⁴⁵ We included data on the reserves of the most valuable natural resources (gold, oil, and gas) in the second group of indicators and the calculated values of the corresponding integral indices are given in Table 4.

⁴⁶ Table 4. Integral indices of the second group of indicators (“natural resources”) for 15 leading countries

Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
USA	20,60	21,27	21,60	21,01	21,34	21,47	20,91	21,03	21,62	21,31	21,21
Russia	10,10	9,67	9,46	9,68	9,58	9,67	10,21	10,52	10,64	10,97	10,95
Germany	8,06	8,32	8,42	8,20	8,30	8,32	8,17	8,21	8,33	8,16	8,13
Italy	5,80	5,99	6,07	5,93	6,01	6,04	5,93	5,97	6,06	5,96	5,93
France	5,75	5,94	6,02	5,88	5,96	5,99	5,89	5,92	6,02	5,91	5,89
China	3,09	3,12	3,12	3,21	3,27	4,48	5,14	5,21	5,30	5,45	5,46
Iran	5,65	5,13	5,39	5,46	5,17	4,89	4,95	4,69	4,29	4,05	4,07
Qatar	4,48	4,06	3,81	3,79	3,56	3,30	3,35	3,20	2,91	2,80	2,80
Switzerland	2,45	2,54	2,57	2,51	2,54	2,56	2,51	2,53	2,57	2,52	2,51
Saudi Arabia	3,20	3,04	2,94	2,95	2,83	2,70	2,74	2,66	2,47	2,36	2,40
Japan	1,81	1,87	1,90	1,85	1,87	1,88	1,85	1,86	1,89	1,86	1,85
India	1,52	1,55	1,57	1,55	1,57	1,57	1,53	1,52	1,59	1,80	1,79
Venezuela	2,15	2,51	2,48	2,79	2,67	2,40	2,17	2,06	1,82	1,72	1,72
Netherlands	1,69	1,71	1,71	1,66	1,63	1,62	1,58	1,59	1,60	1,56	1,50
Kazakhstan	0,71	0,67	0,72	0,78	0,85	0,92	1,00	1,08	1,17	1,28	1,28
Total index for 15 countries	77,05	77,39	77,77	77,25	77,15	77,83	77,91	78,06	78,26	77,72	77,50

⁴⁷ The USA ranks the first because of the largest reserves of gold (more than 8 thousand tons), and this circumstance explains the high ranks of Germany, Italy, France, China, Switzerland, Japan and India, which also have significant reserves of this metal. Russia, being an undisputed leader in natural gas reserves (about 24% of the world), in total occupies the second line of the world ranking due to lower indicators of oil reserves (8th place) and gold (5th place). The index values for it could be higher, if we supplemented the second group with data on diamond reserves (first place in the world with an approximate volume of 650 million carats³) and 17 rare earth elements (fourth place in the world⁴), but statistics on these resources, in view of their rarity, is collected for a narrower range of countries (about 10), and therefore the use of these data for factor analysis may lead to incorrect results.

⁴⁸ Next, we will present data on weight coefficients for the second group of indicators, based on which we can conclude that the influence of the indicator "gold reserves" is gradually increasing while the values of the other two are decreasing (Table 5).

Table 5. Weight coefficients of the second group of indicators

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gold reserves	0,203	0,227	0,241	0,236	0,251	0,266	0,26	0,271	0,298	0,309	0,307
Natural gas reserves	0,415	0,408	0,404	0,403	0,398	0,396	0,399	0,397	0,395	0,393	0,393
Oil reserves	0,382	0,366	0,355	0,362	0,352	0,339	0,341	0,332	0,307	0,298	0,300

In turn, integral indices of the third group of indicators are given in Table 6.

Table 6. Integral indices of the third group of indicators (“population and labor”) for 15 leading countries

Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
China	21,14	20,99	20,85	20,68	20,52	20,35	20,19	20,03	19,86	19,70	19,65
India	16,92	16,90	16,87	16,90	16,93	16,94	16,95	16,95	16,96	16,80	16,73
USA	4,65	4,63	4,61	4,58	4,56	4,54	4,52	4,50	4,48	4,47	4,48
Indonesia	3,56	3,58	3,60	3,60	3,60	3,60	3,60	3,62	3,63	3,67	3,69
Brazil	2,90	2,89	2,90	2,89	2,89	2,88	2,87	2,87	2,87	2,88	2,82
Pakistan	2,38	2,41	2,44	2,47	2,49	2,53	2,55	2,58	2,61	2,62	2,64
Nigeria	2,07	2,10	2,13	2,17	2,20	2,23	2,27	2,30	2,34	2,39	2,41
Bangladesh	2,04	2,04	2,05	2,05	2,06	2,06	2,06	2,09	2,09	2,11	2,09
Russia	2,18	2,16	2,14	2,11	2,09	2,07	2,04	2,01	1,99	1,96	1,96
Japan	1,94	1,91	1,89	1,87	1,84	1,82	1,80	1,79	1,76	1,76	1,76
Mexico	1,63	1,64	1,65	1,65	1,65	1,66	1,66	1,66	1,67	1,67	1,65
Ethiopia	1,27	1,29	1,32	1,35	1,37	1,40	1,42	1,45	1,47	1,49	1,51
Vietnam	1,39	1,39	1,39	1,40	1,40	1,40	1,39	1,39	1,39	1,39	1,39
Philippines	1,32	1,34	1,34	1,35	1,36	1,37	1,37	1,36	1,37	1,38	1,39
Egypt	1,10	1,11	1,13	1,14	1,15	1,15	1,16	1,17	1,18	1,18	1,19
Total index for 15 countries	66,49	66,38	66,31	66,21	66,12	65,99	65,86	65,77	65,67	65,47	65,37

Due to the large population and labor force, China and India are among the leaders in the ranking. As expected the United States of America, Indonesia and Brazil rank high, and in aggregate 15 leading countries in the group of indicators "population and labor" cover an average of 65-66%% world human resources. We would like to note for information note that the averaged weight coefficients of the first two variables (population and labor force) for the period under consideration were 0.485 each, and the last factor, life expectancy, affects the integral index in accordance with the values given in Table 7.

Table 7. Weight coefficients of the factor “life expectancy at birth”

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
0,039	0,036	0,035	0,032	0,030	0,028	0,026	0,024	0,024	0,022	0,021

It can be concluded that the latter factor not only practically does not affect the integral index, but its weight is constantly decreasing. Next, let us consider the integral indices of the fourth group given in Table 8.

Table 8. Integral indices of the fourth group of indicators (“economic indicators”) for 15 leading countries

Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
China	14,98	15,93	16,83	17,69	18,39	19,33	19,58	20,04	20,77	20,78	20,78
USA	17,15	16,41	16,39	16,25	16,30	16,74	16,51	16,23	16,06	16,04	16,03
India	5,35	5,30	5,36	5,44	5,68	6,08	6,41	6,64	6,81	6,77	5,84
Japan	6,09	5,80	5,70	5,27	5,00	4,93	4,98	4,74	4,44	4,54	4,53

Germany	3,99	3,99	3,79	3,77	3,78	3,65	3,70	3,68	3,66	3,67	3,64
Russia	3,08	3,44	3,51	3,42	3,19	2,78	2,68	2,77	2,76	2,82	2,83
Indonesia	2,12	2,17	2,22	2,23	2,24	2,30	2,37	2,39	2,41	2,31	2,37
France	2,82	2,75	2,60	2,60	2,53	2,43	2,42	2,39	2,37	2,43	2,33
UK	2,56	2,45	2,41	2,42	2,46	2,48	2,39	2,34	2,30	2,37	2,27
Brazil	3,13	3,14	3,02	2,98	2,87	2,58	2,41	2,37	2,27	2,15	2,12
The Republic of Korea	1,84	1,79	1,75	1,73	1,74	1,79	1,80	1,99	1,96	1,87	1,91
Italy	2,46	2,37	2,17	2,09	2,00	1,94	1,97	2,05	2,04	1,94	1,84
Mexico	1,92	1,96	1,96	1,91	1,91	1,88	1,84	1,93	1,87	1,84	1,77
Turkey	1,36	1,45	1,47	1,55	1,59	1,65	1,65	1,73	1,65	1,61	1,60
Canada	1,81	1,79	1,76	1,74	1,70	1,55	1,55	1,60	1,55	1,50	1,46
Total index for 15 countries	70,67	70,74	70,94	71,08	71,38	72,12	72,26	72,90	72,93	72,62	71,31

56 What calls attention to itself is the change in the position of two clear leaders - the United States of America and China, which occurred in 2012 and is largely due to the fact that China overtook its main competitor in a number of indicators, primarily in terms of GDP calculated taking into account purchasing power parity (PPP). We would also note that the gap between these countries increases every year. In general, the influence of the leading states in the economic sphere increases from year to year, and in 2020 their total index was 71.31. Additionally, we would like to present weight coefficients for the fourth group of indicators calculated in the process of factor analysis (Table 9). As you can see, the influence of the indicator "steel production" constantly increases; at the same time the value of "grain production" decreases. It is also important to note that such indicators as "GDP by PPP", "Gross value added in industrial production" and "Gross fixed capital formation" have the highest factor load.

57 Table 9. Weight coefficients of the fourth group of indicators

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
GDP converted by PPP	0,185	0,184	0,184	0,184	0,185	0,183	0,184	0,184	0,184	0,186	0,187
Steel production	0,166	0,171	0,17	0,172	0,173	0,172	0,172	0,174	0,174	0,175	0,176
Corn productio	0,167	0,162	0,164	0,164	0,163	0,164	0,163	0,156	0,156	0,161	0,157
Industry (including construction), value added	0,186	0,187	0,187	0,188	0,187	0,187	0,187	0,186	0,186	0,189	0,189
Gross fixed capital formation	0,188	0,189	0,188	0,188	0,187	0,186	0,186	0,185	0,185	0,188	0,188
Broad money (% of GDP)	0,108	0,107	0,107	0,104	0,105	0,108	0,108	0,115	0,115	0,102	0,103

58 Table 10 shows integral indices of the fifth group, which show the superiority of the United States of America over all other countries, although it is also necessary to pay attention to the twofold increase in the share of China over the period under consideration. It should be noted that nuclear weapons, which, of course, would change the balance, are not considered as an indicator, but the probability of their use is minimal.

59 Table 10. Integral indices of the fifth group of indicators ("armed forces") for 15 leading countries

Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
USA	43,10	41,28	39,62	36,95	35,21	36,55	37,01	35,95	36,62	36,27	35,97
China	7,14	8,01	9,11	10,39	11,59	13,13	13,32	13,52	14,11	14,56	15,14
India	2,85	2,88	2,73	2,74	2,94	3,15	3,49	3,83	3,75	3,72	3,71
Russia	3,62	4,08	4,71	5,10	4,89	4,07	4,27	3,95	3,47	3,48	3,47
Saudi Arabia	2,79	2,82	3,27	3,87	4,66	5,35	3,93	4,18	3,81	3,62	3,46
France	3,81	3,75	3,47	3,61	3,67	3,39	3,54	3,59	3,60	3,49	3,43

Germany	2,86	2,79	2,69	2,65	2,66	2,44	2,56	2,69	2,79	2,74	2,72
UK	3,59	3,50	3,38	3,28	3,42	3,30	2,97	2,76	2,82	2,61	2,61
Japan	3,37	3,53	3,47	2,83	2,71	2,58	2,87	2,69	2,63	2,58	2,55
The Republic of Korea	1,74	1,80	1,85	1,98	2,17	2,24	2,27	2,32	2,43	2,36	2,35
Brazil	2,10	2,14	1,97	1,90	1,89	1,51	1,49	1,74	1,57	1,45	1,45
Italy	1,98	1,96	1,72	1,73	1,60	1,36	1,54	1,57	1,57	1,44	1,44
Australia	1,43	1,54	1,52	1,43	1,49	1,47	1,63	1,64	1,51	1,39	1,39
Canada	1,19	1,24	1,18	1,07	1,03	1,10	1,10	1,27	1,22	1,19	1,19
Turkey	1,11	1,00	1,04	1,08	1,03	0,97	1,10	1,06	1,07	1,10	1,10
Total index for 15 countries	82,68	82,34	81,73	80,61	80,95	82,62	83,09	82,75	82,96	81,99	81,98

⁶⁰ Integral indices of the sixth group are given in Table 11. Here one can see that China is far ahead, which is due to its leadership in the export of high-tech products.

⁶¹ Table 11. Integral indices of the sixth group of indicators (“science and innovation”) for 15 leading countries

Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2017	2018
China	23,81	24,82	26,58	27,89	27,27	28,31	26,46	27,62	27,98	28,13	28,24
Germany	9,06	9,34	9,13	8,93	9,02	8,67	9,10	8,29	8,46	8,19	8,20
The Republic of Korea	6,63	6,13	5,85	6,10	6,22	6,39	6,05	7,04	7,78	7,43	7,58
USA	8,48	7,79	7,72	7,32	7,48	7,74	7,86	6,63	6,31	6,43	6,41
Singapore	6,62	6,08	6,11	6,11	6,07	6,05	6,04	6,21	6,27	5,99	5,93
France	5,34	5,19	5,14	5,07	5,06	4,78	4,87	4,62	4,75	4,75	4,74
Japan	6,53	6,13	5,81	4,74	4,49	4,28	4,42	4,49	4,48	4,45	4,28
Malaysia	3,30	3,06	2,98	2,85	2,96	2,80	2,81	3,13	3,65	3,48	3,43
Netherlands	3,90	3,90	3,65	3,74	3,80	3,03	3,18	3,32	3,46	3,33	3,25
UK	3,38	3,52	3,32	3,21	3,21	3,28	3,34	3,17	3,09	3,07	3,05
Mexico	2,47	2,40	2,58	2,49	2,62	2,66	2,77	2,92	2,89	2,96	2,96
Belgium	1,71	1,68	1,71	1,86	1,90	1,77	1,79	1,65	1,60	1,44	1,43
Ireland	1,17	1,28	1,17	1,06	1,08	1,33	1,69	1,55	1,57	1,46	1,45
Italy	1,49	1,57	1,34	1,38	1,39	1,32	1,39	1,35	1,28	1,29	1,26
Canada	1,37	1,29	1,51	1,39	1,23	1,25	1,19	1,27	1,27	1,20	1,16
Total index for 15 countries	85,26	84,18	84,60	84,14	83,80	83,67	82,96	83,26	84,84	83,60	83,35

⁶² The total index of the fifth and sixth groups of indicators of the leading states significantly exceeds the same indicator for the first, third and fourth groups and covers more than 80% of the global volume.

⁶³ And, finally, let us present the results of calculating *integral indicators of national power* obtained by the convolution of group indices, also carried out using factor analysis. As shown in Table 12, at the moment there are two leaders in the world - the United States of America and China. The gap between them is relatively small, and the change in their positions depends on the current economic situation. As for Russia, at the moment it ranks fourth among 193 UN member states, although until 2014 it ranked third. The decline in positions is due to the deterioration of indicators of all groups (except for the first and second ones) associated with the sanctions imposed by Western nations. Additionally, it should be noted that the gap between the third and fourth positions is also minimal, like with two leading countries (Fig. 1).

⁶⁴ Table 12. Integral indicators of national power for 15 leading countries

Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
China	12,86	13,38	14,04	14,66	14,94	15,75	15,60	15,92	16,26	16,44	16,55

USA	17,51	17,02	16,77	16,14	15,95	16,33	16,30	15,90	16,02	16,11	15,92
India	4,79	4,84	4,83	4,89	4,99	5,09	5,20	5,36	5,42	5,31	5,26
Russia	5,19	5,24	5,33	5,40	5,28	5,07	5,14	5,14	5,05	5,04	5,06
Germany	4,33	4,39	4,30	4,20	4,23	4,13	4,22	4,10	4,15	4,15	4,14
France	3,25	3,23	3,15	3,12	3,13	3,03	3,06	3,03	3,05	2,98	2,96
Japan	3,50	3,41	3,33	2,95	2,83	2,76	2,84	2,77	2,70	2,62	2,62
Brazil	2,65	2,65	2,61	2,60	2,57	2,43	2,39	2,42	2,37	2,35	2,33
The Republic of Korea	1,86	1,79	1,76	1,84	1,90	1,96	1,91	2,07	2,22	2,16	2,15
Italy	2,21	2,22	2,11	2,06	2,03	1,97	2,02	2,01	2,00	2,01	1,95
Canada	1,99	1,96	1,96	1,93	1,87	1,84	1,82	1,81	1,80	1,79	1,78
UK	1,98	1,97	1,91	1,88	1,92	1,91	1,84	1,79	1,76	1,72	1,70
Saudi Arabia	1,62	1,62	1,68	1,79	1,91	2,00	1,75	1,75	1,66	1,55	1,55
Australia	1,60	1,63	1,57	1,56	1,56	1,49	1,51	1,52	1,53	1,51	1,51
Indonesia	1,41	1,43	1,47	1,46	1,44	1,45	1,46	1,46	1,44	1,46	1,47
Total index for 15 countries	66,76	66,77	66,83	66,47	66,54	67,22	67,05	67,05	67,44	67,21	66,95

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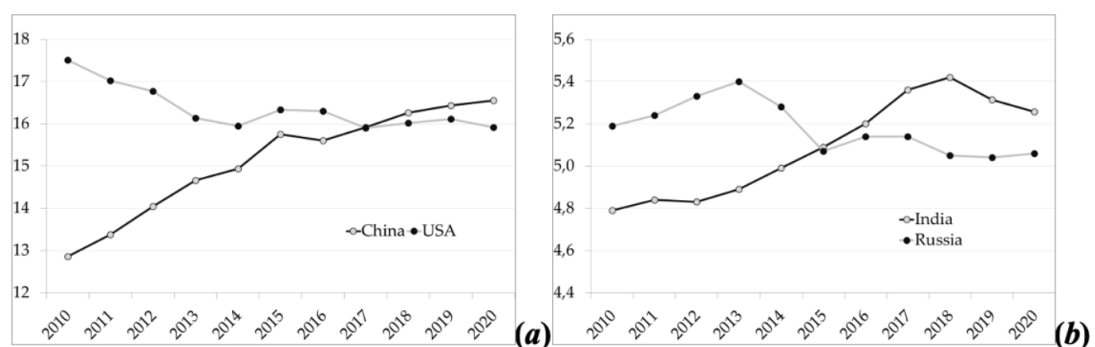


Fig. 1. Integral indicators of national power for the USA and China (a), Russia and India (b)

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Let us present data on the values of integral indicators of national power for all countries considered in the study. In order to save space, we will present the data in the form of a figure colored depending on the corresponding values (Fig. 2). As you can see, the modern world is obviously becoming multipolar - the USA and some European countries on the one hand, and China and a number of Asian states on the other hand, moreover, India, Russia and Germany are potential points of formation of new poles of power. The gap between two clear leaders is relatively small, and the change in their positions depends on the current economic situation. The fundamental issue is the effective use of its potential in order to strengthen state sovereignty and the level of national security.

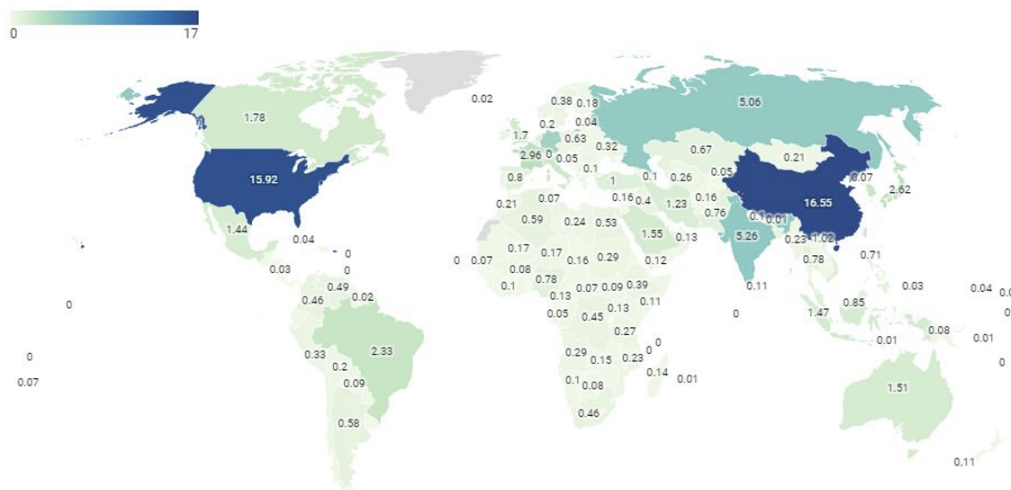


Fig. 2. Integral indicators of national power for all countries of the world in 2020

Also, the values of weighting factors given in Table 13 are of interest. As you can see, the influence of groups of indicators "geographic characteristics" and "natural resources" is decreasing, while the influence of groups "armed forces" and "population and labor" is increasing.

Table 13. Weight coefficients for five groups of indicators

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Group 1 «Geographical characteristics»	0,150	0,150	0,150	0,150	0,149	0,147	0,146	0,143	0,144	0,143	0,142
Group 2 «Natural resources»	0,167	0,166	0,163	0,161	0,159	0,161	0,163	0,162	0,159	0,159	0,158
Group 3 «Population and labor»	0,147	0,149	0,150	0,152	0,152	0,153	0,153	0,156	0,156	0,156	0,157
Group 4 «Economic indicators»	0,203	0,203	0,203	0,202	0,201	0,200	0,199	0,200	0,198	0,200	0,201
Group 5 «Armed forces»	0,172	0,172	0,173	0,176	0,178	0,177	0,177	0,178	0,180	0,180	0,180
Group 6 «Science and innovation»	0,160	0,160	0,160	0,160	0,161	0,162	0,163	0,161	0,162	0,162	0,162

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Forecast

In conclusion we want to give a forecast of the indicator of national power until 2025 depending on the most likely scenario of world dynamics from our point of view.

Scenario description: Suppose that in the short and medium term the previously outlined trends - the strengthening of China, the regionalization of global production chains and the escalation of multipolarity - will persist. Trade has been one of the most powerful factors of economic growth, the interdependence of countries participating in international trade constantly grows, and the states leading in terms of exports and imports strongly influence the development of the entire world economy. The largest trading partner of the USA - China - exported goods worth \$ 435.4 billion in 2020, while imports totaled to \$ 124.6 billion. So, the trade deficit between the USA and China amounted to \$ 310.8 billion (the maximum value was in 2018 - \$ 418.9 billion), i.e. about 34% of the total negative US trade balance (Fig. 3). The same situation, but on a smaller scale, is typical for other trade partners of the United States of America -

Mexico, Japan, Germany. The US administration sees the solution to the problem in the introduction of customs barriers - the establishment of import duties, technological requirements, etc. After the outbreak of the trade war between the USA and China in 2018 the situation with the unfavorable visible trade of balance in the United States began to improve (Fig. 3), however, at the moment it is still too early to tell that the trend has developed.

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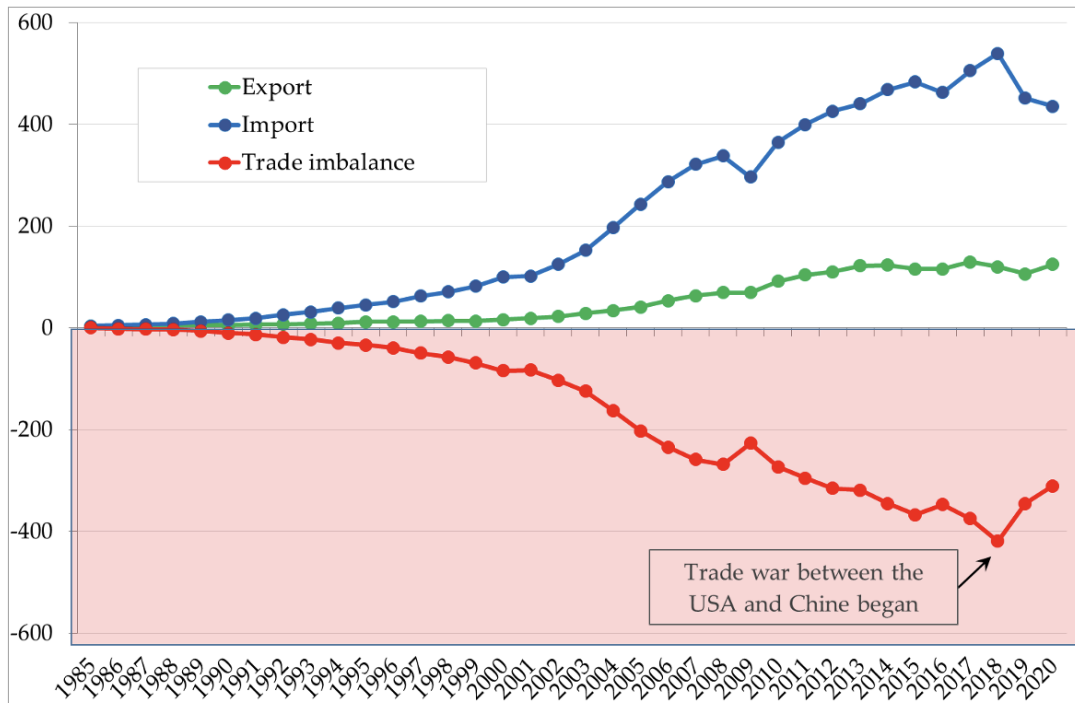


Fig. 3. Commodity trade between the USA and China. Source: US Census Bureau data: <https://www.census.gov/foreign-trade/balance/c5700.html>

73 The volume of world trade in 2021, according to our forecasts, may grow by 7%, but at the same time, due to the assumption made about further regionalization, there will be a redistribution of trade flows between key trading partners. The scenario envisages a gradual transfer of production capacities from China partly to the USA and EU countries, but also in order to minimize costs to developing countries (India, Brazil, Mexico, etc.). This process began before the coronavirus pandemic, which only highlighted the correctness of the chosen strategy from the standpoint of US national security. On the one hand, the relocation of a part of production facilities to the United States from China will entail the creation of additional jobs, but on the other hand it may negatively affect the cost of production. In turn, China, in accordance with the tasks declared in the 14th five-year plan, will continue its policy of stimulating domestic demand. According to the energy strategy until 2035, Russia will strive to increase its share in the markets of the Asia-Pacific region due to the likely reduction in supplies to the EU countries.

74 Summing up the above, we would like to note that within the framework of the scenario we calculate the consequences of a gradual change in global trade chains, further development of the poles of world power, their mutual influence and impact on other world leaders in the medium term. Specifically, in the model we will consider the following events until 2025: (1) A gradual reduction in the trade imbalance between the

United States of America and China by 5% per year; (2) Increased trade between the USA and EU countries on the one hand and India, Vietnam, Mexico and Brazil on the other hand. Trade is expected to grow with an average growth rate of 5% per year; (3) Increase in domestic demand in China by 6% per year. (4) Increase in the share of APR countries in the total volume of oil and oil products exports in Russia up to 40% by 2025.

⁷⁵ Of course, the changes put into the scenario cover only a part of the global shifts taking place in the world. Taking into account the growing fluctuations in social, economic and political spheres, which greatly complicate any forecasts, we will take into account only the most important, in our opinion, trajectories of world development. Also, in our opinion, it does not make much sense to predict single indicators such as GDP, CPI, etc. subject to a strong conjuncture, but a more complex indicator “national power”, which characterizes the geopolitical situation in the world, should be considered.

⁷⁶ We carried out calculations until 2025, and we would like to present values of the abovementioned indicator at the end of the forecast period (Fig. 5). The results obtained showed that in the medium-term China continues to strengthen its power (compared with the data in Fig. 4) and takes on 16.84% of the world's power, thus increasing the gap with the United States of America. The rest of the monitored 13 world leading countries practically did not change their weight, and the remaining 178 UN member states account for only 32.91% of the world power. Also, the national security indicators for the USA and a number of European countries (Switzerland, Austria), Russia and Japan decreased slightly, which is associated not only with changes in global trade chains, but also with processes associated with depopulation and aging of the population.

⁷⁷ So, we can conclude that the rupture of global chains and regionalization primarily strengthen China and weaken the USA. Please note that the calculations did not take into account the possibility of a gradual abandonment of the US dollar in case of a change in the vector of trade relations, which may also further weaken the USA.

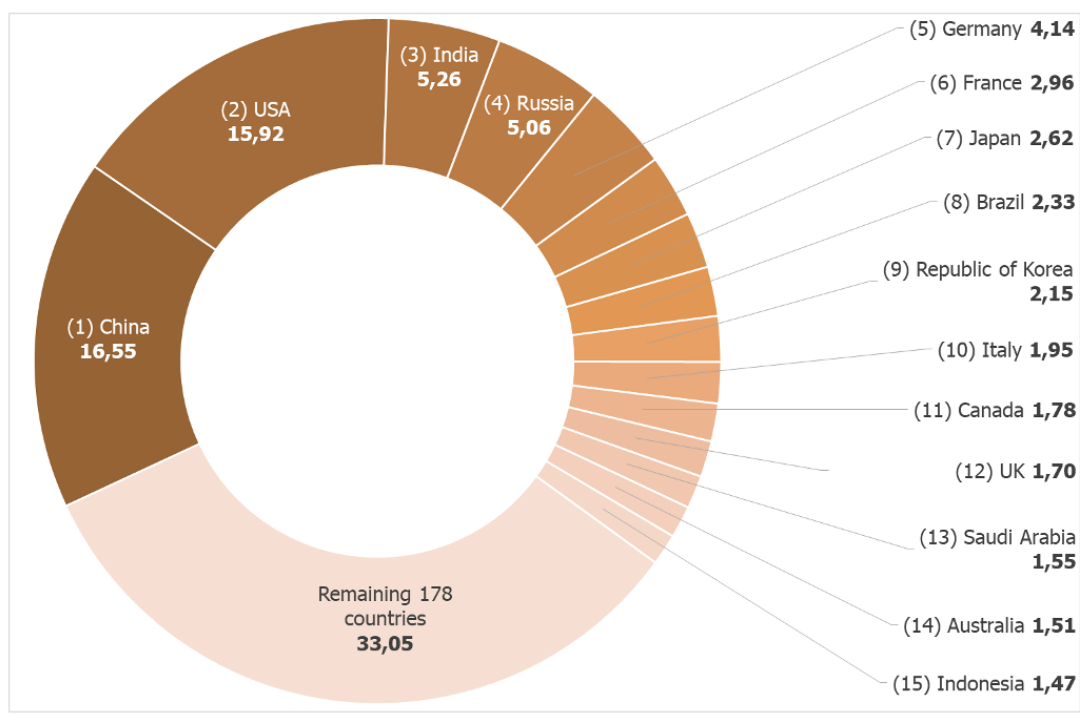


Fig. 4. Integral indicators of national power for 15 leading countries for 2020

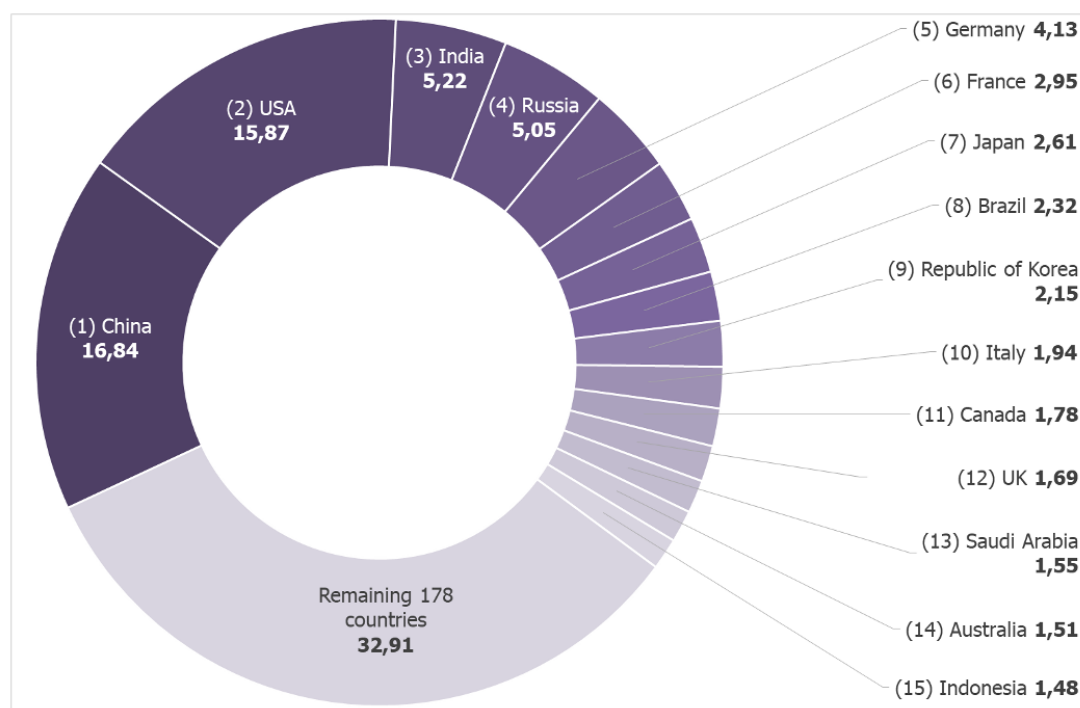


Fig. 5. Integral indicators of national power for 15 leading countries by 2025

Main conclusions

1. The use of methods of multivariate statistical analysis when assessing the contribution of factors to the integral indicator of national power made it possible to somewhat remove the problem of subjectivity.

2. The position of some countries in the abovementioned assessment differs from positions in other ratings, since indicators that determine, first of all, the country's potential (availability of resources, territory, population, etc.), and not market variables that often change depending on the current situation were used to measure national power. The most important task is to competently manage the available potential.
 3. At the beginning of this article, when reviewing the most cited studies, we mentioned that a number of influential American foreign policy strategists highlighted the extreme importance of taking psychological factors into account when assessing national power. These include such components as the level of patriotism and national cohesion, indicators of social integration, political stability, etc. Countries with high values of these indicators are less vulnerable, and the undermining of these factors entails a serious weakening of the state under consideration. At the same time, it was noted that it was extremely difficult to quantify them and then link them with other indicators.
 4. The current geopolitical configuration and the existing system of economic ties in the medium term will continue to strengthen China and weaken the USA. Most countries are slightly sensitive to changes in the trade imbalance between the two main world leaders. India, Russia and Germany still remain potential points of attraction for the formation of new centers of power. In general, we would like to note that there is a high probability that there will be no drastic changes in the global geopolitical situation.
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Примечания:

1. Center for Strategic and International Studies that works on orders of the US government
 2. The information in this table is based on the data provided by Höhn Karl Hermann [1], Sayed Hadi Zarghani [17], as well as the data available on the Internet in the most cited publications in this area as of February 2021.
 3. According to one of the world's largest statistics portals - Statista ([>>>>](#))
 4. According to United States Geological Survey, [>>>>](#)
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Modeling and Assessment of National Power of Different Countries all over the World

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Abstract

The article continues the work on the assessment, monitoring and forecasting of national power integral indicators. National power is the most informative and popular indicator characterizing the total potential of a particular country, which allows comparing the level of its military power and socio-economic development with other countries. Modeling and assessment of the national power indicator is extremely important for adjusting strategic documents related to the country's long-term development, as well as its foreign policy. In many countries, the national security indicator is assessed by a narrow circle of experts or using the average results of surveys conducted with a wider number of respondents. Subjectivity is the disadvantage of this approach. In this paper, the authors provide a scientifically based methodology for modeling and assessing national power. The results of calculating the integral indicators of national power were obtained using the methods of multivariate static analysis. In conclusion we give a forecast of the indicator of national power until 2025 depending on the most likely scenario of world dynamics from our point of view.

Keywords: national power, geographical characteristics, natural resources, population and labour, environmental indicators, armed forces, science and innovation, factor analysis, integrated index, multivariate statistical analysis

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