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BONN POWER SHIFT MONITOR 2022

Contents

Executive Summary	2
Power Shifts between 2016 - 2020 at a Glance	5
Global Perspective	7
Key Findings	11
Selected Country Reports	13
United States of America	13
China	14
Russia	15
Germany	17
Saudi Arabia	18
United Kingdom	19
Bonn Power Shift Monitor Methodology	20
Index of Abbreviations	25
Bonn Power Shift Monitor Data Table	26

Executive Summary

Until the end of the Cold War, there was an understanding that power rested on two dominant ideas of how life should be organized – liberalism or communism. These competing world views found their way into every military and economic conflict during the second half of the 20th century. From this bipolar power balance, the world order was assumed to be unipolar and has now transformed to a multipolar power system. Research on what power between states means has expanded in the last decades and power has been dissected into hard, soft, structural and smart power. However, focusing on only one aspect or index, undermines the multifaceted nature of power. The Center for Global Studies (CGS) introduces the updated version of their eclectic model to explore and measure power. Power remains defined as the ability of a nation to assert national interest and preferences in international affairs due to beneficial resources that may vary in different decision-making situations. The 2022 version of the Bonn Power Shift Monitor (BPSM) includes eight indicators, two being replaced by new indicators to better fathom the entirety of power. The BPSM is designed to reflect the growing importance of soft and structural power. Therefore, it is deemed necessary to include such markers in the BPSM for it to remain current. The UNESCO world heritage sites, maritime Choke Points and number of total reserves held by a country were therefore included, whilst the indicators exports of goods and exports of services were combined. Due to lacking explanatory power, the total number for military troops as well as total number of scientific publications were excluded.

The focus of the BPSM lies on uncovering power shifts. In contrast to traditional power measures, which are more interested in the status quo and only sometimes comment on how a power score might change, the BPSM allows focuses on both absolute and relative power shifts. This then enables comments for the robustness of a countries power score. To identify the scope and pace of power shifts domestic and transnational influences are included in the analysis. This becomes increasingly important as both pace and scope can change over time according to outside influences but determine the future global power system.

Commonly known as the G20, 19 countries plus the European Union, these political, societal, academic, and economic stakeholders combine the largest economic markets and political global rule-setters. As the European Union does not qualify as a

state and the Power Shift Monitor aims to analyze the power shift between states, it is not included in the BPSM.

The first section of the publication will focus on the striking trends in power shifts among the G19 between 2016 and 2020 and an analysis of trends across the eight BPSM categories. This shall underscore power alterations in the last five years. Following the structure of the last BPSM, subsequently five of the 19 countries within the BPSM are further dissected. The profiles as well as the other G20 member state's reports and further analysis are available on our website. The BPSM only uses freely available data, applied through unpretentious calculation methods, which shall be further explained in the methodology chapter. Only including public data underscores the transparency and accessibility. The BPSM is dedicated to reflecting the most recent data, which usually becomes accessible with a two year time lag in "open" data. The selected time frame is due to the update of the different data bases, but again allows for the study of alterations in the distribution of global power.

The updated BPSM is a useful tool, delving into global power shifts, to carry substantial analysis and customize one's own research. The ten key findings, showcased in this publication of the BPSM, can be summarized as follows:

1. Only five out of the G20 individual countries performed above average both individually and globally from 2016 to 2020.

China, India, Germany, Mexico, and Italy are the only countries out of the individual G20 states, which could record a positive shift from 2016 to 2020 both concerning the Power Shift Rate as well as the Rate of Country Change. A distinct regional trend is not visible as the European, the Asian and the Central American region are represented in the top 5 winners. Among the five Italy (30.15), Mexico (29.56), and India (20.85) bank the best country specific performance, further proving the increase importance of emerging countries such as Mexico and India.

2. The US remains the most powerful country

The United States of America has lost the highest margin of absolute power from 2016 to 2020, dropping from 17.65 to 17.19. However, due to a steep increase in reserves and military expenditures as well as their continuous high level of power, the United States remained the most powerful country in the world. This is in line with the documented general decline of US relative power shares.

3. China remains biggest gainer of global shares.

China's power share gain of +0.76 (PSR) from 12.56 (2016) to 13.32 (2020) can be attributed to the increase in GDP, Fortune 500 companies, exports and military expenditures. One would expect, a high Indicator Change Rate of total reserves, however, it is rather low (+8.38), especially in contrast to India (+63.18), Russia (+58.27) and the United States (+54.79). The current numbers suggest that China will overtake the USA as the most powerful country worldwide no sooner than 2035.

4. Regarding the Trend from 2016 to 2020, with 6.62%, India has gained the highest percentage of power of all countries.

India can report the highest margin of percentual power growth over all individual G20 countries. Although its absolute power gain leaves India only at place 7 in the total ranking (+3.64 PSR in 2020), the increase of +6.62% from 2016 to 2020 is the highest among all the nations. The large Power Shift Rate can be attributed to the gain in number of total reserves held by a country (+63.18) as well as the military expenditures (+16.68). In comparison, China, who is the top gainer in global power shares, only gained the second highest percentage of power (+6.04%) between 2016 and 2020.

5. Between 2016 and 2020 Saudi Arabia lost biggest percentage of power again.

Saudi Arabia lost -10.57% of power between 2016 and 2020. This can be attributed to sinking numbers in the total number of Reserves the country holds and low level of military expenditures both absolute and relative. As Saudi Arabia is regarded as a nation high in resources and with a strong focus on military, the decrease in especially those numbers is surprising. The importance a country's reserve is evident again in the power score of Brazil. Brazil lost -8.75% of power between 2016 and 2020, the most influential

numbers being the decrease in total number of reserves and number of universities. Both Brazil and Saudi Arabia, with the exception of a small peak in 2018, have continuously lost power between 2016 and 2020.

6. Within the European region only Germany and Italy gained power shares.

Although France, the United Kingdom and Russia, as traditional powers, are still listed among the ten most powerful states in 2020, only Germany (rank 6) and Italy (rank 8) could increase their power shares between 2016 and 2020 both in absolute and relative numbers. With an increase in +1.73% Germany can attribute its power gain to higher number in total reserves, military expenditures, universities and UNESCO world heritages. As the country has come to define its power through economic prowess, the slight decrease in GDP stands in contrast to the self-image propagated by Germany. Italy's +0.45% increase of power originates mostly in the steep increase of numbers of total reserves. In comparison, France's -0.39% loss can be attributed to falling numbers in exports and the GDP, whilst Russia's -1,00% loss originates in its strongly decreased (-16,48) military expenditures. Great Britain is the biggest loser of power in the European region and second biggest loser internationally between 2016 and 2020 with a Power Shift Rate of -0.30 and a -5.43% loss, having lost shares over all indicators with the exception of the number of total reserves. This development signifies the shrinking importance of traditional European countries, whilst highlighting the emerging importance of Germany and Italy.

7. Power Shifts in Asia are mixed.

With China, Japan, South Korea and India being amongst the ten most powerful countries in 2020, the Asian region has gathered significant influence on the global power scale. However, when looking into the data, it is apparent that both South Korea (-1.24%) and Japan (-1.14%) have lost power between 2016 and 2020. This is offset by the large increase of power from China (+6.04%) and India (+6.62%), resulting in a mixed message for the entire Asian region.

8. The share of power held by the G20 individual states has declined.

Across all eight indicators it is noted that the power held by the 19 BPSM states included has declined by -0.39. This is a small margin, but it does indicate that the global weight of the G20 is transferring to other countries outside the BPSM. The decline of power originates in lower levels in exports (-1.06 in global shares of the G19) and total numbers of reserves (-2.96 in global shares of the G19), which cannot be offset by the growing global share within military expenditures (+0.38) and universities (+0.50). The global shares have decreased on average around -0.2. This low number can be attributed to the large increase in power by China and India, offsetting the twelve out of 19 countries who have slightly changed in power.

9. Comparing 2016 to 2020, the distance between the power values of the individual G20 countries has increased.

As the G19 have lost global shares of power and therefore distance to the rest of the world, the distance within the group of the individual G20 countries has increased. The power value of the countries was closest in 2018 (standard deviation 4.22), but has then increased (standard deviation 4.31), leaving the two most powerful countries, USA and China, far ahead. This standard deviation even succeeds the level of 2016, 4.29, leaving the G19 further apart than ever.

10. Anglo-Saxon and Latin American states are losing increasingly more power.

When looking at the data it is apparent that both the region of Latin America and the Anglo-Saxon world have perceptually lost the biggest power shares. Argentina's loss of -5.15% and Brazil's of -8.75 can be offset somewhat offset by the large country specific increase in power of Mexico (+3.57%). This cannot be said for the Anglo-Saxon states: The US lost -2.60%, the United Kingdom -5.43%, Canada -5.48% and Australia -4.72%. When including the rest of the data it can be said that most traditional powers and some emerging powers have lost power shares between 2016 and 2020, but the decreased influence of the US and the United Kingdom must be especially highlighted, due to their traditional importance. Looking at both the Anglo-Saxon as well as the Latin American sphere the shifting power towards Asia becomes more apparent. The results found, we recommend, should be used, by

our recommendation, to intensify research on patterns of global power shifts to further discussion on future global power players that can change and reposition the global world order. Furthermore, the BPSM advises policymakers to recognize their state's current position in the global system of states and use this knowledge to create a balanced framework for global decision-making.

All predictions are to be made cautiously, especially in regard to confrontations of power and nations. In our highly globalized world, any rapid power shifts can have grave impact, the same is to be said about probable conflicts. Assumptions made hastily or thoughtlessly could lead to rapid and risky decision-making.

Power Shifts between 2016 and 2020 at a Glance

The nineteen individual states of the G20 are the starting point for our power shift analysis. We selected these major economies as they are key decision-makers in regional and global governance. A first glance at these nineteen major states (G19) reflects their preponderance in all aspects of power. From 2016 to 2020, these states gained weight in seven out of eight Bonn Power Shift indicators. In one indicator no change could be identified.

GDP

Global Change Rate: +14.53%

G19 Change Rate: +14.58% 

G19 Global Shares 2016 – 2020: 59.16% – 58.10%

Top-Gaining Country: China

Relative Trends: 5 out of 19 states gained global shares

Absolute Trends: all G19-states increased their GDP

Exports of goods and services

Global Change Rate: +7.00%

G19 Change Rate: +5.08% 

G19 Global Shares 2016 – 2020: 59.16% – 58.10%

Top-Gaining Country: China

Relative Trends: 6 out of 19 states gained global shares

Absolute Trends: 11 out of 19 states increased in exports

Top companies

Global Change Rate: 0.00%

G19 Change Rate: +0.23% 

G19 Global Shares 2016 – 2020: 87.80% – 88.00%

Top-Gaining Country: Mexico

Relative Trends: 5 out of 19 states gained global shares

Absolute Trends: with 440 companies on the list, the G19 states gained one ranking place compared to 2016

Total reserves

Global Change Rate: +23.40%

G19 Change Rate: +17.74% 

G19 Global Shares 2016 – 2020: 64.48% – 61.52%

Top-Gaining Country: India

Relative Trends: 7 out of 19 states gained global shares

Absolute Trends: 15 out of 19 states increased their total reserves

Defense spending

Global Change Rate: +10.26%

G19 Change Rate: +10.76% 

G19 Global Shares 2016 – 2020: 83.84% – 84.23%

Top-Gaining Country: Turkey

Relative Trends: 8 out of 19 states gained global shares

Absolute Trends: 15 out of 19 states increased their troops

Control of Choke Points

Global Change Rate: 0.00%

G19 Change Rate: 0.0% 

G19 Global Shares 2016 – 2020: 100.00% – 100.00%

Top-Gaining Country: none

Relative Trends: none

Absolute Trends: none

Top universities

Global Change Rate: +0.00%

G19 Change Rate: +0.69% 

G19 Global Shares 2016 – 2020: 72.00% – 72.50%

Top-Gaining Country: Italy

Relative Trends: 6 out of 19 states gained global shares

Absolute Trends: with 145 universities on the list, the G19 states gained one ranking place compared to 2016

Top UNESCO

Global Change Rate: +9.70%

G19 Change Rate: +9.25% 

G19 Global Shares: 2016 – 2020: 44.20% – 44.02%

Top-Gaining Country: Saudi Arabia, South Africa

Relative Trends: 11 out of 19 states gained global shares

Absolute Trends: with 508 UNESCO sights on the list, the G19 states gained 43 ranking places compared to 2016

Breakdown of G20 Country Power in 2020

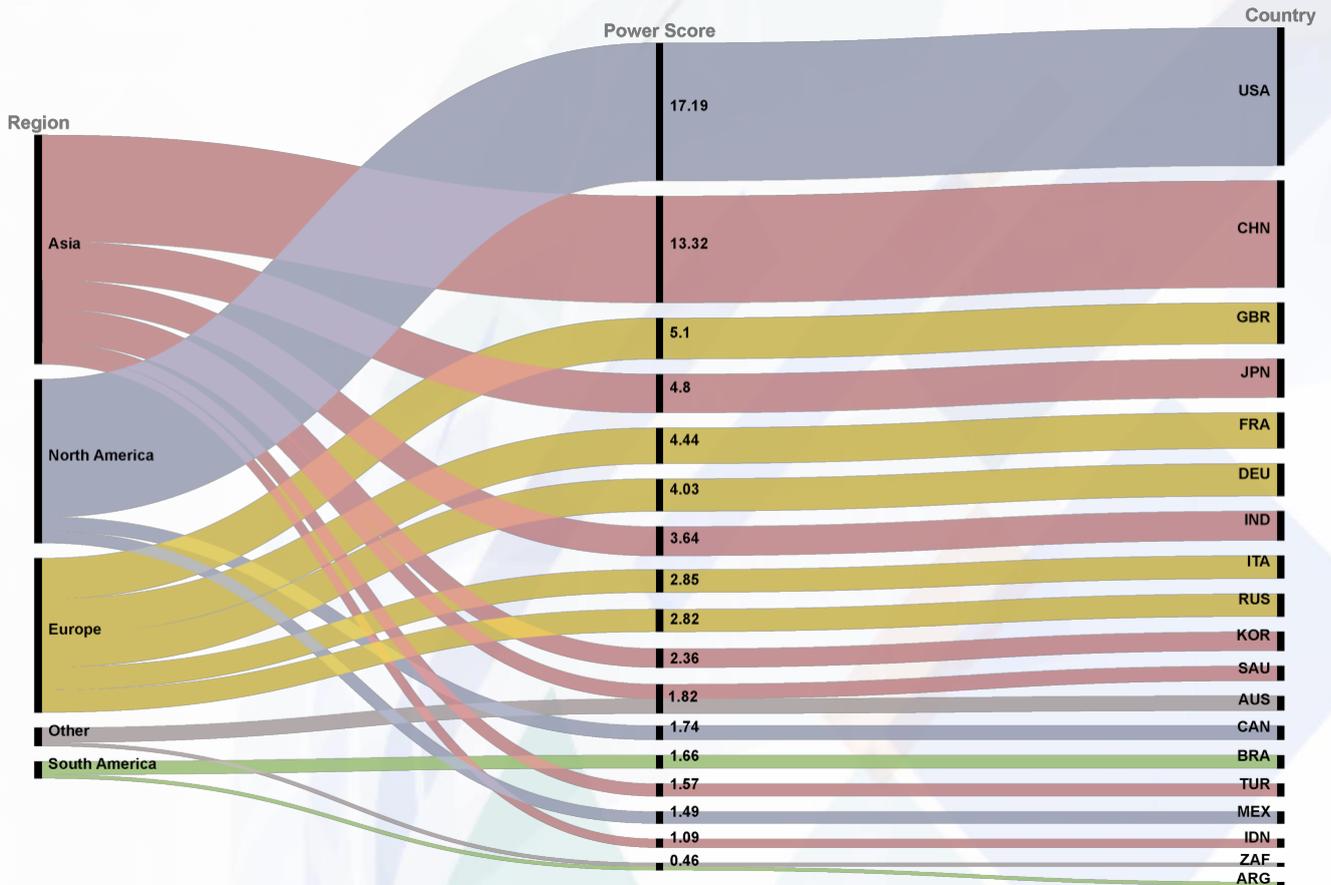


Chart: Center for Global Studies (CGS) . Source: Bonn Power Shift Monitor (BPSM) 2022

Power Shifts between 2016 and 2020

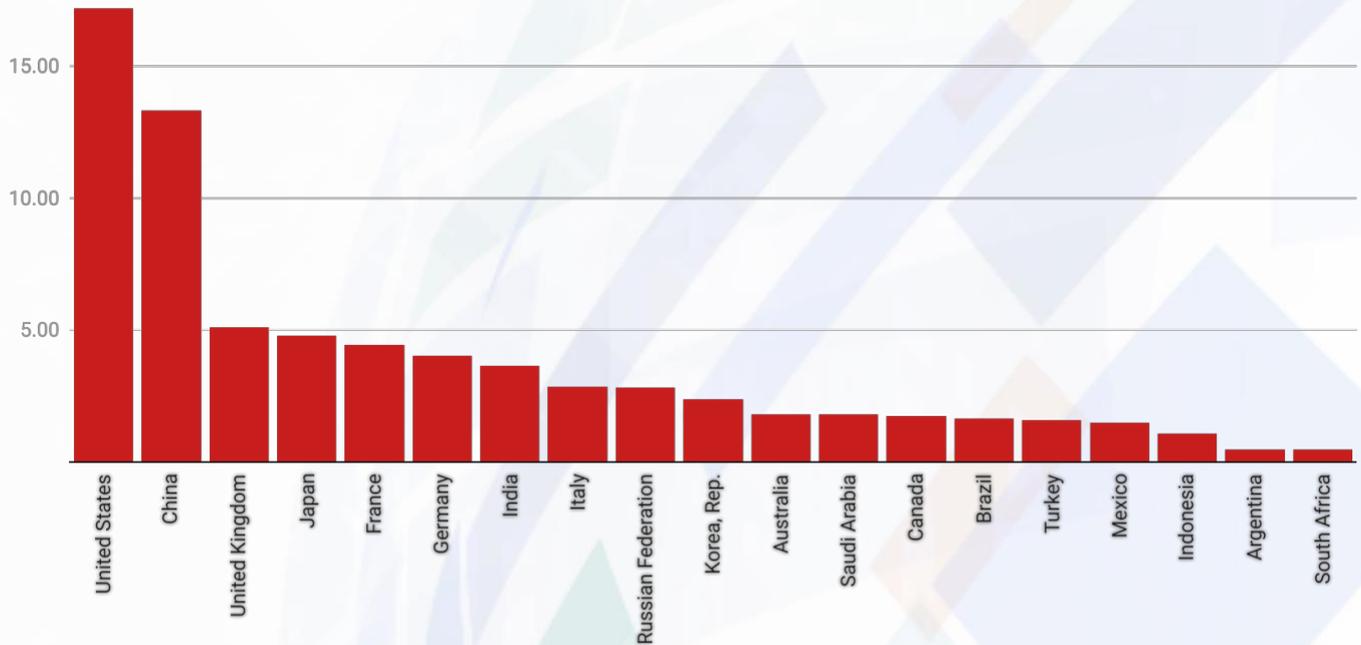
From 2016 to 2020, China has gained the most power (PSR), followed by India, Germany and Mexico. Considering only the country specific developments (CC), Italy has taken the greatest steps forward, whereas Indonesia, Argentina, Australia and Brazil are presenting a relative and absolute downward trend.

Country	Power Shift Rate (PSR) 2016-20	Rate of Country Change (CC)
China	0.76	14.11
India	0.22	20.85
Germany	0.07	12.22
Mexico	0.05	29.56
Italy	0.02	30.15
South Africa	0.00	5.01
France	-0.01	9.43
Indonesia	-0.01	-2.55
Turkey	-0.01	6.83
Argentina	-0.02	-0.21
Korea, Rep.	-0.03	7.59
Russian Federation	-0.03	8.02
Japan	-0.05	7.40
Australia	-0.09	-1.12
Canada	-0.10	5.72
Brazil	-0.16	-2.43
Saudi Arabia	-0.21	12.63
United Kingdom	-0.30	3.56
United States	-0.46	8.06

Chart: Center for Global Studies (CGS) - Heidbrink . Source: Bonn Power Shift Monitor (BPSM) 2022 . Created with Datawrapper

Global Perspective

Power Scores of the G20 Member States 2020



The BPSM Power Scores (PS) correspond with the average country shares of a particular year. Please note that the updated dataset does not correspond to previous versions of the BPSM.

Chart: Center for Global Studies (CGS) • Source: Bonn Power Shift Monitor (BPSM) 2022 • Created with Datawrapper

Cross Country Comparison

Overall, the United States continues to be the most powerful country of the G19 in 2020. However, the US remains on a relative power-decline. Its power score decreased in the years 2016 to 2020 from 17.65 to 17.19 but compared to the loss of power (-1.31) from 2011 to 2015, the downward curve has flattened. China continues to grow and tighten the gap to the US in our rankings. Its power score increases from 12.56 to 13.32. When compared to the previous analysis period the incline has slowed down significantly. Still, the gap between China and the US is narrowing slowly but steadily - China will have overtaken the US in the accumulated power score by 2035.

Compared to the other countries monitored, China is the biggest winner of the 2016 to 2020 period with a PSR growth of 0.76. India comes in second with a growth of 0.22. The United States and the United Kingdom rank at the bottom of the G19, with a PSR loss of -0.46 and -0.30 respectively. In general, the share of power held by the G19 states has declined. In 2016 the G19 countries still accounted for 73.04% of global power, in 2020, however, it dropped

to 72.65%. This decline in power of 0.39 percentage points is significantly greater than that of the previous period (0.09 percentage points). This could indicate that either the global power balance is approaching a new leveling of power or that power growth is mainly taking place in emerging states outside the G19.

Based on its power score from 2016 to 2020, India has gained the largest percentage (+6.62%), further increasing the power shares in the Asian region, followed by China, with an increase of 6.04%. Saudi Arabia lost the largest percentage share of power (-10.57%) during the observed period. While its absolute country specific development (CC 12,63) is positive, the values are below the average for the G19 states. Interestingly, this loss is mainly due to decreases in military spending and total reserves, both categories that have been of significant importance to the traditional hard power of Saudi Arabia so far.

With a rate of Country Change (CC) of 20.85, India presents the third-highest country change behind Italy (30.15) and Mexico (29.56). Surprisingly, Brazil (-2.43) and Indonesia (-2.55), generally considered emerging countries, show the greatest decrease of their Country Change Rates. Both countries' losses are mainly due to

decreases in the hard power sectors. For Brazil the decline of total reserves, GDP and MILEX had a significant impact, whilst in Indonesia companies, exports of goods and services and total reserves led to the slump.

In previous versions of the Bonn Power Shift Monitor, both Saudi Arabia and South Korea were among the winners of power shares, however, the percentage of their relative global power shares fell in the 2015 to 2017 phase (BPSM Update 2019). Nevertheless, in the years between 2016 and 2020 their absolute country specific development (CC) remained positive (South Korea 7.59, Saudi Arabia 12.63). In contrast to the relative Power Shift Model, the rate of country change examines the development of the country figures without comparing them to the global total. This model reveals whether a country has experienced a positive or negative trend over the years.

Taking a closer look at their power scores, South Korea has been able to slightly recover from 2016 to 2020 and is among the top ten again, whereas Saudi Arabia keeps its downward trend. Argentina and South Africa remain the bottom performers in the BPSM. The power share of both countries has dropped slightly since the 2019 BPSM update, making them the weakest (both with a Power Score of 0.46). Both states have been unable to pave their way up the ranking and seem to be stagnating with a slightly negative trend. South Africa shows a positive development in terms of Country Change (CC +5.01), while Argentina is among the states with a negative trend (CC -0.21). Neither one of these states hosts any Fortune 500 enterprises, which underscores a micro-structural power lack.

Redistribution of Power

In contrast to static power rankings, the analysis of power shifts allows to predict the current and future the trend of power (re)distribution. In this context, power shifts are a dynamic field of research that explores the constellation of states among themselves. Asymmetries and thus relative advantages or disadvantages in the international interplay of powers can thus be investigated. On average, the distance between the power values of the G19 countries has decreased. A broad midfield can be identified, including all but the two leaders, the US and China, and the two laggards, South Africa and Argentina. While the gap between the midfield states and China has widened until 2020, there is evidence of a convergence of power among these midfield states. This is particularly due to losses of traditional powers such as the United

The 10 Most Powerful G20 Member States in 2020

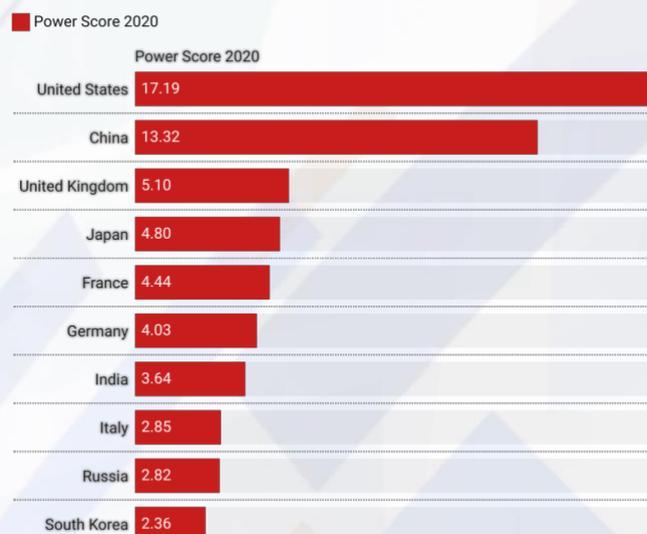


Chart: Center for Global Studies (CGS) • Source: Bonn Power Shift Monitor (BPSM) 2022 • Created with Datawrapper

Kingdom, Japan or France as opposed to rising levels of secondary powers such as South Korea or India. Therefore, the gap between the old leaders and new risers is reduced. The previous trend continues: an increasing adjustment of asymmetries and thus a more balanced distribution of power in the middle field can be observed among the G19.

Regional Developments

Within the G19, three major geographic power centers can be detected: First, the North American center under the leadership of the United States; second, Europe as a composite power center of the United Kingdom, Germany, France and Italy; and third, an Asian center with China as its main regional power and the growing powers Indonesia and India. Most noticeable among the Asian G19 countries is that India's power growth accelerated. Contrary to this, China's growth rate decelerated since 2016. Out of the European power center all countries (United Kingdom, France, Germany, and Italy) are among the top ten powers. A general increase in European power can be noted. The past years have been an especially good period for Germany. Berlin managed to increase its power score from 3.97 to 4.03 and shows an increase in market share for four of seven indicators.

In South America, both Brazil and Argentina are stagnating and even featured a negative prefix in the last years of observation. As a result, Argentina now ranks last among the states monitored. While Brazil's Power Score has dropped significantly, the country remains in 14th place.

A Close-Up of BPSM Indicators

This BPSM update features three new power indicators: Geographical Chokepoints, Total reserves and UNESCO World Heritage Sites.

Number of Controlled Choke Points in 2020

The BPSM monitors 16 choke points around the globe. The choke point score (CCP) is assigned according to the capability of a country to control primary and secondary choke points.



Depending on the relevance for global trade and maritime communication, the selected chokepoints were categorized in primary and secondary chokepoints. Primary chokepoints gained two points, secondary one point. Primary chokepoints are marked with a star. Hover over the map for more information. The complete dataset of controlled choke points is included in the 2022 version of the BPSM.

Map: Center for Global Studies (CGS) - Heidbrink - Source: Bonn Power Shift Monitor (BPSM) 2022 - Created with Datawrapper

Starting with the chokepoint indicator: the US consolidates its leading position via this indicator since it controls the most chokepoints around the globe - 23 - while China holds 10. Europe has increased its share of power through this new indicator. The United Kingdom, France, and Italy as maritime (naval) powers each control at least as many or more chokepoints as China. Argentina, Canada, Saudi Arabia, and South Africa come in last, with control over one chokepoint each. The chokepoint indicator was constant during 2016 to 2020; this could change if control capacities change. Chokepoint control capabilities are geographically anchored, therefore as seldomly borders shift, this indicator is likely to remain rather constant.

The next new indicator refers to the total reserves of a country. Total reserves comprise holdings of monetary gold, special drawing rights, reserves of IMF members held by the IMF, and holdings of foreign exchange under the control of monetary authorities. This indicator is a measure for a state's stability and contributes to its hard power. An upward trend can be observed in the total reserves of countries worldwide. While all European G19 countries show increasing figures in this indicator, it is the Asian countries that have increased their reserves the most in absolute terms. China holds by far the highest total reserves compared to the other countries (CS 22%), followed by Japan (CS 9%) with the US only coming in third (CS 4%). During the observation period, Beijing experienced the largest loss in power shares in this category, as the other countries significantly

increased their shares of reserves. The US in particular has also substantially increased its share of reserves. The worst performer is Saudi Arabia, which has both the highest absolute decline in its reserves and the second highest compared to the other observed countries.

For the first time, the BPSM have examined the World Heritages category in this 2022-version. As these sites contain cultural and natural heritage throughout the world considered to be of exceptional value to humanity, they serve as a measure of a nation's soft power. The number of World Heritage Sites in a country is not only an indicator of the country's attractiveness as a place to live for foreigners and for tourism, but also of its influence at the level of world cultural policy. The following trends can

be identified for the category of World Heritages: China and Germany each gained five new World Heritage Sites by 2020. Italy and France also saw growth during this period, gaining three new UNESCO acclaimed World Heritage Sites each. The total number of World Heritage Sites has increased between 2016 and 2020 from 1052 to 1154. The top three countries are China, Italy – with 55 Heritage Sites respectively – and France, with 46. The bottom three are South Africa (10), Indonesia (9) and Saudi Arabia (5). Generally, a convergence of World Heritage Sites among the G19 states can be seen in Asia and Europe, followed by North and South America.

Regarding the more well-established indicators significant shifts can be identified. The world's top universities are monitored by the QS World university ranking. Leading universities are central hubs of scientific knowledge production and a country's academic outreach on a global level. Depending on the research, universities contribute to the hard, soft, and structural power of their home countries in various ways. In the case of universities, it is the English-speaking countries that are among the biggest losers; the US, Canada, and the United Kingdom each lost two universities from the global ranking. At the same time, they continue to host the majority of the top universities in the world, with a total of 90 universities among them. Italy and Japan each increased the number of their top universities by two. Nonetheless, the global distribution of the top universities

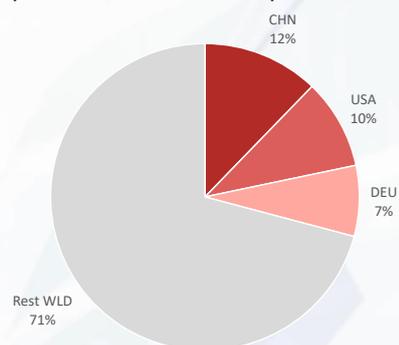
has not changed greatly. Even if slight changes are discernible, the English-speaking and European countries continue to lead the list of universities. The US still has significantly more top universities than any other country among the G19, with a total of 46. In the Asian region, only India was able to add one university, bringing the total to 17. Indonesia's and Turkey's underperformance in leading science are emphasized by them presenting not one globally renowned university.

The world's largest companies, as ranked by revenue in the Global Fortune 500, shape the economic structures around the globe. These companies represent engines driving globalization, innovation, production, and communication. Looking at the shares of the G19 countries among the world's 500 most valuable companies, the developments of China and the US are particularly striking. Between 2016 and 2020, China increased the number of its companies in the Global Fortune 500 from 103 to 124. Within the US the number of its Global Fortune 500 companies decreased from 134 to 121 marking the largest absolute loss. Both South Africa and Argentina remain at the bottom without a single company among the Global Fortune 500.

Exports of goods and services record the entirety of all tangible and intangible commodities delivered across a state's border. This indicator illustrates the integration of a state's economy into global markets as well as its competitiveness. A general growth of exports of goods and services can be observed worldwide. In Southeast Asia in particular, exports have grown strongly in recent years. A direct comparison between the competitors China and the US shows that China was able to significantly improve its exports (CS up to 12%), while the US had to record minor losses (CS down 9%). Asia is the leading region among the G19 concerning exports by now, followed closely by Europe.

The GDP - the value of all final goods and services produced within a country each year provided in a standard measure by purchasing power parity (PPP) - rates of the G19 countries have generally increased since 2016, with China, the US and India leading. China, Indonesia, and Australia managed to achieve the highest relative GDP increase, booking the biggest relative shift in this sector. While

Exports of Goods and Services – Top Three Countries 2020



the country share of almost all states decreased due to a general rise in productivity around the globe only China, Indonesia and India were able to resist this development. Accordingly, the GDP seems to be increasing particularly rapid in the Asian region with China being the outstanding growth engine. In sum, the G19 member states managed to increase their GDP from \$84 trillion in

2016 to \$96 trillion in 2020. With this, these countries slightly increased their relative economic weight in a global view, generating roughly 72% of the World's GDP. The rising GDPs at purchasing power parity express improvements in the living standards of the rated states as all of them exhibiting positive growth rates.

While taking a closer look at the military spendings around the world an approximate correspondence to the Power Score of the observed nations can be noticed. The US and China lead the world in terms of absolute military expenses, with the US accounting for 40% of World's total military expenditures and China for 12%, whilst the least powerful countries like South Africa (0.18%) and Argentina (0.16%) rank at the bottom. Surprisingly, Russia still undercuts these states and comes in last with the largest decrease in military expenditure and with 3.5% of the World's total expenditure. Looking at the Internal Change Rate Turkey, Indonesia and Germany show the largest growth compared to their military expenditures in 2016 while Russia, Saudi Arabia and Argentina record the steepest decline. In view of the war in Ukraine some states, such as Germany, have already announced a significant increase in the defense budget, which will be reflected in future versions of the BPSM.

Conclusion

By 2020, a further decline in regional power can be observed in Europe and North America, a continuation of power growth in Asia and a seeming stagnation in South America, as well as a slightly positive development in the South Africa and Australia, which are subsumed under "Other". The rise of Asia is thus continuing, with an increasing power gap to the traditional power centers. Since 2005, Asia's weight has steadily increased, while the weight of North America and Europe has continuously decreased. As a result, Asia has overtaken North America as the strongest region among the G19.

BPSM KEY FINDINGS

Power Shifts between 2016 and 2020



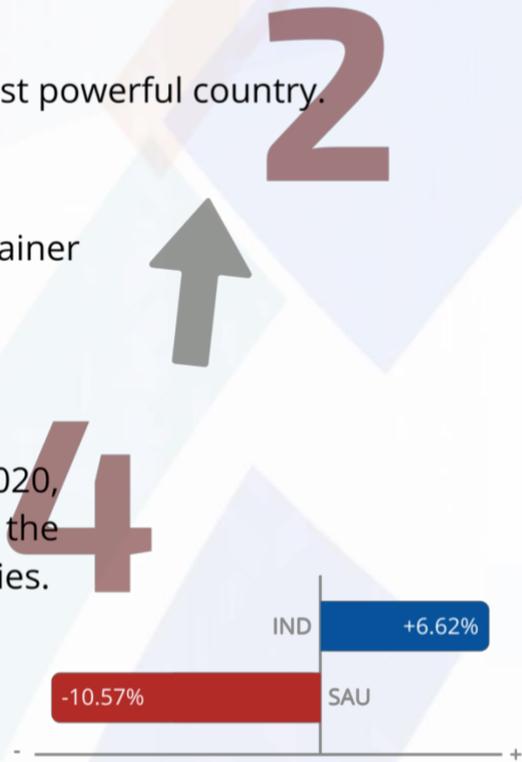
1 Only five out of the G19 countries performed **above average** both **individually** and **globally** from 2016 to 2020.

As China, India, Germany, Mexico and Italy are from all regions of the world, no regional trend is visible.

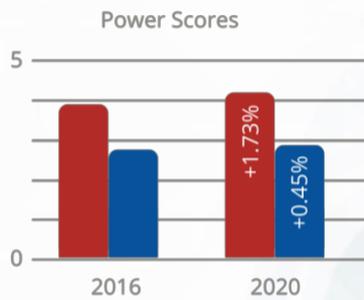
The **US** remains the most powerful country.

3 **China** remains the biggest gainer of global shares.

Regarding the Trend from 2016 to 2020, with +6.62 per cent, **India** has gained the highest percentage of power of all countries.



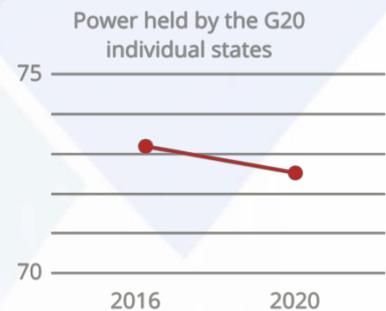
5 Between 2016 and 2020 **Saudi Arabia** lost the biggest percentage of power again.



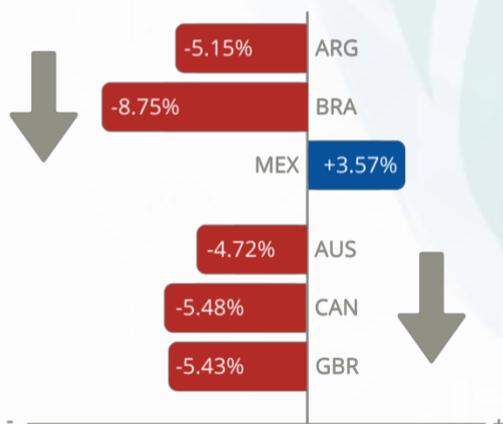
Within the European region only **Germany** and **Italy** gained power shares, all other European countries have lost power shares between 2016 and 2020.

Power shifts in **Asia** are mixed.

The **global share** of power held by the G20 individual states has **declined**.



Comparing 2016 to 2020, the **distance** between the power values of the individual G20 countries has **increased**.



Anglo Saxon and **Latin American** states are losing increasingly more power.

USA – Narrowing gap to China

The United States of America remains the most powerful country of the G19 in 2020. Although it has continued losing international power, its downward curve flattened further with its Power Score falling slightly from 17.65 to 17.19 between 2016 and 2020. This represents a smaller loss of power compared to the 2011/2015-phase with a Power Shift Rate of -1,31. However, in 2020 the US ranked at the bottom of the G19 with a Power Shift Rate of -0.46. Furthermore, the gap between China and the US is narrowing slowly but steadily. According to the accumulated Power Score, China will have overtaken the US by 2035.

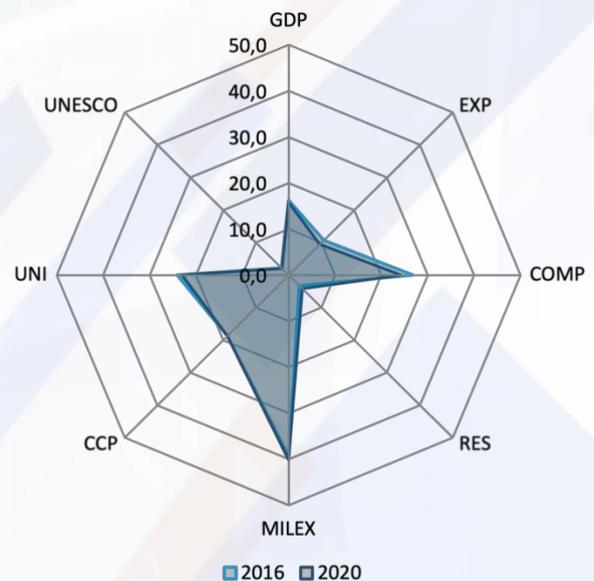
Power Shift 2016-2020



With respect to the indicator of Chokepoints, the US was able to consolidate its leading position since it holds most of the chokepoints - 23 – while China only holds 10. On the contrary, China holds by far the highest amount of reserves with a Country Share of 22%, while the US, with a Country Share of 4%, is only coming third. Nevertheless, the US has significantly increased its total reserves, leading to a substantial increase in share in this sector. Moreover, a direct comparison between the competitor China and the US indicates that China was able to significantly improve its exports throughout the 2016-2017 period with an increase of Country Share from 10.5% to 12.2%, whereas the US had to record a decrease from 10.7% to 9.5%. While in 2016, China and the US were the leaders in terms of GDP (PPP), almost exactly tied at the top and far ahead of the chasing pack, they were still out of reach in 2020; however, China has drawn ahead significantly by increasing its GDP Country Share from 16,2% to 18,3%, while the US has recorded minor losses from 16,2% to 15.8%.

With regard to the UNESCO World Heritage indicator, the US gained one new site - the 20th-Century Architecture of Frank Lloyd Wright - in 2019. Considering the indicator of top Companies, the US had to record the biggest loss with the number of companies declining from 134 to 121.

USA Market Share



Looking at the indicator top Universities, the English-speaking countries are among the biggest losers. To say, the US, Canada as well as the United Kingdom each lost two top-universities in the global ranking. In terms of its military spending, the US still clearly dominates the rest of the world with a Country Share of 40% (second is China with 12%).

To wrap it up, the domains of Chokepoints, Reserves and Military spending can be pointed out as the main pillars of the US' global Power Share. Thus, the country still especially excels in the field of structural and hard power. Losses can be registered with regard to the sectors of exports, GDP (PPP), top companies and top Universities. Finally considering the global Power Share on the whole, the gap between the United States and China clearly continued to narrow throughout the period observed

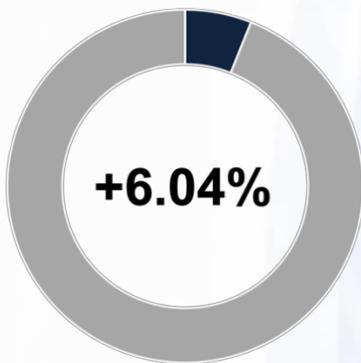
Please cite as:

Center for Global Studies (CGS) (2022). "Bonn Power Shift Monitor: USA: Narrowing Gap to China:", University of Bonn, Bonn.

China – Getting to the Top

Between 2016 and 2020, China's Power Share continued to grow, and Beijing managed to tighten the gap to the US. Furthermore, China was able to increase its Power Score from 12.56 to 13.32. However, its Power Shift Rate decreased compared to the previous period from 1.72 to 0.76. The gap between China and the US is narrowing slowly but steadily - China will have overtaken the US in the accumulated Power Score by 2035. The 2019 Bonn Power Shift Monitor forecasted power parity by 2023, underscoring China's slowing growth momentum. Based on its Percentage Power Score increase, China comes in second place, with an increase of 6.04%

Power Shift 2016-2020

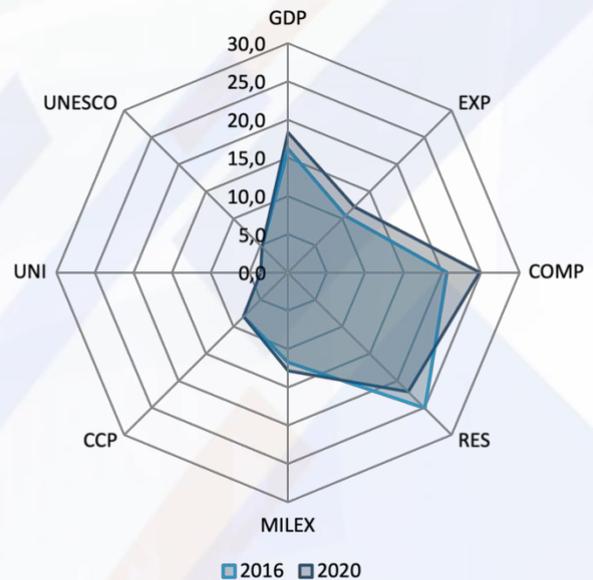


from 2016 to 2020. Compared to the other G19 countries, China is the biggest winner of the 2016 to 2020 period with a PSR growth of 0.76. Furthermore, China widened its distance to the midfield states till 2020.

Turning to the indicators, and starting with the newly introduced, China comes in first place regarding the UNESCO World Heritage Sites – tied with Italy at 55 sites. Between 2016 and 2020, China gained five new sites, as did Germany. In 2016, two new sites were added, Qinghai Hoh Xil and Kulangsu, a Historic International Settlement. In 2017 Fanjingshan, and in 2019 the Archaeological Ruins of Liangzhu City and the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China were acknowledged as World Heritage Sites.

Continuing with Chokepoints, the US consolidates its leading position via this indicator since it controls the most chokepoints around the globe - 23 - while China holds 10 (4th most). In the third new indicator, Total reserves, China holds by far the highest number compared to the other countries (CS 22%) and therefore comes in first place.

China Market Share



Taking a look at the other indicators, China increased the number of its companies in the Fortune 500 from 103 to 124, claiming both, biggest gain and first place for itself. A direct comparison between the competitors China and the US shows that China was able to significantly improve its exports (from CS 10.5% to CS 12.2%), while the US had to record more losses here (from CS 10.7% to CS 95%). In 2016 China and the US were the leaders in terms of GDP (PPP), almost exactly tied at the top and far ahead from the chasing pack. In 2020 they are still far ahead of the chasing pack, but China has drawn ahead significantly by increasing its GDP CS from 16.2% to 18.3% while the US had to record minor losses (16.2% to 15.8%). The US clearly dominates the rest of the world in terms of Military spending (CS 40%, China comes second with 12.8%, while still being quite far ahead of the other countries, third is India with CS 3,8%).

Please cite as:

Center for Global Studies (CGS) (2021). "Bonn Power Shift Monitor: China: Getting to the Top", University of Bonn, Bonn.

Russia – Truly a Hard Power?

As the biggest country by territory in the world and remembering its former superpower status, the Russian Federation set its own aspirations high – not to say global. Based on a period of remarkably huge growth in the 2000s, Russia is currently lagging behind its ambitions due to economic hardship and diplomatic tensions. After the conflicts in Georgia, Ukraine and Syria, Russia now reached a new level of conflict with the invasion of Ukraine in February 2022. The military offensive in Ukraine and Russia's resulting isolation due to the West's far-reaching economic sanctions are weakening Russia. The final effects of the war, however, will only become apparent in the coming years. Formerly, the conflicts were proof of Russian hard power and its ability to project its military might abroad; the current situation in Ukraine casts the Russian military in a different light.

Moscow experienced relative losses compared to the G19 countries for the latest period, with a Power Shift Rate of -0.03. In comparison, Russia has thus lost 1.02 percent of its power since 2016. However, the absolute power development of Russia has further increased, with a Country Change Rate of 8,02. Showing a Power Score of 2.82

Power Shift 2016-2020

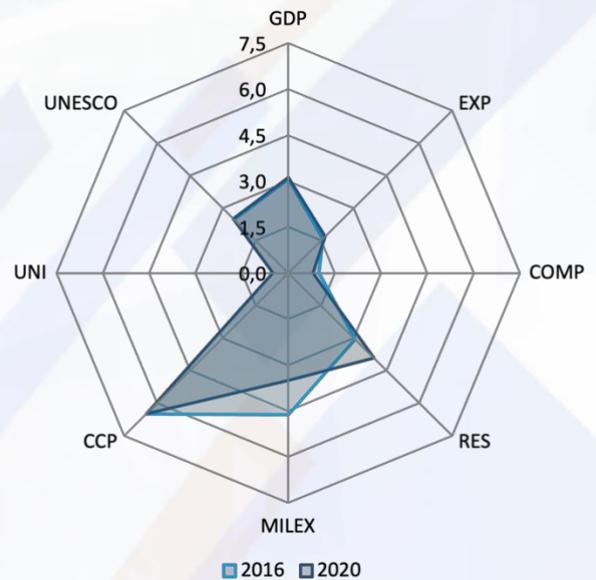


in 2020, it is the 8th strongest nation of the G19 member states. Taking a closer look, however, its development takes quite a discontinuous path with volatile Power Scores.

Turning to the Soft Power indicators first. As for Russia's power in science, the number of renowned universities is stagnating at one: The Moscow State University. This indicates that Russia's knowledge society is at risk to fall behind the accelerated tempo of education around the globe. In 2016, Russia presented five companies among the global 500-elite, however, over the last four years, Moscow lost another company, now remaining at only four.

Now focusing on the new Soft Power Indicator: The UNESCO World Heritage Sites in Russia increased from 26 to 29 between 2016 and 2020. In 2017, two new World Heritage Sites were inscribed.

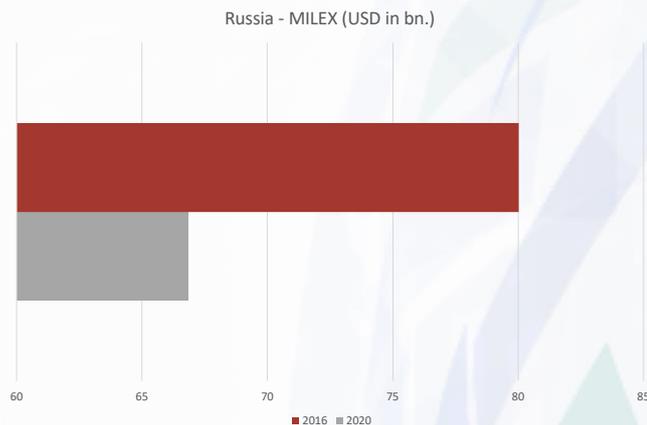
Russia Market Share



First, the Landscapes of Dauria, a region east of Lake Baikal containing different steppe ecosystems, forests, and grasslands, as well as wetlands and lakes. Second, the Assumption Cathedral and Monastery of the town-island of Sviyazhsk. The city island is located at the confluence of the Volga, Sviyaga and Shchuka rivers. It was founded in 1551 by Ivan the Terrible. Its strategic location at a crossroads of the Volga route and the Silk Road made it the first outpost for Ivan's conquest of the Khanate of Kazan. The cathedral and monastery complex were built in the 16th century and renovated in the 18th century. The frescoes in the cathedral are among the best examples of Russian Orthodox painting and are painted in a unique blend of styles from different regions of Russia. In 2019, in addition, the Churches of the Pskov School of Architecture were included as a World Heritage Site. This site includes ten churches or monasteries and associated buildings in the city of Pskov. They represent the work of the Pskov School, which drew from the Byzantine and Novgorod traditions, fused them with local folk traditions, and adapted architecture to the use of local resources. The churches date from the 12th to the early 17th centuries, with the peak of this style in the 15th and 16th centuries.

Now turning to the typical hard power indicators, starting with the new Chokepoint indicator. In 2020, as in 2016, Russia controlled 8 of the world's chokepoints. The Chokepoint indicator was constant for the last period, this could change if control capacities change. Generally, it is unlikely, since chokepoints are geographically

anchored, and large boundary shifts are improbable. However, the Russian war in Ukraine could bring about change: the Kerch Strait is a chokepoint in Ukraine that connects the Black Sea with the Sea of Azov. Currently, Russia controls Crimea and the surrounding areas and aims to establish a land bridge between Donbass and Crimea in order to gain access to the Black Sea. It therefore remains to be seen, how the situation between Russia and Ukraine will develop and how long Russia will retain control over the temporarily occupied territories.



In the economic sense, the Russian hard power presents a mixed picture. In the macroeconomic categories considered by the Monitor, Russia slightly gained in the GDP category since 2016 (ICR +16,78; MC +0,06). Focusing on the exports of Goods in Services, Russia comes in fifth in the Asian region comparison with a CS of 1,69%, therefore showing a slight increase since 2016. In comparison to the other G19 states Russia takes 12th place. Regarding its defense spending, Russia shows a negative Indicator Change Rate between 2016 and 2020 (-16,48). It comes in fourth place behind China, the US and India with a CS of 3,50%. Turning to the Total reserves indicator, Russia comes in fourth, just behind China, the US and Japan with a CS of 3,92%. Looking at the Indicator Change Rate, Russia takes second place behind India (ICR +58,27).

Over the period of observation, Russia increased its hard power in numbers and also proved a willingness to project this power in foreign affairs. The Russian invasion of Ukraine in February 2022, however will cause drastic changes in the development of Russian power. First, economically due to the imposed sanctions by the West (China's role still unclear) and second, militarily due to the loss of military power and troops in the Ukrainian-Russian War.

Please cite as:

Center for Global Studies (CGS) (2021). "Bonn Power Shift Monitor: Russia: A Truly Hard Power?", University of Bonn, Bonn.

Germany – On Track for Success

Generally, an increase in European power can be noted, but some states gained more than others. Germany is one of the power winners of the past period and managed to maintain its 6th place in

Power Shift 2016-2020



the overall ranking. Between 2016 and 2020, Germany was able to increase its Power Score from 3.96 to 4.03. It further showed an increase in Market Share for four out of seven indicators.

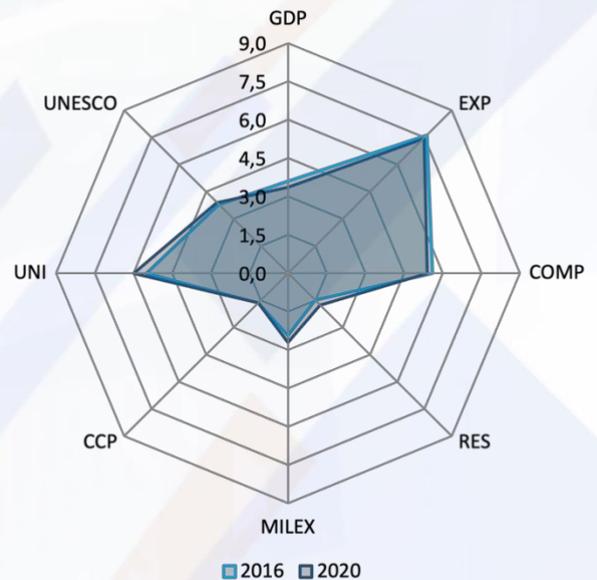
Taking a look at the new indicators first, Germany has added five new World Heritage sites since 2016, now boasting a total of 45. In 2017, the Caves and Ice Age Art in the Swabian Jura was added. In 2018 and 2019 Germany gained four new sites overall, the Archaeological Border complex of Hedeby and the Danevirke and the Naumburg Cathedral in 2018, the Erzgebirge/Krušnohoří Mining Region and Water Management System of Augsburg in 2019. The only other country equally gaining five new sites in the observed period was China.

Turning to the indicator of Chokepoints, Germany comes in tied for 12th place (together with Japan, Korea and Mexico), controlling two chokpoints – the second lowest number of chokepoints controlled among the G19 states. Looking at total reserves, all European G19 countries show increasing figures in this indicator. Germany's Country Share increased from 1,49% to 1.67% in this regard.

Continuing with the well-established indicators. In terms of GDP (PPP), Germany ranks 5th, just behind Japan, India, China and the United States. Germany lost one company, now remaining with 27 among the Global 500, but gained one , coming in at 12.

Overall, Germany succeeds in continuing the positive development already seen in the last update. It remains interesting to see what influence the current Russian war in Ukraine will have on Germany's developments. A significant increase in the defence budget has already been announced, and further changes seem likely.

Germany Market Share



Please cite as:

Center for Global Studies (CGS) (2022). "Bonn Power Shift Monitor: Germany: On Track for Success:", University of Bonn, Bonn.

Saudi Arabia – Stumbling at the Bottom

As already observed in the previous period from 2011 to 2015, Saudi Arabia again lost the largest Share of Power with an average Power Shift Rate of -0.21 between 2016 and 2020, ranking 17th considering the overall Power Shift Rate. On the whole, Saudi Arabia dropped down from 15th to 16th place in the BPSM-Power-ranking in terms of overall Power Score throughout the period observed. Concerning the Country Change Indicator, Saudi Arabia comes in 5th place. The countries specific development can be stated as positive (CC 12.63);

Power Shift 2016-2020

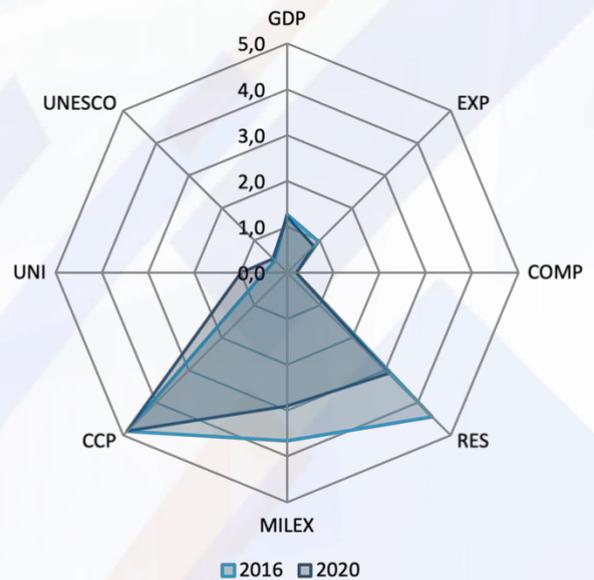


however, Saudi Arabia's relative values are below the average of the G19 states. In total, a downward trend can be observed in this respect, since the CC was higher in the previous period observed (2011-2015).

The overall decrease of power can mainly be traced back to losses in the sectors of Military spending (from a CS of 3.66 in 2016 to a CC of 2.91 in 2020) and Total reserves (from a CS of 4.43 in 2016 to a CS of 3.10 in 2020), both categories that have been of significant importance to Saudi Arabia's traditional hard power so far. With regard to the indicator of Total reserves, Saudi Arabia can be pointed out as the worst performer of all G19 states in this sector showing both, the highest absolute decline in regarding its own reserves and the second highest compared to the other countries observed.

Turning to the remaining indicators, Saudi Arabia comes 9th regarding the sector of Chokepoints, controlling 6 Chokepoints. Considering the indicators of GDP (PPP) and exports, Saudi Arabia registered decreases in Country Share. The observed downward trend continues with regard to the indicator of UNESCO World Heritage Sites. With the Al-Ahsa Oasis, listed in 2018, Saudi Arabia only gained one new site, now counting five, and is therefore tied for last in this aspect, showing the fewest total amount of UNESCO World Heritages of all G19 members.

Saudi Arabia Market Share



Looking at the indicator of top Companies, no change can be observed: Saudi Arabia still lists one company in the Forbes 500. At last, Saudi Arabia managed to add one new top university to the QS 200, now counting two while doubling its Country Share from 0.5 in 2016 to 1 in 2020 in this sector.

Overall, Saudi Arabia clearly struggles at the bottom of the G19 states with losses in terms of Country Share in the sectors of Military spending, Total reserves, exports and GDP (PPP). The country's only Pillars of Success include the indicators of UNESCO World Heritage and top university. However, despite showing a positive trend in these two sectors, Saudi Arabia still remains a tail lamp in this respect.

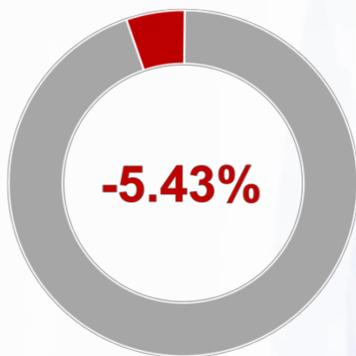
Please cite as:

Center for Global Studies (CGS) (2022). "Bonn Power Shift Monitor: Saudi Arabia: Stumbling at the Bottom", University of Bonn, Bonn.

United Kingdom - A Losing Power inside and outside the EU

Throughout the observed episode, the United Kingdom occupied the penultimate place of the G19 in terms of its Power Shift, showing a Power Shift Rate of -0.30. Regarding the overall power ranking, the UK remains in 3rd place, even though it substantially lost ground and Japan and France were able to catch up significantly. While a general increase in European power can be noted, the UK was the only European country losing a considerable amount of power. Short, the UK showed the 3rd worst performance of the G19 in terms of Percentage of Power Change (-5.43%).

Power Shift 2016-2020

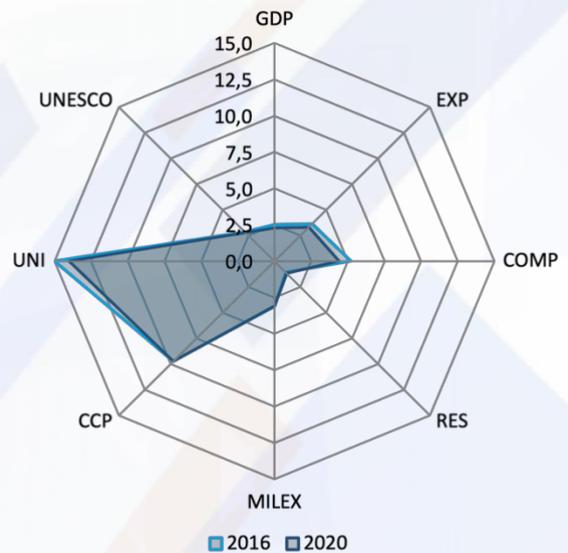


Turning to the indicators, the UK comes 10th considering the total GDP (PPP) volume. On the whole, the UK managed to slightly increase its total GDP while still losing a significant amount in terms of Country Share,

coming 15th in terms of Percentage Change from 2016 to 2020 in this sector. In the dimension of exports, the UK showed a constant increase until 2019. However, in 2020 the country registered an extreme slump of its export volume due to the intertwined consequences of Brexit and the Corona Virus Pandemic, leaving the UK with a decrease of export volume throughout the observed episode and a sharp decline in Country Share. All in all, the UK showed the 5th worst development in this field of the G19.

Considering the indicator of top Companies, UK's struggling trend continues. The country lost four UK based companies (from 26 to 22) that dropped out of the Fortune 500, signifying the second biggest absolute loss. But also, with respect to the dimension of top Universities, the UK can be ascribed to the biggest losers. In general, the English-speaking countries significantly lost ground in this field, each losing two universities out of the global ranking. However, with 28 universities left in the list of the top 200, the UK still ranks second compared to the other G19 members in this dimension of structural power.

United Kingdom Market Share



Turning to the indicator of Reserves, the UK managed to increase its Country Share from 1.09% in 2016 to 1.18% in 2020. In the case of Military spending, the country however showed a slight decline in terms of Country Share from 3.11% in 2016 to 3.06% in 2020.

Looking at the dimension of UNESCO World Heritage Sites, the UK only registered two new sites, which led to a minor decrease of Country Share in this category. Listing 32 world heritages, the UK ranks 7th compared to the rest of the G19. In terms of the sector of Chokepoints, the UK clearly stands out as a naval power, controlling 12 chokepoints in total, ranking 3rd.

To wrap it up, one can say that the sectors top Universities, Chokepoint control as well as top Companies are the pillars of the UK's global Power Share.

Please cite as:

Center for Global Studies (CGS) (2022). "Bonn Power Shift Monitor: United Kingdom: A Losing Power inside and outside the EU", University of Bonn, Bonn.

Bonn Power Shift Monitor: Methodology

The Bonn Power Shift Concept

The Bonn Power Shift Monitor (BPSM) uncovers and analyzes the shifts in international Power Relations between the world’s leading industrialized and emerging economies. Our goal is to raise awareness of power shifts and to invite business, politics, and society to discuss the consequences and policy responses to these changes across borders. Further, it is equally important to us, to stimulate the debate on power concepts, as well as traditional and innovative measuring methods.

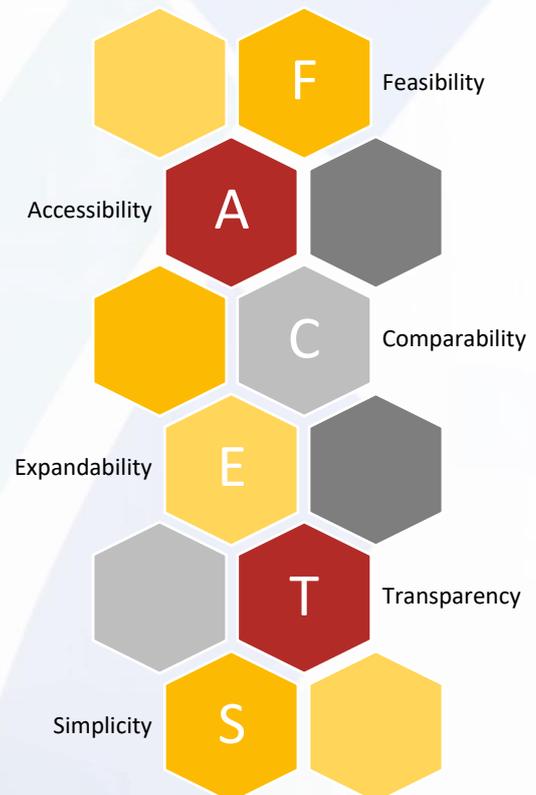
Even though the focus on states as actors indicates a classical realist view, we apply an eclectic understanding of power to the BPSM. We prefer neither an aggregate, nor a relational, nor a structural conception of power, as we consider them compatible in analytical and operational terms (in agreement with Barnett and Duval), although they certainly emphasize different aspects. Furthermore, the sources of those power categories are by no means separable in any empirically meaningful way. Accordingly, our indicators are not subjected to any artificial ad hoc taxonomy. Each change monitored by the indicators may translate to shifts in aggregated, relational, structural, soft or hard power underlining the multi-faceted nature of such categories. Assessing which dimensions of power are affected by the shifts and to what extent, remains an analytical question that creates wide interpretive spaces. With this approach, the BPSM departs from traditional power measures that focus only on one (ad hoc predetermined) power concept, and neglect the influence of other factors.

Based on this, the model considers the classic resource capabilities, the impact on related actors, a country’s attractiveness, and its ability to innovate structures. This reflects our understanding that power is composed of the capacities, willingness and ability to assert interests. If one of these components is missing, an actor’s power decreases, i.e. the ability to achieve political victory, diminishes.

In a word, the scores and shifts provided by the BPSM are intended to be a tool for analysis. They help explain and predict the developments in the international relations among states, as well as their power or powerlessness in the international system. In order to be useful and reliable as a research instrument, the BPSM is based on six principles: feasibility, accessibility, comparability,

expandability, transparency, and simplicity. Their initials build the acronym “facets” which directly refers to our basic idea of integrating theories of power into one model. By using only freely available data, the BPSM provides unparalleled accessibility, extensibility, and transparency for researchers, students, and beyond. It avoids definitional fuzziness and statistical complexities in its theoretical and calculation model to ensure the simplicity of the approach. With this, the model remains comprehensible to the public and easily extensible. This, in turn, ensures the comparability of results and feasibility of analyses beyond the project.

BPSM Principles



The Indicators

Indicator	Unit	Source
1. GDP	PPP; current int. Dollar	World Bank
2. Exports of goods and services	BoP, current USD	World Bank
3. Top companies	Total of top 500	Fortune
4. Total reserves	Includes gold, current US\$	World Bank
5. Defense spending	Constant 2018 USD m	Stockholm Institute for Peace Research
6. Choke Points	Number of geographic choke points controlled	Pustovitovskij/ Center for Global Studies (CGS)
7. UNESCO World Heritages	Total amount	UNESCO World Heritage List
8. Top Universities	Total of top 200	QS World university ranking

Please note: The data has been completely updated in 2022. Due to this update, the numbers and results of the 2019-report have changed to some extent. Please make sure that you refer to the respective year when you quote the BPSM. World numbers are based on available data and may thus deviate from reality.

Figures concerning the People's Republic of China are treated as follows: The World Bank Indicators and the university QS World ranking do not include data from Hong Kong SAR, Macao and Taiwan. The Fortune 500 figures do incorporate Hong Kong SAR but not Taiwan.

GDP

GDP (PPP) is the value of all final goods and services produced within a country in a given year provided in a standard measure by purchasing power parity (PPP) rates. GDP (PPP) in current international Dollar was selected as an indicator, because it illustrates the overall state of an economy, its purchasing power in international comparison, the size of the national market as well as the general economic prosperity. The basic assumption is that the higher the GDP (PPP) of a state, the higher is its economic power in the international system. This in turn affects different hard and structural power aspects, e.g., to influence bargaining processes such as trade agreements or to enforce sanctions.

Exports of goods and services

Exports of goods and services record the entirety of all tangible and intangible commodities delivered across a state's border. This indicator illustrates the integration of a state's economy into global markets as well as its competitiveness. It not only appraises material power structures, but also immaterial ones such as financial flows, communication and information structures, as well as knowledge. The indicator reveals the shifts on the global trade market, hence market power shifts between the leading export nations. Higher exports of goods and services translate into the capacity to influence international economic structures and shape them according to a state's interests.

Top companies

The world's largest companies, as ranked by revenue in the Global Fortune 500, shape the economic structures around the globe. These companies represent engines driving globalization, innovation, production, and communication. In this way, they contribute to the hard, soft and structural powers of their home countries in various ways similar to universities. More specifically, leading companies particularly shape the financial flows and thus interdependent structures at the global level illustrating the structural power a country. Providing another example, leading companies boost national reputation by serving as globally known brands which contributes to a state's soft power.

Total reserves

The total reserves of a country comprise holdings of monetary gold, special drawing rights, reserves of IMF members held by the IMF, and holdings of foreign exchange under the control of monetary authorities. This indicator is a measure for a state's stability and contributes to its hard power. A high volume of reserves also gives a country structural power advantages by reducing its external dependence on other states, institutions or political actors. By leveraging reserves as a means of economic power, a state can influence the behavior or interests of other targets. A country's total reserves have become increasingly important in times of crisis as it serves self-insurance against shocks, sanctions or market volatility.

Defense spending

Defense spending (in constant 2018 million USD) illustrates the trends of a countries military expenditures over time by adjusting it to a consistent base year measure. This process-oriented category reflects a state's willingness to gain military might and thereby hard and structural power in international relations. It also indicates national preferences, for example security perceptions and risk assessments, military modernization, as well as the preparation or involvement in armed conflicts. In brief, the defense spending of a state illustrates its willingness to change to status quo of global power structures and predicts possible power shifts.

Top universities

The world's top universities are monitored by the QS World university ranking. Leading universities are central hubs of scientific knowledge production and a country's academic outreach on a

global level. Depending on the research, universities contribute to the hard, soft and structural power of their home countries in various ways. More specifically, leading universities illustrate the research quality, international connectedness and academic reputation of a country which provides soft power in form of prestige or the attraction of academic staff. The indicator also illustrates the capacities to shape current and future structures of knowledge, innovation, production and technology.

Choke Points

Choke points are a prominent issue today in the global economy and shipment of goods. They especially contribute to their countries structural power - countries that control many choke points typically range higher in the overall ranking. Within the framework of the power indicator, we note a differing ability of actors to block one or more of these passages. The BPSM monitors 23 choke points around the world based on the volume and quality of goods passing through these geographical bottlenecks. Based on this, a distinction between primary and secondary choke points is made. The ability to block one of the primary choke points weighs more heavily in terms of a negotiating option and thus of structural power than the potential blocking of one of the secondary passages. The score for indicator is calculated from the sum of the controlled choke points of the country according to the primary and secondary status. In order to obtain a suitable measure for the BPSM power score, the proportion of the country is calculated by dividing the total number of choke point control scores of the G19. A complete overview is included at the end of this document and can be downloaded from the BPSM website.

UNESCO World Heritages

A World Heritage Site is a landmark or area with legal protection by an international convention. The United Nations Educational, Scientific and Cultural Organization (UNESCO) has included sites of cultural, historical, scientific or other significance on its World Heritage List since 1978. Because these sites contain "cultural and natural heritage throughout the world considered to be of exceptional value to humanity," they serve as a measure of a nation's soft power. The number of World Heritage sites in a country is not only an indicator of the country's attractiveness as a place to live for foreigners and for tourism, but also displays a country's influence at the level of world cultural policy.

The Calculation

Power Score (PS)

The Power Scores (PS) correspond with the average country shares of a particular year. Thus, the Power Scores and Power Shift Rates are based on the model of relative “market” shares.

Calculate the country shares by dividing the world’s total by the country figure. In the absence of a world total for top universities and companies, we use the number of entities included in the ranking (200 and 500), which gives more weight to these indicators in our index. This fits in our model as we assume that micro-economic hubs are of central importance to a country’s position in the globalized network of states.

$$\frac{\text{Country indicator}}{\text{World total}} = \text{Country Share (CS)}$$

Calculate the average to derive the Power Score of a country for a certain year. In our model n equates to eight as this is the number of indicators, hence country shares used.

$$\frac{1}{n} \sum_{i=1}^n CS = \text{Power Score (PS)}$$

Power Shift Rate (PSR)

The Power Shift Rate (PSR) is the difference between the Power Scores of two points in time. This score illustrates whether a country lost or gained considering all indicators of our index.

Use the Power Scores of two points in time (t) to calculate the Power Shift Rate (PSR).

$$PS_{t_2} - PS_{t_1} = \text{Power Shift Rate (PSR)}$$

Rate of Country Change (CC)

In contrast to the relative Power Shift model, the rate of country change examines the development of the country figures without comparing them to the global total. This model reveals whether a country has experienced a positive or negative trend over the years.

Calculate the rate of change between two points in time (t) of each indicator.

$$\frac{I_{t_2} - I_{t_1}}{I_{t_1}} \times 100 = \text{Indicator Change Rate (\%)}$$

Calculate the average to derive the Rate of Country Change (CC). In our model n equates to eight as this is the number of indicators, hence country shares used.

$$\frac{1}{n} \sum_{i=1}^n \text{Indicator Change Rates} = \text{Rate of Country Change (CC)}$$

Breakdown Control of Choke Points

Choke Points per Country

Country	Choke Points	Score
United States of America	Panama Canal, Strait of Malacca, Strait of Hormuz, Suez Canal, Strait of Bab el-Mandab, Bosphorus and Dardanelles, Strait of Gibraltar, Cape of Good Hope, Strait of Dover, Bering Strait, Strait of Magellan, Sunda Strait, Lombok Strait, Korea Strait, Kiel Canal, La Pérouse Strait	23
China	Strait of Malacca, Strait of Hormuz, Strait of Bab el-Mandab, Sunda Strait, Lombok Strait, Korea Strait, La Pérouse Strait	10
United Kingdom	Strait of Malacca, Suez Canal, Strait of Bab el-Mandab, Bosphorus and Dardanelles, Strait of Gibraltar, Strait of Dover, Kiel Canal	12
Russian Federation	Suez Canal, Bosphorus and Dardanelles, Strait of Gibraltar, Kiel Canal, Bering Strait	8
Japan	Korean Strait, La Pérouse Street	2
Germany	Strait of Dover, Kiel Canal	2
India	Strait of Malacca, Strait of Hormuz, Strait of Bab el-Mandab, Sunda Strait, Lombok Strait	8
France	Strait of Malacca, Strait of Hormuz, Suez Canal, Strait of Bab el-Mandab, Bosphorus and Dardanelles, Strait of Gibraltar, Strait of Dover, Sunda Strait, Lombok Strait, Kiel Canal	16
Korea, Rep.	Korean Strait, La Pérouse Street	2
Italy	Suez Canal, Bosphorus and Dardanelles, Strait of Gibraltar, Strait of Hormuz, Strait of Bab el-Mandab	10
Canada	Bering Strait	1
Argentina	Strait of Magellan	1
South Africa	Cape of Good Hope	1
Indonesia	Strait of Malacca, Sunda Strait, Lombok Strait	4
Turkey	Suez Canal, Bosphorus and Dardanelles, Strait of Gibraltar, Strait of Bab el-Mandab	8
Mexico	Panama Canal	2
Saudi Arabia	Suez Canal, Strait of Hormuz, Strait of Bab el-Mandab	6
Australia	Strait of Malacca, Sunda Strait, Lombok Strait	4
Brazil	Panama Canal, Strait of Magellan	3

Choke Point Type	Primary Choke Points (2 Points)	Secondary Choke Points (1 Point)
1	Panama Canal	Cape of Good Hope
2	Strait of Malacca	Strait of Dover
3	Strait of Hormuz	Bering Strait
4	Suez Canal	Strait of Magellan
5	Strait of Bab el-Mandab	Sunda Strait
6	Bosphorus and Dardanelles	Lombok Strait
7	Strait of Gibraltar	Korea Strait
8	-	Kiel Canal
9	-	La Pérouse Strait
Total Points:	14	9

Abbreviations

ARG	Argentina	PS	Power Score
AUS	Australia	PSR	Power Shift Rate
BRA	Brazil	RES	Total reserves
CAN	Canada	RUS	Russian Federation
CC	Rate of Country Change	SAU	Saudi Arabia
CCP	Control of Chokepoints	TUR	Turkey
CHN	China	UNESCO	UNESCO World Heritage Sites
COMP	Companies (total of Global Fortune 500)	UNI	Universities
CS	Country Share (Indicator World Share)	USA	United States
DEU	Germany	WLD	World
EXP	Exports of goods and services	ZAF	South Africa
FRA	France		
GBR	United Kingdom		
GDP	GDP (PPP. current int. Dollar)		
ICR	Indicator Change Rate		
IDN	Indonesia		
IND	India		
ITA	Italy		
JPN	Japan		
KOR	Korea, Rep.		
MC	Market Change (Comparison of Country Shares)		
MEX	Mexico		
MILEX	Military Expenditures		



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