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THE POWER OF HUMAN ACTION OR CIVILIZATIONAL POWER

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OR
CIVILIZATIONAL POWER

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The fundamental concept of the social sciences is power in the same sense in which energy is the fundamental concept of physics.

Bertrand Russell

The most important feature of every international system is the distribution of power.

Raymond Aron

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List of abbreviations and country names according to ISO 3166-2

ARE – United Arab Emirates

ATG – Antigua and Barbuda

BHS – Bahamas, The

BIH – Bosnia and Herzegovina

BRN – Brunei Darussalam

CAF – Central African Republic

COD – Congo, Democratic Republic

CZE – Czech Republic

DOM – Dominican Republic

EGY – Egypt, Arab Republic

FSM – Micronesia, Federated States

GNB – Guinea-Bissau

GNQ – Equatorial Guinea

KGZ – Kyrgyz Republic

KNA – St. Kitts and Nevis

MHL – Marshall Islands

MKD – Macedonia, FYR

PNG – Papua New Guinea

PRK – Korea, Democratic People's Republic

SLB – Solomon Islands

STP – Sao Tome and Principe

SYR – Syrian Arab Republic

TTO – Trinidad and Tobago

TWN – Taiwan, Province of China

VEN – Venezuela, RB

VCT – St. Vincent and the Grenadines

FOREWORD

The presented Report has two distinct layers. The first is a study of the international balance of power. In this respect, it is a continuation of earlier reports published in traditional (paper) and electronic versions. In the traditional version these reports were (in chronological order): M. Sułek (editor), R. Kobryński (editor assistent), *Potęga 2015. Międzynarodowy układ sił w procesie zmian*. Raport potęgometryczny, Polskie Towarzystwo Geopolityczne, Kraków 2015, ss. 108; R. Białoskórski, R. Kobryński, M. Sułek, *Potęga państw 2017. Międzynarodowy układ sił w procesie zmian*. Raport potęgometryczny, Warszawa 2017, ss. 179; R. Białoskórski, Ł. Kiczma, M. Sułek, *Potęga państw 2018. Międzynarodowy układ sił w procesie zmian*. Raport potęgometryczny, Warszawa 2018, ss. 248; Ł. Kiczma, M. Sułek, *Potęga państw 2020. Rankingi potęgometryczne*, Powermetric Research Network, Warszawa 2020, ss. 85. In the electronic version, the following were published: R. Białoskórski, Ł. Kiczma, M. Sułek, *National Power Rankings of Countries 2019*, Powermetric Research Network, Warsaw 2019; R. Białoskórski, Ł. Kiczma, M. Sułek, *Potęga państw 2019. Rankingi potęgometryczne*, Powermetric Research Network, Warszawa 2019; Ł. Kiczma, M. Sułek, *National Power Rankings of Countries 2020*, Powermetric Research Network, Warsaw. In principle, these reports were based on the same methodology; variations between reports primarily stemmed from differences in the scope of issues that were addressed and illustrated. The 2018 Report had the greatest "expansion." Electronic versions were limited to core issues.

The current version of the Report differs significantly from previous versions with the introduction of a new category of power: civilizational power, which is the second layer of the Report. The definition of civilizational power is very simple – it is the sum of physical power (measured by annual energy consumption) and sociological power (measured by the model used in all previous reports). The Report is another attempt to respond to the great institutional and societal demand for empirical studies of international relations, which has intensified after Russia's aggression against Ukraine. In our report, we refer to praxeology (the science of human action), cybernetics (the science of control), and potentiometry (the science of measuring the power of participants in international relations, especially states). It is a sub-discipline of geopolitics. As you can see, the basic term used in the Report is "power." Its equivalent in Polish is "potęga," in French is "puissance," in German is "Macht," and in Russian is "мощь."

The presented Report may seem complex, particularly as the situation is further complicated by the introduction of the new category of power – civilizational power. However, we are convinced that the complex methodology will not be an obstacle to understanding its main contents and results. We will begin with the Report's main content, changes in the international balance of power, and supplement this content with derivative quantities (such as militarization indicators). We show changes in the international balance of power in two layers. Layer one is familiar from previous reports – the relations of economic, military and geopolitical forces estimated on the basis of a simple mathematical model (the understanding of which is not necessary to understand the results). Layer two is based on the simple concept of civilizational power, which shows the power of human action. In both layers, we also present the necessary calculations of the efficiency of human action in the countries under study.

Note that the presented assessment of the international balance of power is formal in the sense that it is context-free, that is, it does not take into account geographical location, the shape of borders, friends and enemies, alliances, etc. Therefore, it is not an assessment of a state's actual position, which would have to include the context (conditions) of the states under consideration. Additionally, we omit the issue of nuclear weapons, nor do we refer to emerging terms such as hard power, soft power, smart power, sticky power, sharp power or awkward power.

INTRODUCTION

Background

Following the end of the Cold War, far-reaching changes in the global (international) balance of power occurred in a short period of time. These consisted of a transition from a bipolar system to a system closer to a so-called unipolar moment determined by the US. The system became less stable and less predictable. As a result, the demand for more accurate assessments of the international system in terms of power relations increased, resulting in many proposals for estimating and measuring the power of individual states. These were formed primarily by great powers (the US, China, Russia, India), although lesser powers, states with power ambitions (Iran, Turkey) and medium-sized states (Poland, Spain) participated as well.

Since the early 1990s, research on measuring the power of states has developed in two directions. The first took into account the various groups of factors that make up so-called hard power (armed forces, military spending, the economy, industrial production, technology); the second – influenced by the theory of Professor Joseph Nye – focused on so-called soft power (power based on attractiveness) and smart power (a combination of hard power and soft power). This second concept was based on a rather optimistic vision of international relations after the collapse of the Soviet Union and the end of the Cold War. The last decade or so has been marked by a "return to history," i.e., a hard power game and interests, not excluding serious armed conflicts, which entailed the return of traditional problems of diplomacy. The complication of international relations triggered the emergence of further concepts for the study of the power of states, and thus the international balance of power. Additional categories of power have arrived, such as sticky power, sharp power and awkward power.

In this study, we propose to initiate research on measuring the power of civilization, which we define in praxeological and cybernetic conventions. Praxeological (or Praxiology) conventions are used because we refer to systems of human action while cybernetic conventions are used because we distinguish between information (managerial) and work (executive) flows in every system of action. Both are energy flows, with the difference being that informational flows have the task of informing (it is important to consume as little energy as possible in the process), while work flows have the task of doing work (the idea is to consume only as much energy as necessary, without unnecessary waste). In systems of human action, physical energy is processed in, say, processes of production or transportation, and sociological energy is manifested in products and services of a certain value. Energy flows take place over time, so any system of human action can be described in terms of power (physical and sociological). In our approach, civilizational power will be the sum of both types of power, that is, civilizational power = physical power + sociological power. Since we express the power of states only in terms of power, the two terms will be used interchangeably. The term "sociological power" has been used on the basis of contrasting it with "physical power," and it will be used within the framework of considering civilizational power. In the section on sociological power, it will appear as "economic power" (divided into civilian power and military power) – a term used in previous publications.

In light of the great variety of definitions of civilization/culture, we have proposed an operational definition, based on objectified data, allowing it to be quantified. Our main goal is to present the dynamics of change in the international balance of power (in the structure of the international system) in two ways – first, in terms of civilizational power (from 2001 to 2022 – the period for which the latest data on energy consumption are available) and second, in terms of sociological power (from 1992 to 2023). For both types of power, we calculate efficiency indicators that will help us classify individual countries into the appropriate type of civilizational power. Our calculations apply only to states and their unions, meaning we omit any non-state actors.

Due to considerable confusion in regard to terminology, our operational definitions, which lead to concrete numbers, are given without additional discussion. For us, the basic concept is power (expressed in terms of power), which is a certain value that is shaped in the sphere of international relations, just as the value (price) of goods in the free market is shaped. This value is objectified in the process of synthetic interaction evaluation of the totality of tangible and intangible characteristics of the state. This assessment is a process, so it is constantly changing under the influence of many circumstances. The use of formal models or expert assessments serves to interpret this assessment but will always be approximate.

We based the presented results on special formulas proposed by Miroslaw Sulek. They are highly synthetic in nature given that they use only available statistical data, so the calculation process is easy and accessible to everyone. Accordingly, people using the same sources will achieve the same results which is not the case when only expert evaluations are used. Of course, this is only the first stage of the work. In the second stage, experts will always be needed (despite differing interpretations) to transform the numbers into words.

Structure of the report

The Report consists of four main parts. Part I is a brief overview of the theory of human action. Part II presents the used methodology. Parts III and IV contain the results of calculating the power of states, with the exception that Part III refers only to economic (sociological) power. In Part IV, we estimate the size of the civilizational power of states and, based on the adopted measures of efficiency, have assigned a selected group of states to one of the four types of civilization. Both parts end with a summary, while the entire Report ends with a conclusion. In Part III, we consistently use the term "economic power," which – due to a change of context – will appear in Part IV as "sociological power." From this it appears that "economic power" = "sociological power." Thus, this change is only terminological, not conceptual. Thus, the main category of sociological power is economic power, the structure of which consists of civil and military power. These two powers - civilian and military – also converge to form geopolitical power.

The theoretical basis of the report is established with praxeology as the science of human action; cybernetics as the science of control; and powermetrics as an applied science that deals with measuring, estimating and assessing the power of participants in international relations, especially states. Powermetrics is a sub-discipline of geopolitics. praxeology makes it possible to present the system of human action in the form of three subsystems: cooperation, struggle and competition, which are the basis for distinguishing the three types of state power.

Cybernetics is credited with distinguishing between two types of energy flows in systems of human action. The first type is control (information) flows, the second is executional (work) flows. We treated physical energy flows as control flows and sociological energy flows as executive flows. This division allowed us to construct a simple definition of the power of civilization. Thanks to powermetrics, we achieved concrete results.

The methodological basis of the report is formed by models and formulas developed by Miroslaw Sulek. Thanks to these models, we calculated the size of the power of states by economic, military, and geopolitical power (in Part III) and civilizational power (in Part IV). Thanks to the derived indicators (militarization, index of social organization, affectivity of transformation), we were able to describe the changes in the international balance of power with much more accuracy and depth.

Statistical database

Statistical data used in the Report comes from several sources, the number of which was kept to a minimum wherever possible. Data on population, GDP size by exchange rate, and area of countries' territories primarily come from the World Bank (WB) database. The exception is data for Taiwan (a province of China), where data on the size of GDP by exchange rate come from the International Monetary Fund (IMF) database, while data on population and territory area come from the United Nations (UN) database. Data on the number of active-duty troops and military spending in U.S. dollars were taken from "The Military Balance" yearbooks published by the London-based International Institute for Strategic Studies (IISS). We took data on energy consumption two key sources: the Key World Energy Statistics 2021, published by the International Energy Agency, and the U.S. Energy Information Administration. Missing data from the aforementioned sources were supplemented with data from the following sources according to the hierarchy: International Monetary Fund (IMF), Stockholm International Peace Research Institute (SIPRI) and the US Central Intelligence Agency (CIA).

In general, we do not discuss the quality of the statistics used, although we understand that their reliability for different countries varies. The most reliable statistics refer to highly developed countries with mature market economies. Some countries hide certain data (e.g., on the military sphere), while others simply falsify them. As for countries with underdeveloped market economies or even non-market economies, the data is falsified not so much by the authorities but by the system itself, which is unable to generate the right prices. It should also be noted that the reported volume of military spending for different countries conveys slightly different information. Definitions aside, the peculiarities of the market for armaments and military equipment mean that, for example, the military expenditures of the United States are somewhat overstated, while those of Russia and China are understated. This carries over to the results of military power calculations.

SUMMARY

This Report presents the changes in the international system after the Cold War, i.e. from 1992-2023.These changes are of two types. First, they are changes in the international balance of power on the basis of three types of power: economic power, military power and geopolitical power. Second, changes in the structure of civilizational power, which is the sum of physical power and sociological power (2001-2022).

Economic, military and geopolitical power

Polarity of the international system from 1992 to 2023

Taking economic power as a measure, it can be said that in 1992 a unipolar system determined by the United States was formed, although it had not yet reached the position of superpower (about 16% of the world's economic power). Japan was in second place, followed by Germany, China, France, Italy, Russia, the United Kingdom, India and Canada. Poland was ranked twenty-eighth. In 2023, the balance of power radically changed. A balanced bipolar system consisting of China and the USA emerged, with China overtaking the United States. (this has already happened since 2017. India came in third, Brazil in fourth, Japan in fifth, Russia Russia only in sixth place. Germany, France, the United Kingdom, Canada and Mexico followed. Poland was ranked 24th.

Taking military power as a measure, we see that in 1992 a decidedly unipolar system was formed with the United States in the lead, which in the process achieved the position of superpower (at 25.6% of the world's military power). Russia, which was in second place at the time, was almost three times weaker. The remaining places were occupied by China (far behind Russia), followed distantly by France, Germany, Great Britain, India and Japan. Saudi Arabia and Italy were still in the top ten. Poland was ranked twenty-sixth. Going into 2023, the system remained unipolar though experienced some shifts in power. Now in second place, significantly behind the US, was China. Russia was in third place, and India in fourth. The next places were occupied by Saudi Arabia, France, the UK, Germany, Ukraine, Japan, Brazil, South Korea. Brazil was promoted to 11th place. Poland was ranked 18th.

Taking geopolitical power as a measure, we note that in 1992 the system was clearly unipolar, determined by the United States, which reached the position of superpower (at 22.3% of the world's geopolitical power), maintaining a threefold advantage over Russia in second place. China was ranked third, followed by Japan, Germany, France, the United Kingdom, India, Italy and Canada. Poland was ranked twenty-seventh. In 2023, the system became bipolar (the US and China), with China clearly weaker. Thus, it is a poorly balanced system, and China's geopolitical power is more than half that of the US. Poland was ranked 20th.

Taking all types of powers into account, it can be said that between 1992 and 2023 there were far-reaching changes in the international balance of power. China's great ascendancy garners attention, and less spectacular but also significant is the case of India. The United States has weakened somewhat but has maintained its leading position in terms of military and geopolitical power. The biggest loser of the period is Japan which recorded a rare decline in its position of peacetime.

Winners and losers

We consider winning states (i.e., those that have achieved an increase in their power) and losing states (i.e., those that have seen a decline in their power) solely in terms of economic power. It is the most objective measure as it does not depend on the decisions of politicians in the short term, unlike military power and, indirectly, geopolitical power. Additionally, since the struggle for power is a zero-sum game, if someone wins, someone must lose. To add to this, depending on one's perspective, in the long term, economic power is decisive; in the medium term, geopolitical power; and in the short term, military power.

The results of the comparison are very interesting and somewhat surprising. There are quite a few spectacular wins and some spectacular losses in the 1992-2023 period. In the table, the countries have been ranked according to percentage increases or decreases in power. In terms of economic power, the greatest winners include China, Vietnam, Kenya, Bangladesh, India, Angola, Nigeria, Indonesia, Pakistan, Israel, the Czech Republic, Slovakia and Poland. Also among the winners are Turkey, Israel, Brazil, Australia, and South Korea. As for the losers, first place goes to Japan (more than a 60% drop in power!). The next countries are Libya, Italy, Greece, and Germany. In lower places are France, Sweden, Argentina, Spain, Ukraine, Austria, Taiwan, Belgium, Denmark, and Finland. Among the losers are also the United States and Russia, but the decline in their power was relatively small (well below 10%). The breakdown for 2001-2023 looks slightly different. The winning side still contains underdeveloped and developing countries (China, Vietnam, Angola, Kenya, Bangladesh, Indonesia, Nigeria), while the losing side consists of highly developed countries (Japan, Greece, Italy, UK, Germany, France).

Given this data, it is clear that in terms of economic power in the 1992-2023 period, the greatest winners are the medium and underdeveloped countries. In our opinion, processes of globalization, or rather, the expansion of international cooperation, is largely responsible for this trend. The elimination of constraints through cooperation leads to equalization of standards. (As an aside, this is a common phenomenon in nature. On this principle, the levels of liquids, temperature, and pressure are equalizing.) Particularly high increases have been recorded by countries that have embraced globalization (China, India). However, it is worth noting that different political-economic systems are not equally prepared to receive the benefits of globalization. Either way, at the expense of Western countries, a great advancement of most developing countries has occurred.

Regionally, Sub-Saharan Africa and East Asia and the Pacific have seen the largest gains in power. The Middle East and North Africa region and Latin America and the Caribbean also saw significant growth. Excluding a slight decline in South Asia, the only big losers are Europe and Central Asia. The power of North America remained unchanged. So, as you can see, the poorest region, sub-Saharan Africa, was the most successful.

There were also big changes in the division of power between East and West. It turned out that between 1992 and 2009, the West had the advantage, while from 2010 onward, the East turned out to be stronger, and this gap was growing. In 2022, the trends reversed - the power of the East declined slightly, and the power of the West increased slightly.

Militarization

It should be remembered that the militarization we count is relative, that is, the militarization of the world equals 1. This applies to all three types of militarization – economic militarization (economic-demographic militarization), GDP militarization (production-service militarization) and demographic militarization. In doing so, three model situations are possible. The first occurs when the position of the state determined by all three types of militarization is similar – this is a balanced position. However, it should be remembered that it can be achieved with different levels of militarization, high or low. The second occurs when the position resulting from GDP militarization is markedly higher than that resulting from demographic militarization (an unbalanced position characterized by a production-services tilt). And the third occurs when the position resulting from demographic militarization is clearly higher than the position resulting from GDP militarization (an unbalanced position characterized by a demographic tilt). Militarization indicators can be interpreted as both mobilization ratios (since they show how much of the resources have been allocated for military or defense purposes) and readiness indicators (i.e., the degree of preparedness for national defense).

In 1992, finding countries with a clearly balanced position in high levels of militarization is difficult. Nevertheless, such countries may include Oman, Armenia and Russia. Countries characterized by a manufacturing-services tilt are Kuwait, Azerbaijan, Vietnam, and Saudi Arabia. Countries with a demographic tilt include North Korea, Israel, Syria, Iraq, and Greece. In 2023, the situation has changed significantly. Countries with a balanced position include: Ukraine, Armenia, Russia. Countries with a manufacturing and services tilt are: Algeria, Saudi Arabia, Kuwait. Countries such as North Korea, Israel, Greece, South Korea are characterized by demographic tilt.

States by criteria of power status

We adopted as many as seven synthetic criteria of power status (Table 1), considering them on the basis of three types of power: economic, military and geopolitical.

Table 1 Classification of the power status of states based on synthetic measures of power

Power status	Symbol	Criteria (in % of world power)
Superpower	XP	over 18
World Power	WP	12–18
Great Power	GP	7–12
Medium Power	MP	3–7
Local Power	LP	1–3
Small Power	SP	0.1–1
Micro Power	PP	less than 0.1

On the basis of economic power, the United States met the criteria for a world power throughout the given period (except in 2001, when it reached superpower status). China went from a middle power (1992-2004) through a great power (2005-2011) to a world power (2012-2021). India was a local power (1992-2002) and then a middle power (2003-2023). Japan was a middle power, except for when it was a great power from 1993-1995. Russia, on the other hand, remains a local power, with the exception of 2008 and 2010-2014, when it was a middle power. It recorded its lowest level of economic power in 1999-2000.

On the basis of military power, the United States was the only superpower. China was, respectively, a middle power (1992-2000), a great power (2001-2004), a middle power again (2005-2010), and then a great power (2011-2023). India advanced from being a local power (1992-2008) to a middle power (2009-2021). In 1992, 1997-2002 and in 2005, Russia met only the criteria of a local power, whereas in the other years it met the criteria for a middle power.

On the basis of geopolitical power, the United States was a superpower. China reached the status of a middle power (1992-2001) and then a great power (2002-2004), only to fall again to the level of a middle power (2005-2008). It was a great power from 2009-2017 and a world power from 2018-2023. India was a local power from 1992-2006, and a middle power in the following years. Russia was a local power from 1992-2006 (except in 1993 and 2004 when it was a middle power). As of 2007, it remains a middle power.

States in the power cycle

We have also shown power cycles (in fact, fragments of power cycles) for the first thirty countries in terms of economic power from 1992 to 2023. This period, although relatively short, allows us to observe the trends subsequently used in forecasting. The charts presented here reveal that the course of the cycles varies strongly in both time and amplitude. For example, only after the end of the Cold War and with the onset of advancing globalization did China embark on a path of rapid power growth. The U.S. position fluctuated but showed a downward trend throughout the period. Japan went through a textbook power cycle: rapid growth from 1961 to 1988; stabilization from 1989 to 1995; and a strong decline since 1995. India showed a downward trend until around 1993, after which a mild upward trend began. The power cycle for Brazil was fluctuating, but the trend was mildly upward throughout the period. Russia went through three phases: from 1989 to 1999 there was a strong downward trend; from 2000 to 2013 there was a strong upward trend. Since 2013, there has been a mild downward trend. The war with Ukraine will likely exacerbate this trend.

Distribution of power in the European Union

Two main periods can be distinguished in the formation of the economic power of the European Union between 1992 and 2023. The first involved a slow upward trend (1992-2004); the second involved a strong downward trend (2004-2023). A clear downward trend is found throughout the entire period under analysis. Here, too, there are winners and losers. The biggest declines were recorded by countries such as Belgium, France, Germany, Italy and the United Kingdom. The strongest country throughout the period was Germany, which had more than a quarter of the Union's power at 26.13% in 1993 and only 20.90% in 2023. Some countries, in turn, have significantly increased their share. The biggest "winner" is Ireland, but all the countries admitted to the Union in 2004 and onwards have also made significant gains. In other words, the balance of power within the European Union has become less polarized.

Civilizational power

This chapter contains the results of measuring the civilizational power of countries in 2001 and 2023, along with three measures of efficiency: the efficiency of transformation of physical energy into sociological energy (calculated on the basis of civilizational power), the index of social organization (calculated on the basis of sociological power) and the integrated index of efficiency (the product of the two above measures of efficiency). Thus, we will present two main lists of countries characterized by (1) civilizational power and its components and (2) measures of efficiency, which will be helpful in assessing the level of civilization of selected countries. Measures of efficiency will allow us to build three lists of countries: two on the basis of partial indicators and one on the basis of an integrated indicator, decisive for the final assessment. The integrated efficiency index was constructed in a different way than the index developed by Ian Morris (more on his concept in Part II) but conveys similar information.

As a reminder, the power of civilization is the sum of physical power and sociological power. It is the power of human action. Due to the fact that individual states have different levels of development, their positioning according to these two types of power varies greatly. From the point of view of the study on the international balance of power, sociological power is decisive but indicators of efficiency allow a deeper assessment of the capabilities of states.

We used three measures of efficiency to determine the levels of civilization: the efficiency of the transformation of physical energy into sociological energy; a measure of the organization of society in time and space derived from sociological power; and an integrated efficiency index, which is the product of the previous two measures. Thus, we have presented two main lists of countries: (1) according to the main measures, i.e., civilizational power and its components and (2) according to efficiency measures. Physical power plays the role of inputs, while sociological power plays the role of outputs. We assumed two levels for efficiency measures – high (H) and low (L). This gave four levels of civilization – very high, high, low and very low.

Table 2 Levels of civilization with examples of countries

Levels Civilization	Efficiency Coefficients			EXAMPLES
	Partial		Integrated	
	e_s	e_o	iei	
I (Very High)	H	H	H	Switzerland, Ireland, UK, Japan, Germany, Denmark, Israel, USA, Italy.
II (High)	L	H	H	Spain, Austria, Norway, Belgium, Taiwan, Sweden, South Korea
III (Low)	L	L	L	Pakistan, Tunisia, Bolivia, Namibia, Armenia, Azerbaijan, Georgia, Belarus
IV (Very low)	H	L	L	Niger, Libya, Turkmenistan, Kyrgyzstan, Tajikistan, Iran, Mongolia, Sudan

The indicators used in the table above represent the following: e_s this indicator shows the efficiency of transformation of physical energy into sociological energy and is a dimensionless quantity. The second indicator is more complex in nature. This indicator expresses the level of socio-economic development, the level of social productivity in time and space, or the level of organization of society (e_o) – it is only concerned with sociological power and is, in fact, a broad view of social productivity - broad because it is the productivity of society captured not only in time but also in space. The third indicator, the integrated efficiency index (iei), is simply the product of two sub-indices: iei= $e_s \times e_o$.

H-H-H civilization (very high level) includes countries characterized by high efficiency indicators in all three categories. L-H-H civilization (high level) includes highly developed countries with low transformation efficiency rates but a high bottom line. L-L-L civilization (low level) includes developing countries with low efficiency rates. H-L-L (very low level) civilization includes low-developed countries (high transformation efficiency is due not to a high level of development but to a low level of energy consumption).

PART I
HUMAN ACTION - THEORY

1.1 Praxeology – the science of human action

1.1.1 The pursuit of power and the logic of human action

The power of the state or other organized social groups is the most important characteristic of human action, and its logic remains the same throughout history – only the tools (technology) and the conditions of the environment, which has an increasingly artificial character, change. Man has consistently moved away from the natural environment because it is unfriendly to him. Instead, he creates his own artificial one, which also poses many threats.

As taught by the prominent representative of the Austrian school of economics, Ludwig von Mises (1881-1973), the science of human action is praxeology, also defined as the science of efficient action or the science of improving action, as argued by the distinguished Polish philosopher and logician, Tadeusz Kotarbinski (1886-1981). The two approaches are basically the same, but the emphasis on efficiency is highly desirable here. A problem arises in Tadeusz Kotarbinski's approach in that he called for the search for principles of efficient action that work in all types of human action. The new approach to praxeology shows that such principles exist but offer little practical value, being that they are too general. Ludwig von Mises argued that praxeology is apriori-deductive in nature[1]; Tadeusz Kotarbinski placed more emphasis on practical experience, so he attached great importance to sentences, aphorisms, thoughts of outstanding individuals or proverbs of nations.[2] We base the new approach to praxeology on the following reasoning.[3]

People as particles of a social organism are born, live and act in a competitive environment, i.e., in a world of limited resources. It can even be said that the necessity to act arises from this. In this world, people want first and foremost to survive and then to thrive. To this end, they create social systems of action (SSA). Scarcity of goods can only be dealt with in two ways: the first is through voluntary cooperation (increasing the amount of goods and services) and the second is through struggle (taking from others). According to game theory terminology, cooperation is a positive-sum game (all parties involved benefit) while fighting is a negative-sum game (all parties involved suffer losses). In real life, there is neither pure cooperation nor pure struggle (they are only models). Rather, there is always some mixture (hence, for example, relations between states can be friendly, proper, tense, hostile). In the course of action, people must make decisions relating to the direction and proportion (intensity) of the cooperation/struggle. We will call this type of action competition (which is a zero-sum game). Survival and development under conditions of scarcity of goods force the pursuit of maximizing one's opportunities (power, wealth, strength, glory, fame, prestige, recognition, authority). This striving is synthesized in the concept of power by Bertrand Russell. According to Russell, the

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[1] L. von Mises, *Human Action. A Treatise on Economics*, Ludwig von Mises Institute, Auburn, Alabama 1998, p. 30–36. Recent efforts have sought to develop a fully a priori theory of international relations. Example: M.R. Crovelli, *Toward an A Priori Theory of International Relations*, "Journal of Libertarian Studies" Volume 21, No. 4 (winter 2007), p. 101–121, https://cdn.mises.org/21_4_9.pdf [dostęp: 03.04.2021].

[2] T. Kotarbiński, *Traktat o dobrej robocie* (A Treatise on Good Work), Ossolineum, Łódź 1955, passim.

[3] M. Sułek, *Praxiology: A New Approach*, [in:] Wojciech Gasparski (Editor), *Praxiology: The International Annual of Practical Philosophy and Methodology*, Volume 25, Routledge, New York and London 2018, p. 152–161.

fundamental concept in social science is Power in the same sense that Energy is the fundamental concept in physics.[4] We shall add that power struggles not only concern humans – they also take place in the animal world and even the plant world.

Cooperation, as a positive-sum game, means that all parties involved benefit. From the state point of view, a prominent example of this is the market economy. Cooperation between enterprises and customers or cooperation between just enterprises benefits both entrepreneurs and customers. Moreover, the success of enterprises is not conditional on the elimination of another enterprise; rather, the opposite is true: the development of a certain group of enterprises requires the development of other enterprises. Even companies in direct competition with each other benefit (through heightened emphasis on increased innovation, flexibility of operation, etc.). And even if one of them fails (as a consequence of not cooperating well enough with society, i.e., not using the available resources properly), society as a whole benefits, as the resources freed up will go to more efficient entrepreneurs and be put to better use. The theory of cooperation is economics (it can be called cooperative economics or civil economics). Cooperation is based on trust and truth. It is characterized by the ethics of cooperation, or economic ethics; understood as the ethics of calculation, the ethics of reason and prudence; and accompanied by economic aesthetics, aimed at creating order and harmony in the economic system. Cooperation takes place between partners who are united by a strong community element.

Struggle (as a negative-sum game) means that all parties involved suffer losses. Struggle understood in this way can be carried out in a variety of fields. From the state point of view, the best example is armed struggle, i.e., a fight to the death. In combat, the key issue is victory, i.e., either destroying the opponent or inflicting such heavy losses on him that he no longer poses any threat. The theory of combat is the art of war (also called the economics of combat or simply military economics). The art of war is based on deception, trickery, surprise, and disinformation. It is accompanied by a military ethic that protects the unity of command, action, and the fighting spirit. It is aided by military aesthetics, which manifests itself not only in the elegance of uniforms and drill but also in combat actions. Combat takes place between enemies. In combat, the community element is weaker but still present (both can die).

Rivalry (as a zero-sum game) means that one party's gain is another party's loss of identical value. Such is the nature of the pursuit of power – on a societal or even global scale, rivalry is always present, with individuals organized into various social groups competing for the largest possible share. This can be seen well in the international arena – individual states strive for the greatest possible power, i.e., the greatest possible share of world power. Here, power cannot be just shared; the interests of the parties are completely opposed. The communal element disappears – one side gains at the expense of the other! As the rivalry straddles cooperation and struggle, it is based on duplicity, which manifests itself primarily in propaganda. Depending on the degree of tension between the rivals, the propaganda leans more towards the truth or more towards deception. All this is in line with the ethics of competition (the ethics of politics), aided by the aesthetics of competition. Rivalry is central to social life – it is to rivalry that the subsystems of cooperation and struggle are subordinate. In other words, the logic of competition, the drive to maximize power, is the dominant logic of social life.

[4] B. Russell, *Power. A New Social Analysis*, Routledge, London and New York 1996, p. 4.

The logic of rivalry, that is, the drive to maximize power, is the dominant logic of social life.

Cooperation and struggle belong to the real sphere; rivalry belongs to the sphere of regulation. In the real sphere, mainly the processing of matter and energy is carried out, whereas in the sphere of regulation, mainly information is processed. Information processing in the rivalry sphere aims to work out decisions about the scope, directions and intensity of Cooperation - Struggle.[5]

Following Raymond Aron's guidance, we define the power of states as the ability to do or the ability to create or destroy.[6] We have called the ability to do an economic power; the ability to create a civil power; and the ability to destroy a military power. Geopolitical power, in turn, is the result (not the sum) of civil power and military power. Thus, we have three types of power that reflect the three subsystems of human action: cooperation, struggle, and rivalry. They can be presented separately, but it is sufficient to show economic power and military power, because in this way we also indirectly show civil power. The increase in militarization comes at the expense of civil power. If military power were equal to zero (an abstract case), then civil power would equal economic power. The reasoning above is described in Table 3.

Table 3 System of human action

<table>
<tr><td colspan="2">REAL SPHERE</td><td>SPHERE OF REGULATION</td></tr>
<tr><td>COOPERATION</td><td>WARFARE</td><td>RIVALRY</td></tr>
<tr><td>The logic of cooperation
Theory of cooperation
Economics
Positive-sum game
Truth
Informing
Ethics of cooperation
The aesthetics of cooperation
Partner</td><td>The logic of war
Theory of war
Theory of the art of war
Negative-sum game
Deception
Disinformation
Ethics of war
The aesthetics of war
The enemy</td><td>The logic of rivalry
Theory of rivalry
The science of politics (geopolitics)
Zero-sum game
Hypocrisy (“two-facedness”)
Propaganda
Ethics of rivalry
The aesthetics of rivalry
Rival</td></tr>
<tr><td>CIVIL POWER
(Ability to create)</td><td>MILITARY POWER
(Ability to destroy)</td><td rowspan="2">GEOPOLITICAL POWER
(Ability to shape the geopolitical environment)</td></tr>
<tr><td colspan="2">ECONOMIC POWER
(Ability to do)</td></tr>
</table>

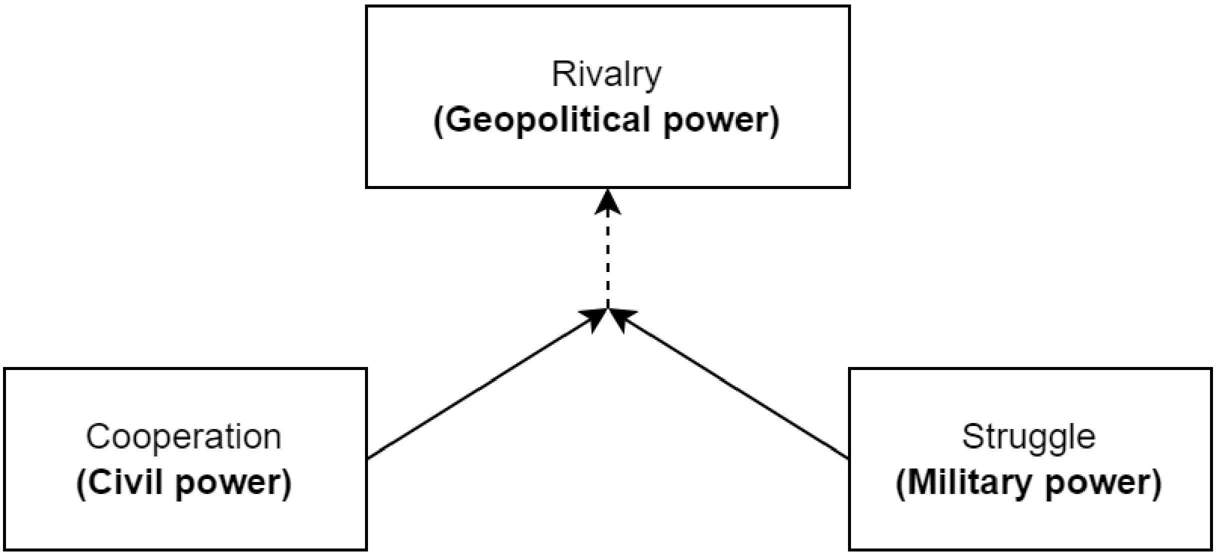
Source: this is a slight extension of the model presented in: M. Sułek, *Praxiology: A New Approach*..., op.cit., p. 154.

[5] M. Sułek, *Praxiology: A New Approach*..., op.cit. p. 152–161.

[6] R. Aron, *Peace and War. A Theory of International Relations*, Transactions Publishers, New Brunswick (U.S.A.) and London (U.K.) 2003, p. 47. «Au sens le plus général, la puissance est la capacité de faire, produire ou détruire », https://www.catallaxia.org/wiki/Raymond_Aron:le_concept_de_puissance.

These three types of human action form a unified social system of action, consisting of a real sphere and a regulatory sphere. It can be seen in every social group but especially in the state. In the state we have a clearly delineated subsystem of cooperation (the economy); a subsystem of struggle (the armed forces with their economic, political, ideological and cultural background); and a subsystem of regulation (state authority). In the Rivalry subsystem, decisions are worked out as to the scope, direction and intensity of the resources at the disposal in Cooperation - Struggle.

Figure 1 Social action system



The three types of action mentioned above form a unified social system of action, consisting of a real sphere and a regulatory sphere. It is evident in every social group but especially in the state.

1.1.3 Efficiency accounts

In each of the three subsystems of human action, decisions are made to achieve specific goals in the best way possible. Each decision is preceded by specific calculations. The human action system is made up of three subsystems: the two subsystems of the real sphere (in which matter and energy are primarily processed) and the regulation subsystem (in which information is primarily processed). Each of these subsystems is characterized by a different logic. A simple conclusion follows from this – the calculations should also be fundamentally different. This involves a different understanding of inputs and outputs and efficiency accounts. The general guidelines in this regard derive from the principles of cooperation, the principles of the art of war and the principles of (geo)politics which – as practical rules – have been shaped over millennia. In this work, we are primarily interested in inputs and outputs in the three subsystems of human action. When we speak of cooperation, we are primarily concerned with benefits; when we speak of warfare, we are primarily concerned with losses.

Benefits and losses in the real sphere (in cooperation and struggle)

Cooperation is a feature of the civilian economy, while struggle is a feature of the military economy. In order to better understand the efficiency accounts in the real sphere, we will describe the characteristics of both approaches to economy. These are contained in Table 4. When we speak of cooperation and warfare, we have in mind gains (income, profits) and losses (inputs, costs). According to the views presented here, they depend on the type of system of action and on the ratio of forces (opportunities, potential), i.e., the state of equilibrium or disequilibrium. Cooperation provides benefits to both parties, with – it is worth emphasizing – the relative benefits of the smaller (weaker, less developed) partner being greater. In a fight, the opposite is true – it is the stronger one that suffers fewer losses (absolute and relative). This reasoning is presented in Table 4.

Table 4 Benefits and losses according to the system of action and distribution of power

System of action / Distribution of power	**Cooperation** (Benefits)	**Struggle** (Losses)
Balance	Balance of benefits (income, profits)	Balance of losses (human and material)
Imbalance	Larger benefits accrue to the weaker side	Smaller losses accrue to the stronger side

Source: M. Sułek, *Potęga państw. Modele i zastosowania* (The Power of Nations. Models and Applications), Warsaw 2013, p. 317.

Let us summarize. Voluntary economic exchange serves both parties, but it is the lower developed economy that gains more. The teacher-student analogy can be invoked here. Although the teacher can undoubtedly learn something from the student, it is the student who is the main beneficiary of their cooperation. The situation differs completely in struggle – it is the stronger one who suffers fewer losses, inflicting correspondingly greater losses on the opponent. The content of Table 4 is rarely well understood. Claims to the contrary are often found in the literature. A good test for the correctness of the reasoning in Table 4 is the effects of globalization. If understood as a process of expanding international cooperation, the overall effect should be a change in power relations in favor of poorer, less developed countries. As we shall see in later sections of the study, this has indeed happened.

There are simple directives from Table 4 (which seem trivial but are not always properly formulated): aim to cooperate with the stronger (richer, more highly developed) or avoid fighting with it and engage in combat with a weaker opponent. Under conditions of power balance, fighting makes no sense (equal losses do not change the mutual ratio of forces), while cooperation does; equal gains also do not change the ratio of forces, but states develop rather than destroy each other. As the imbalance grows, the stronger side has weaker and weaker incentives to cooperate, while the weaker side has more and more. With a balance of power, the incentive for cooperation between both sides is greatest, and the incentive for struggle is least.

Benefits and losses in the sphere of regulation (in the sphere of competition)

At the level of competition – to take the most favourable position – the role of inputs and outputs can be fulfilled by changes (increases, decreases) in the power of states, taken as a fraction of the world power (which is always 100%). One has to agree with Kenneth Waltz's view that "the ultimate test of a policy is its success: success means ensuring the survival and strengthening of the state."[7] It is distinctive that the final results of the rivalry do not depend only on the efforts of a particular nation but are a function of changes in the world system as a whole. As power struggles are a zero-sum game, a decline in the power of distant states (as a result of crisis or war) causes a rise in the power of other states and vice versa. The huge increase in the power of China and much of India (and other countries) after the Cold War was paid for by a decline in the power of Japan or most of the countries in the European Union.

Two main approaches can be used to estimate the magnitude of state power: formal models and expert assessments. Dozens of ways to estimate and measure the power of states have been proposed in the field of international relations theory, although it is an issue that is only present in a handful of countries, mainly current superpowers and states aspiring to superpower status. Such research is most intensively conducted in the USA, Russia, China and Iran. Research is conducted to a lesser extent in Japan, India, Turkey, Poland, Germany and Brazil. Expert assessments can be used independently of formal models, but the best results come from a combination of both approaches.

1.2 The power of human action

1.2.1. Human action as energy transformation

Every operating system takes its energy and matter from outside, processes it (transforms it) and releases it to the outside. Thus, we have the input of the system, the transformation and the output of the system. A general measure of the efficiency of a system is the ratio of output to input. This is the transformation efficiency. In the case of social action systems, we have physical matter and energy as input, which are transformed into goods and services. It is also easy to understand that in production processes, matter is exchanged because values are exchanged under its form. Therefore, commodities appear in a dual role – as things (matter), for the production of which physical energy was needed, and as values (abstraction), realized

[7] K.N. Waltz, *Struktura teorii stosunków międzynarodowych* (Theory of International Politics), translated by: Renata Włoch, Warszawa 2010, p. 120.

in the process of exchange (labour, or sociological energy). Physical power corresponds to specific labor, and sociological power corresponds to abstract labour. Let us also note that the production of any product always requires the consumption of physical energy, while it may be accompanied by zero sociological power. This is the case when the product on offer finds no purchaser, so its social value is zero.

Sociological energy is the result of a combination of spiritual, corporeal and physical (material, tangible) factors that can easily be found in any social group. The same applies to the social action system of different groups – states, political parties, businesses, families or individuals. The processing of energy takes place over time, so it is convenient to operate with the concept of power.

Figure 2 The process of transformation of physical energy into sociological energy

In any system, we can distinguish between energy flows and information flows. In technical systems, this division is fairly easy to distinguish, especially as it concerns the transformation of one physical energy into another type of physical energy. In social action systems, the situation is more complex, as these systems are concerned with the transformation of physical energy into sociological energy. It should be added that informational flows are also energy flows, but they have a different function (they are meant to inform) than typically energetic flows, which are meant to do work. From this point of view, it seems natural that physical energy flows have a working, executive character. However, this is not the case – these flows have an informational character, whereas sociological energy flows have a working, executive character as they are meant to do work. This work is the satisfaction of human needs. The discrepancy is therefore apparent.

Energy is consumed for work in both working processes (e.g., propulsion, heating, etc.) and control processes, but with the difference that in working processes the performance of work and the consequent consumption of a certain amount of energy is the goal (the ideal would be to consume no more energy than theoretically necessary, i.e., to avoid energy losses), whereas in control processes the goal is not to work but to inform (the ideal would be to consume energy equal to zero).[8]

From a cybernetic point of view, physical energy flows are information (control) processes and value flows are energy (work) processes! It should not come as a surprise, therefore, to have an opinion according to which "*production is not something physical, natural, and external; it is a spiritual and intellectual phenomenon.*"[9] Of course, production is also a physical phenomenon, but it is secondary to mental processes.

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[8] M. Mazur, *Jakościowa teoria informacji* (Qualitative theory of information), Warszawa 1970, p. 85.

[9] L. von Mises, *HUMAN ACTION. A Treatise on Economics*, The Ludwig von Mises Institute, Auburn, Alabama 1998, p. 141, https://cdn.mises.org/Human%20Action_3.pdf [dostęp: 28.04.2022].

Following Raymond Aron, we have adopted a praxeological definition of the power of political entities, which states: “In the most general sense, power is the ability to do, create or destroy.”[10] We have called the ability to do an economic power, the ability to create a civil power, and the ability to destroy a military power. Energy flows over time, so we can operate with the concept of power. The sum of physical power and sociological power results in civilizational power, i.e., civilizational power = physical power + power to create + power to destroy.

1.2.2. Energy as a measure of civilization/culture

The linking of socio-economic development to energy conversion has a long history and began in the 19th century with the development of the natural sciences (especially physics) and the social sciences (especially economics). The German mathematician and physicist Georg Ferdinand Helm was probably the first author to argue that money is the economic equivalent of low entropy.[11] The same thought is later found in Leon Winiarski, who wrote: "In this way, the prices of goods... represent nothing but relative coefficients of biological energy." He concludes: "Gold is therefore a universal social equivalent, a pure embodiment and personification of socio-biological energy."[12] The work of the Polish economist Zygmunt Heryng, “Logic of Economics,” in which he tried to explain the concepts of economics using the language of physics, should also be mentioned in this field. In his work, for example, he introduced the concept of kinetic social energy (as work done, in motion) and potential social energy (energy to be consumed).[13]

In later years, human energy consumption began to be more closely linked to the concept of civilization or culture. These concepts often appear together, side by side, and are defined very differently. They are also often equated with each other. Here is an example. Ulrich Kull defines culture and civilization as follows:

Culture is... everything that a certain group of people has produced over a certain period of time and in a limited area in confrontation with the environment; it expresses itself through language, religion, ethics, state, law, crafts, technology, art, science, etc. In German, a distinction is often made between culture and civilization, the material side that shapes the life

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[10] R. Aron, *Pokój i wojna między narodami (teoria)*, Centrum im. Adama Smitha, Warszawa 1995, p. 69; R. Aron, *Peace and War. A Theory of International Relations*, New Brunswick (U.S.A.) and London (U.K.) 2003, p. 47. In my opinion, in the phrase 'making, creating, or destroying,' the author's intent would be better conveyed by replacing the comma with a hyphen, resulting in 'making—creating or destroying'.

[11] G. Helm, *Die Lehre von der Energie*, Leipzig 1887, p. 92 and the following Quoted from: N. Georgescu-Roegen, *Entropia, wartość i rozwój* (Entropy, value and development), [in:] *Ponad ekonomią* (Beyond economics), Warszawa 1985, p. 241–242. Also: W. Ostwald, *Energetische Grundlagen der Kulturwissenschaft*, Leipzig 1909; H. Rickert, *Kulturwissenschaft und Naturwissenschaft*, Tübingen 1910 (Zweite Ausgabe).

[12] L. Winiarski, *Essai sur la mécanique sociale: L’energie sociale et ses mensurations*. Part II. “Revue Philosophique” XLIX, 1900, p. 265, 287. Quoted from: N. Georgescu-Roegen, *Entropia, wartość i rozwój* (Entropy, value and development), [in:] *Ponad ekonomią* (Beyond economics), Warszawa 1985, p. 242.

[13] Cf: Z. Heryng, *Logika ekonomii. Zasadnicze pojęcia ekonomiczne ze stanowiska nauki o energii* (The Logic of Economics: Fundamental Economic Concepts from the Perspective of Energy Science), Warszawa 1896, p. 241–248.

of a group. [...] [Civilization is ...] the totality of the material-technical devices of a culture. The transformation and simplification of an earlier way of life by science and technology. [14]

In general, it can be said that there are two main approaches to defining civilization. The first relates it to the level of development of a society; according to the second, represented, for example, by the Polish historiosophist Feliks Koneczny, civilization is "a method of organization of collective life." It is not, therefore, about the level of development but about the principles defining the whole of social coexistence and the abstract notions to which the community refers to justify these principles. The realization of the purpose of the paper is more suited to the first approach, i.e., linking civilization to the level of social development. This, in turn, brings to the fore the problem of energy processing and use in organized communities.

The role of energy in defining civilization or culture was recognized quite some time ago. The American anthropologist Leslie White wrote in the first sentence of his essay, published in 1943: "Everything in the Universe can be described in terms of energy."[15] Leslie White, being a representative of evolutionism in cultural anthropology, wanted to restore the approach to its former nineteenth-century lustre. The purpose of culture, White writes, is to satisfy human needs. These needs are of two kinds. The first are those that can be satisfied by using the resources inherent in the human organism as such. This type of need is illustrated, for example, by singing, dancing, creating myths, or organizing clubs or associations. The second type of need can only be satisfied by drawing resources from the external world. These include tools, weapons and other means by which man provides himself with food, shelter from the elements and defense against enemies. The satisfaction of spiritual and aesthetic needs through singing, dancing, myth-making etc. is only possible if the needs for food, protection and defense are satisfied. Thus, the whole construction of culture depends on materials, the mechanical means of connecting man to the earth.[16]

Further on, Leslie White formulates the law of cultural evolution: a culture develops when the amount of energy used per person per year increases; or when the efficiency of the technological means harnessing that energy to work increases; or both.[17] Two types of energy are used to produce goods and services – human energy and external energy. Human energy is a constant factor, while external energy is a variable factor. An increase in the amount of goods and services supplied goes hand in hand with an increase in external energy. This, in turn, means more goods and services per unit of human labor. Therefore, we arrive at the law: with other conditions unchanged, culture develops with an increase in the productivity of human labour.[18]

The struggle of humans for survival is expressed in endless attempts to make culture a more effective tool to ensure the safety and survival of the species. And one of the ways leading to this is to increase the amount of energy used per capita per year (i.e., to increase power! – my

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[14] U. Kull, *Evolution des Menschen. Biologische, soziale und kulturelle Evolution*, Stuttgart 1979, p. 72, 73. Quoted from: M. Fleischer, *Teoria kultury i komunikacji* (Theory of culture and communication), Dolnośląska Szkoła Wyższa Edukacji Towarzystwa Wiedzy Powszechnej, Wrocław 2002, p. 56.

[15] L.A. White, *Energy and the evolution of culture*, "American Anthropology", July–September 1943, Vol. 45, No. 3, Part 1, p. 335. The role of energy in White's concept is briefly highlighted by: R. Wright, *Non-zero, the logic of human destiny,* Pantheon Books, 2000. Robert Wright, Nonzero. *Logika ludzkiego przeznaczenia* (Non-zero, the logic of human destiny), Warszawa, no year of publication (original – 2000), p. 378.

[16] Cf. L.A. White, *Energy and …*, *op.cit*., p. 336.

[17] *Ibidem*, p. 338.

[18] *Ibidem*, p. 346.

note – M.S.). The second way of improving culture as an instrument of adaptation and control is by inventing new and better tools and improving old ones.[19]

Leslie White also cites George G. MacCurdy, who expressed a similar thought a decade earlier. According to him, the "level of development of civilization" of any era, people or group of people "is measured by the ability to use energy to develop or meet human needs." Energy is of two types, internal and external. Internal energy is the energy of the human body and is based on food. External energy occurs outside the human body, and its basis is fuel. Man has managed to harness a great store of external energy. With his own internal energy and that acquired from external sources, he has been able to oppose the unfavorable forces of the natural environment. The difference between these two opposing forces is the measure of civilization.[20]

A more contemporary example of tying economics to physics is Philip Mirowski's book, which has a beautiful subtitle: economics as social physics, physics as the economics of nature.[21] In the following years, research went rather in the direction of searching for synthetic indicators that characterize civilization. Such an attempt was made, for example, by Andrew Targowski, who constructed the Civilization Index.[22] Another researcher Ian Morris, preferring the quantitative study of history, examined human civilization as a whole, based on the concept of social development. According to him, it is the ability of social groups to master their physical and intellectual environment through tailored organization.[23] Ian Morris mentions the Human Development Index (HDI), developed by Pakistani economist Mahbub ul Haq and made public in 1990. He stresses that his index serves other purposes but strongly supports the principle that few measurable characteristics can serve as indicators-symptoms of a much broader concept.[24] Ian Morris' Human Development Index, which surveyed 16,000 years of human history, consists of four diagnostic features: (a) acquired energy; (b) social organization; (c) information technology; (d) ability to conduct wars.[25]

Undoubtedly, the proposed index can be considered as a kind of measure of the power of organized social groups, including states. The great merit of Ian Morris' approach is that it is limited to a small, necessary number of characteristics. However, it is debatable whether or not to include the ability to wage war in a single measure, as it is closely dependent on the other factors. In the theory presented in the Report, the military factor is separated from the civilian factor.

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19 *Ibidem*, p. 339.

20 G.G. MacCurdy, *Human Origins*, New York, 1933, Vol. 11, pp. 134–135. Quoted from: L.A. White, *Energy and…*, *op.cit.*, p. 356.

21 P. Mirowski, *More heat than light. Economics as social physics: Physics as nature's economics*, Cambridge University Press 1989.

22 Cf.: A. Targowski, *Information Technology and Social Development*, Information Science Reference, Hershley – New York 2009, Chapter III.

23 Por. I. Morris, *The Measure of Civilization. How Social Development Decides the Fate of Nations*, Princeton University Press, Princeton and Oxford 2013, p. 3, 5.

24 *Ibidem*, p. 28.

25 *Ibidem*, p. 39–42.

PART II. METHODOLOGY

2.1 Powermetrics, the modeling and measurement of the power of states

2.1.1. What does powermetrics do?

Powermetrics is the science of measuring the power (power, energy, strength) of participants in international relations. The need for such measurements was recognized quite a long time ago, but extensive research did not begin until after World War II. A number of terminological and conceptual proposals emerged.

Garry King, speaking in favor of the development of quantitative methods of political analysis, lists several proposed terms to describe the quantitative approach to political science, such as: *Politimetrics,*[26] *Polimetrics,*[27] *Politometrics,*[28] *Political Arithmetic,*[29] *Quantitative Political Science, Governmetrics, Posopolitics,*[30] *Political Science Statistics,*[31] *Political Statistics.*[32] He then writes:

I make one main point in this article: If political methodology is to play an important role in the future of political science, scholars will need to find ways of representing more interesting political contexts in quantitative analyses. This does not mean that scholars should just build more and more complicated statistical models. Instead, we need to represent more of the essence of political phenomena in our models. The advantage of formal and quantitative approaches is that they are abstract representations of the political world and are, thus, much clearer. We need methods that enable us to abstract the right parts of the phenomenon we are studying and exclude everything superfluous.[33]

Add to that Kenneth Boulding's proposal – *Politicometrics*[34] – the term was perhaps the most frequently invoked. Politicometrics was referred to by Stephen D. Slingsby as director of the *Politicometrics Research Program* at Ohio State University. At an elementary level, politicometrics is understood as the science of measuring political behavior. According to the scope of research, as well as application, it can be divided (at the level of didactics and research) into four categories: micro and macro, and basic and applied.[35]

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[26] T.R. Gurr, *Politimetrics: An Introduction to Quantitative Macropolitics*, Engelewood Cliffs, N.J.: Prentice Hall 1972.

[27] H.R. Alker Jr., “Polimetrics: Its Descriptive Foundations”. In *Handbook of Political Science*, ed. Fred Greenstein and Nelson Polsby. Reading: Addison-Wesley 1975.

[28] G. Hilton, *Intermediate Politometrics*. New York: Columbia University Press 1976; B.S. Frey, “Politometrics of Government Behavior in a Democracy”, Scandinavian Journal of Economics 1979, vol. 81, No. 2; F. Turnovec, *Politometrics: Econometrics for Political Science*, Politechnika Wrocławska, Wrocław 2003.

[29] W. Petty, *Political Anatomy of Ireland*. Reprint. Totowa, N.J.: Rowman and Battlefield 1971 (Original: 1672).

[30] L. Papayanopoulos, ed. „Democratic Representation and Apportionment: Quantitative Methods, Measures, and Criteria.” *Annals of the New York Academy of Sciences* 1973, 219:3–4.

[31] K.B. Rai, and J.C. Blydenburth, *Political Science Statistics*. Boston: Holbrook Press 1973.

[32] S.A. Rice, „Some Applications of Statistical Method to Political Research”. *American Political Science Review* 1926, 20 (2):313-29.

[33] G. King, “On Political Methodology”, *Political Analysis*, Vol. 2 (1991), p. 1.

[34] Cf. N. Rashevsky, E. Trucco, Introduction: L.F. Richardson, *Arms and Insecurity. A Mathematical Study of the Causes and Origins of War*, Pittsburg 1960, p. VII.

[35] Cf.: *Proceedings of Joint Meeting of Government Operations Research Users and Producers*, ed. M.L. Friend, Gaithersburg, Maryland, June 5–6, 1969, p. 81–82.

Interest in the use of quantitative methods in political science persists, but terminology is still evolving. Three terms are currently in use: politicometrics, polymetrics and politometrics, understood as sub-disciplines of political science, hence the prefixes politico-, poly-, polito-. They all address the application of quantitative methods to the study of political institutions (political systems, electoral systems) and rather omit international relations.[36] It is worth mentioning that in one publication, politicometrics was defined as "*application of dynamic systems theory to wars and arms races; created by Lewis Frye Richardson ca 1920.*"[37]

In our work, we propose the term powermetrics. It was used for the first time (along with the term powernomics) in the title of Miroslaw Sulk's 2001 book.[38] Powerometrics studies the measurement of the power of states and the modeling, simulation and forecasting of the international balance of power – it is an auxiliary discipline of geopolitics and the science of international relations.

To restate it, powermetrics is the application of quantitative methods to the study of international relations, treated primarily as relations of forces (powers). Its main task is to better understand international relations and world politics, to make theses and conjectures more precise (supporting theory) and to help draw conclusions. This is done by building formal models with concrete applications, and then performing calculations and performing experiments on the models, i.e., running simulations. The latter, in turn, make it possible to build forecasts of the international situation, especially the international balance of power, or to objectify existing ones. Combining the category of power with forecasting the international balance of power is undoubtedly of great importance.

The basic powermetric tool is modeling. The subject of modeling can be the power of states or other political units, as well as various forms of the international system, using power models. These models can be static, in which case time plays no explanatory role, and dynamic models, which include a time variable so that we can track changes over time.

2.1.2. Systematics of power increase/decrease in absolute and relative terms

The key to describing geopolitical rivalry (competition for power) as a zero-sum game is to understand absolute and relative gains/declines. Typical absolute gains are, for example, population growth (expressed in thousands or millions of people), GDP or military spending (in millions or billions of zlotys, dollars, etc.). However, for example, a high rate of GDP growth as a synthetic indicator of the efficiency of the economic system does not guarantee the growth of power; it all depends on what is happening in the world system as a whole. When the rest of the world grows even faster, then the power of a given country decreases, not increases. The reverse can also be true: a country's GDP may be declining, yet its power will grow when the GDP of the rest of the world declines even more. This idea is presented in Table 5.

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[36] On the subject of politometrics, see: J.M. Colomer, *Politometrics: Quantitative Models of Political Institutions*, George Mason University, February 2017, http://ices.gmu.edu/wp-content/uploads/2017/01/Politometrics-Quantitative-Models-of-Political-Institutions-by-Colomer.pdf [dostęp: 12.05.2019].

[37] R.H. Abraham, "The genesis of complexity", *World Futures*, 67, 2011, p. 392.

[38] Cf. M. Sułek, *Podstawy potęgonomii i potęgometrii* (Foundations of powernomics and powermetrics), Kielce 2001; M. Sułek, *Potęga państw. Modele i zastosowania*, op. cit.

Table 5 Increase/decrease in the power of states in absolute and relative terms

Relative view / Absolute view	Increase	Decrease
Increase	(1) Absolute growth, relative growth	(3) Absolute growth, relative decrease
Decrease	(2) Absolute decrease, relative increase	(4) Absolute decrease, relative decrease

The combination of increases and decreases in absolute and relative terms results in four possible situations. From the point of view of international competition, two are favorable – (1) and (2) – with the others being unfavorable. In the case of (1), absolute growth is easy to accept with relative growth; in the case of (2), an easily perceptible absolute decline meets a more difficult relative growth. Even more difficult to accept is absolute growth with relative decline – situation (3). It is much easier to accept absolute decline with relative decline – situation (4). Understandably, absolute and relative changes often carry contradictory information, which confuses policy makers and researchers. It is important to remember that from the point of view of power struggles, that is, from the point of view of geopolitics, only relative increases/decreases are important.

2.1.3. Systematics of power and position increases and decreases

A term similar to power is international position, which we can define as the place of a state in the international hierarchy, determined by its power and corrective factors. It should be emphasized that the place determined by the formal model is nominal. In order to estimate the actual position, it is necessary to take into account the strengthening factors (e.g., long political-military traditions, alliances, friendly neighbors, good governance, internal cohesion, favorable geographic location, high economic innovation) and the weakening factors (e.g., hostile and strong neighbors, inept governance, conflicted society, unfavorable geographic location, economic backwardness). Strengthening factors can also include permanent membership in the UN Security Council, participation in international organizations, the number of embassies and diplomatic missions or the extent of external assistance (humanitarian or development). It could also be successful participation in foreign missions or wars won. After taking into account the strengthening and weakening factors, we will arrive at the actual position. In other words, the description of the nominal position focuses more on resources, while the actual position focuses more on results.[39] Either way, the main determinant of any state's position is its power. Closely related to power is the status (e.g., superpower status) and stature of the state; loosely related to

[39] This distinction mirrors Klaus Knorr's proposal, which differentiates between putative power and actualized power. The former refers to the resources held, while the latter pertains to the outcomes achieved. Cf.: K. Knorr, *Military Power and Potential*, Lexington, Mass. 1970, p. 3.

power is the role of the state. For understandable reasons, we focus on showing the nominal position – we use additional comments only in certain cases.[40]

Note that an increase in power most often leads to an increase in position, and a decrease in power leads to a decrease in position. But this is not always the case – there can be an increase in power and a decrease in position, or a decrease in power and an increase in position. Thus, four situations are possible, as illustrated below.

	Increase in position	Decrease in position
Increase in power	Increase in power, increase in position	Increase in power, decrease in position
Decrease in power	Decrease in power, increase in position	Decrease in power, decrease in position

From the point of view of analyzing power relations, power and the direction of its changes are more important; position is more of a prestige nature, but in some situations it can be an important criterion for including a country in a particular group. Much depends on what type of power is the reference point. In periods of relaxation and broad international cooperation, economic power is most important. When there is an increase in political-military tensions, the importance of the military factor increases, and, therefore, military power and consequently geopolitical power.

2.2. The main formulas of power of M. Sulek

The main formulas refer to physical power and sociological power and will be discussed below. Derivative formulas will be calculated for both types of power: two efficiency formulas – for civilizational power (as an indicator of the efficiency of the transformation of physical energy into sociological energy) and for sociological power (as an indicator of the organization of society or social efficiency), plus three measures of militarization – sociological (economic) militarization, GDP militarization and demographic militarization. These will be discussed in detail just before the results are presented.

2.2.1. The concept of civilizational power

The power of any organized human activity includes two types of power – physical power and sociological power. We adopt a simple definition of civilization power – it is the sum of physical power and sociological power (PhP + SP). Thus, the main category of sociological power is economic power, the structure of which consists of civil and military power. These two powers - civilian and military – also converge to form geopolitical power.

[40] For more on power and position, see: M. Sułek, *Pozycja geopolityczna Rosji. Podejście potęgometryczne* (Russia's Geopolitical Position: A Potentiometric Approach), [in:] L. Sykulski (ed.), *Geopolityka Rosji i obszaru postsowieckiego* (The Geopolitics of Russia and the Post-Soviet Space), Warszawa 2020, p. 17–33.

The basic expression of sociological power is economic power, the other powers are derivative of it. Physical power is expressed by annual physical energy consumption, or Total Energy Supply (TES).[41] *Sociological power is the amount of sociological energy processed in a unit of time (in our work, in a year). Sociological energy is a quantity that characterizes the state of a social system as its ability to do work. We measure sociological power based on a special formula. From a cybernetic point of view, physical energy flows are information flows, while sociological energy flows are working (executive) flows. This seems counterintuitive to view, but it is so.*

CIVILIZATIONAL POWER (CIP)	
PHYSICAL POWER (PHP)	SOCIOLOGICAL POWER (SOP)
Civilizational power = physical power + sociological power (CIP = PHP + SOP)	

The goal of states should not be to maximize civilizational power but rather sociological power with a given consumption of physical energy, which, from the point of view of our considerations, is idle energy. However, it should be strongly emphasized that we are making a certain simplification here. The point is that part of physical energy in the form of energy consumed in households should be added to sociological energy. According to Eurostat (the European Statistical Office), in 2020 the share of energy consumed in households in gross inland energy consumption was 18.7%. This is not small, but not enough to distort our calculations. If we add to this that the energy intensity of the economy and households are correlated, the simplification does not seem large.

2.2.2. Formulas of economic power

As we wrote in the introduction, the term "sociological power" was used on the principle of opposing it to "physical power" and will be used only in considering the power of civilization. The term "sociological power" was used by the prominent Polish cyberneticist Marian Mazur, which is a certain commitment for us.[42] In this section, it will appear as "economic power." In other words, sociological power = economic power.

The methodology presented here has its origins in international relations theory and geopolitics. It also draws on the achievements of cybernetics and praxeology. The international balance of power (MUS), which is the focus of this Report, will be presented in a quantified manner. The main content is the measurement of the power of states and derived quantities (indicators of militarization).

[41] Full definition: *Key World Energy Statistics 2020*, International Energy Agency, https://www.energiafed.be/sites/default/files/editor/Key_World_Energy_Statistics_2020.pdf [dostęp: 06.05.2022]. Previously, the Agency used the term "Total Primary Energy Supply".

[42] Cf.: M. Mazur, *Cybernetyczna teoria układów samodzielnych* (Cybernetic theory of autonomous systems), Warszawa 1966, p. 161 and the following; Idem, *Cybernetyka i charakter* (Cybernetics and character), Podkowa Leśna 1976, chapter 11.

We based the calculation of economic power on the Sulek model.[43] In our opinion, it is easy to understand and apply, including for non-specialists. It is based on the necessary and sufficient number of "constant factors" in history, inherent in the existence and functioning of human groups, including political units. The author of the model considered such factors to be "people" operating in a certain "space" and at a certain "time," representing certain "organizational and productive skills," or the capacity for collective action, and, therefore, for the social processing of matter, energy and information. As people "act," they have certain "results." From the point of view of a political entity, GDP (Gross Domestic Product) can be considered a good synthetic outcome. One can consider other possible measures, such as GNP (Gross National Product), but this is not relevant at this stage of consideration. It cannot be ruled out that in the future there will be a better indicator that is more suited to measuring the effects of people. So, the variables we will consider are the following: people, space, time, and the results of people's collective actions.

The model makes it possible to calculate three basic types of state power: economic power (the sum of civilian and military power), civilian power, military power, and the resultant of economic power and military power, or geopolitical power. Economic power consists of economic performance (gross domestic product), demographic factors (population) and space factors (territory area). Military power consists of military-economic factors (military spending, which is part of GDP), demographic-military factors (number of active-duty soldiers) and spatial factors (area of territory).[44] Geopolitical power is the resultant of civilian and military power, and we count it as the arithmetic average of civilian power and tripled military power. Therefore, since we do not count civilian power – geopolitical power is calculated as the arithmetic average of economic power and doubled military power, which is an equivalent expression. Note that the listed categories of power correspond to R. Aron's definition. The ability to do is economic power; the ability to create is civilian power; the ability to destroy is military power. Geopolitical power – not mentioned by R. Aron – is an integrated measure of the ability to influence the international and domestic environment according to circumstances.

[43] Cf.: M. Sułek, *Podstawy potęgonomii i potęgometrii* op.cit.; Idem, *Potęga państw. Modele i zastosowania* op.cit.. The last item provides a broad overview of other approaches and models for calculating the power of states. For an even broader one, see: Karl Höhn, *Geopolitics and the Measurement of National Power* (dissertation), Universität Hamburg, Hamburg 2011.

[44] For simulation or planning purposes, the rate of militarization of GDP and population can be adjusted, considering factors such as immediate and long-term personnel reserves and other resources. These adjustments should be taken into account when analyzing the outcomes.

$$ECP = (GDP)^{0.652} \times L^{0.217} \times a^{0.109};$$

$$MIP = (MEX)^{0.652} \times S^{0.217} \times a^{0.109};$$

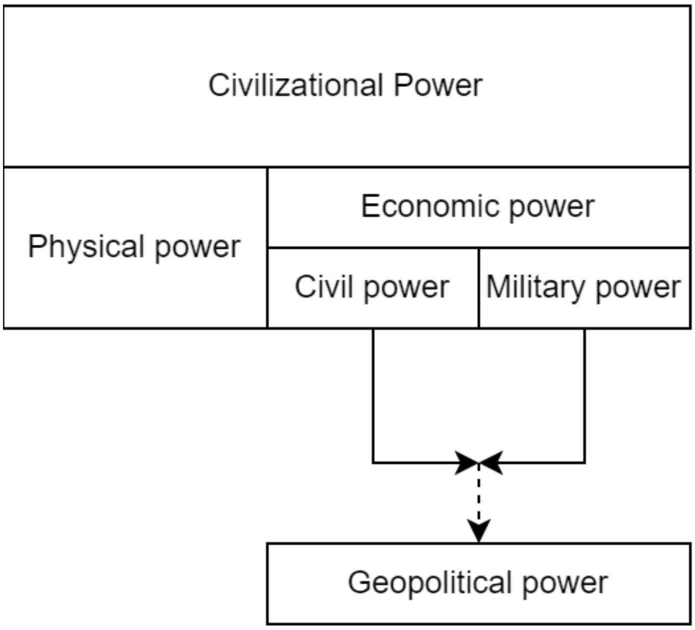
$$GEP = \frac{EP + 2 \times MP}{3}.$$

Symbols:
ECP - economic power;
MIP - military power;
GEP - geopolitical power;
GDP - gross domestic product;
L - population;
a - territory;
MEX - military expenditure;
S - number of soldiers on active duty.

Note that while the population (L) or the number of soldiers (S) are quantitative indicators – the amount of GDP per capita or military spending per soldier are qualitative indicators. The first indicator determines in a general way the level of economic development of a country, while the second determines the level of saturation with armaments and military equipment, i.e., the technological level of the armed forces. It should be acknowledged that GDP as a representative of collective capacity has been widely criticized for several decades. So far, however, we do not have an indicator with which to replace it. The same is true of military spending (MEX), whose share in the aggregate collective action capability indicator we have taken as a measure of the defense (military) effort of society.

All categories of the power of states are shown in Figure 3. The broadest category is civilizational power, which consists of physical power (the power of control flows) and sociological (economic) power – the power to act (do). This, in turn, breaks down into civilian power (the power to create) and military power (the power to destroy). The resultant of civilian and military power is geopolitical power. Since we omit the calculation of civilian power (it is shown indirectly through the contribution of military power to sociological power), geopolitical power can be equally shown as the resultant of sociological power and military power, which we do in the Report. Recall that the above categories map the power of states in terms of energy flux, or power. Thus, we can give the following definition of state power: state power expressed in terms of power is the amount of social (sociological) energy processed in a unit of time. Expressing the power of states in terms of power is the basic way of describing the international system in terms of power relations. Reasoning in terms of resources and flows is easy to realize when we consider two commonly used categories: assets and income. An asset is a resource, which is, for example, $1 million as of December 31, 2022, while income is a stream (of, say, $5,000 per month).

Figure 3 Categories of power of states



The power of the state expressed in terms of power is the amount of social (sociological) energy processed in a unit of time.

The model presented also allows us to measure (count) the power of states in terms of potential energy (potential). This issue would require the introduction of the size of assets (i.e., resources) in place of GDP, in place of military expenditures (combat value of armaments and military equipment (also a resource). These accounts are very complex and do not give clear results. This does not prevent us from giving its definition – the power of the state expressed in terms of potential energy (potential) is the accumulated stock of social (sociological) energy captured for a given moment in time. As we remain exclusively within the stream expression, the terms "power" and "power" can be used interchangeably.

State power expressed in terms of potential energy (potential) is the accumulated stock of social (sociological) energy captured for a given moment in time.

The counting technique (shown in the box) is simple. We show absolute figures in the form in which they are most often published, but of course they can be converted to shorter forms and presented in billions, millions or thousands.[45]

Calculation method

The main formula expresses the three types of power mentioned above: economic, military and geopolitical. For those who are interested, we recommend the following counting technique: we divide all the collected data by the corresponding world figures and enter the resulting fractional figures into the formula. After performing the operation, we get the power of countries as a fraction of the world power.

We start by collecting baseline data, which we convert into world shares. Then we substitute the obtained numbers into the formula, thus obtaining the power of the country as a fraction of the world power. We can leave the result in this form – for large countries this may be convenient, but for medium and small countries it is advisable to multiply by 100 or 1000, and in the case of micro-states, even by 1,000,000.

Table 6 Output data for calculating the overall power of countries (2021)

	Absolute figures			Relative figures		
Countries	GDP	L	a	GDP	L	a
	$	people	km^2	-	-	-
WORLD	96100091004540.90	7836630792	129979826.5	1	1	1
USA	22996100000000.00	331893745	9147420	0.23929322	0.042352	0.070376
China	17734062645371.40	1412360000	9424702.9	0.18453742	0.180225	0.072509
Poland	674048266397.37	37781024	306130	0.00701402	0.004821	0.002355

First variant (world=1)

$EP_{USA} = (0.23929322)^{0.652} \times (0.042352)^{0.217} \times (0.070376)^{0.109} = 0.14840974$

$EP_{China} = (0.18453742)^{0.652} \times (0.180225)^{0.217} \times (0.072509)^{0.109} = 0.17210038$

$EP_{Poland} = (0.00701402)^{0.652} \times (0.004821)^{0.217} \times (0.002355)^{0.109} = 0.00640271$

Second variant (world=100)

$EP_{USA} = (0.23929322)^{0.652} \times (0.042352)^{0.217} \times (0.070376)^{0.109} = 0.14840974 \times 100 = 14.840974$

$EP_{China} = (0.18453742)^{0.652} \times (0.180225)^{0.217} \times (0.072509)^{0.109} = 0.17210038 \times 100 = 17.210038$

$EP_{Poland} = (0.00701402)^{0.652} \times (0.004821)^{0.217} \times (0.002355)^{0.109} = 0.00640271 \times 100 = 0.6402715$

Third variant (world=1000)

$EP_{USA} = (0.23929322)^{0.652} \times (0.042352)^{0.217} \times (0.070376)^{0.109} = 0.14840974 \times 1000 = 148.40974$

$EP_{China} = (0.18453742)^{0.652} \times (0.180225)^{0.217} \times (0.072509)^{0.109} = 0.17210038 \times 1000 = 172.10038$

$EP_{Poland} = (0.00701402)^{0.652} \times (0.004821)^{0.217} \times (0.002355)^{0.109} = 0.00640271 \times 1000 = 6.402715$

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[45] M. Sułek, *Wprowadzenie do metrologii nauk o bezpieczeństwie i obronności* (Introduction to the metrology of security and defense sciences), (in:) R. Białoskórski, P. Górny (ed.), *Metrologia nauk o bezpieczeństwie i obronności* (Metrology of security and defense sciences), UP-H, Siedlce 2018;

Microsoft Excel formula:
=(Share$_{GDP}$^0.652)*(Share$_{L}$^0.217)*(Share$_{a}$^0.109)

2.2.3. The power of tradition – earlier proposals for estimating the power of states

There are a great many proposals in the literature for measuring the power of states. They are based on different concepts and approaches, as they are created by political scientists, economists, physicists, military scientists and others, but some of them show great ideological or structural similarity. We think that M. Sulek's model is an operationalization and development of at least two approaches to measuring the power of states: the concepts of Alexander Supan and Ray Cline.

Alexander Supan (1847-1920) was a well-known geographer born and raised in Austria. In 1918 he published *Guidelines to General Political Geography* (Leitlinien der allgemeinen politischen Geographie); the second edition in 1920 was published after his death. Supan can be considered one of the pioneers of German geopolitics, along with Friedrich Ratzel and Rudolf Kieljén.[46] For Supan, "the state is the basis of all civilization and culture." He distinguishes three components that make up the power of the state: space (territory), population and organization.[47] Thus, it can be written:

Power of the state = f(organization, population, space)

Space is, of course, heterogeneous. Supan divides it into active space, which is defined by a population density of at least 1 person per square kilometer, and passive space, which is the idle remainder.

The population is an important material for the power of the state. In doing so, basic characteristics of the population are important, such as social cohesion (unity, community spirit), flowing from ethnic homogeneity and religion. Intelligence is another factor, but its importance is diminished by the lack of culturally oriented organization – and here Alexander Supan gives the example of China. The Chinese, despite being an intelligent and industrious nation, do not have much power.

[46] The section on A. Supan was compiled based on: K.H. Höhn, *Geopolitics and the Measurement of National Power* op.cit. p. 9 and the following; K. Hwang (it is Karl H. Höhn), *Power in Alexander Supan's "Guidelines to Political Geography (1918/1920*", „Przegląd Geopolityczny" ("*Geopolitical Review*") 2011, Vol. 3, p. 23–44.

[47] The concept of state power presented here is closely linked to the classic definition of the state developed by German jurist Georg Jellinek (1851–1911). In his definition, Jellinek identified three essential elements: *power*, *territory*, and *the population* inhabiting that territory, over which power is exercised. Power, in this context, refers to the organized structure of active individuals who achieve specific outcomes.

Organization is a common and constant factor associated with human action. Here it should be added that when speaking of organization, Supan rather had in mind what we today refer to as political organization, namely the state. Understood in this way, organization also refers to economic activity, so that government and economics go hand in hand in promoting development.

In defining the power of states, geopoliticians contemporary to Supan (such as Friedrich Ratzel) often referred to the concept of energy.[48] Alexander Supan followed this pattern, as demonstrated in his attempt at a definition: "Power, or more generally force, and the will to use it, can be summarized in the concept of energy. [...] The position of a state according to power depends on organized energy, represented by the population. Space plays a role insofar as it creates opportunities for the activation of energy."[49] Supan also values the will as a source of power. The direct tool of this will is the weapon, which in ancient and medieval times appeared primarily in biological (human) form. Technological advances have led to the increasing importance of financial resources and, consequently, national wealth.

The opinion that Sulek's model is an operationalization of Supan's approach is confirmed by Karl H. Höhn, who states straightforwardly, "Although Sulek was not familiar with Supan's work, he received, in effect, Supan's operationalized concept. Not only does the model include the three basic measures proposed by Supan – the hierarchy of importance of the three variables is also the same."[50]

Ray Steiner Cline (1918-1996), an officer in the US intelligence community, was Deputy Director of Intelligence of the Central Intelligence Agency (CIA) from 1962 to 1996. He first presented his concept of measuring the power of states in 1975 and repeated it in 1977 in the second edition of his book.[51] It is a new formula, he said, but based on old truths. It should address the following factors: political, economic and military. Here is the formal form of Cline's model:

$$P_p = (C + E + M) \times (S + W),$$

where:
P_p – Perceived Power;
C – Critical Mass = Population + Territory;
E – Economic Capability;
M – Military Capability;
S – Strategic Purpose;
W – Will to Pursue National Strategy.[52]

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[48] Poland also has a proven track record in this area. Cf.: Z. Heryng, *Logika ekonomii. Zasadnicze pojęcia ekonomiczne ze stanowiska nauki o energii* (The logic of economics. Basic economic concepts from the stand of energy science), Warszawa 1896.
[49] A. Supan, *Leitlinien der allgemeinen politische Geographie: Naturlehre des Staates*. 2. Ausgabe, Walter de Gruyter & Company, Berlin 1922, p. 60–61. Quoted from: K.H. Höhn, *Geopolitics and…*, *op.cit*., p. 20.
[50] K.H. Höhn, *Power in Alexander Supan's …*, *op.cit*., p. 37–38.
[51] R.S. Cline, *World Power Assessment1977. A Calculus of Strategic Drift*, Westview Press, Boulder Col. 1977, p. 3–5.
[52] Ibidem.

As can easily be seen, the model consists of two distinctive parts:

- the first part (C + E + M) corresponding to the concept of demographic, territorial, economic and military potential of the country;
- the second part (S + W) indicating the possibility of initiating and utilizing this potential

Cline's model has a very good structure (i.e., it takes into account the right components) but is difficult to operationalize (i.e., convert to numbers). All components are converted into points. As you can see, Cline's model is idea-expert (conceptual and expert). Undoubtedly, it has many weaknesses, but in our opinion, it did not deserve the harsh criticism it received from Chin-Lung Chang, a professor at the Institute of Political Science at Fo-guang University, who described it as arbitrary, subjective, inaccurate and simply unscientific[53] ("Cline's method of constructing a power index is arbitrary and subjective, or simply, neither scientific nor precise," p. 11).

Now let's compare Cline's model with the Sulek model. Recall that in Cline's model are the following factors: demographic, space, economic, military, strategic and volitional. Let's relate them to the Sulek model. Let's note that population (L) represents the demographic factor; the area of the country (a) represents the spatial factor; gross domestic product (GDP) represents the economic factor; and the size of military spending (MEX) with the size of the armed forces (S) represents the military factor. This comes directly from the model. The remaining factors are expressed indirectly. Strategy and will are represented by the share of military spending in GDP (GDP militarization rate) and the share of the number of active duty soldiers in the general population (demographic militarization rate). These variables reflect the recognition of the role of the military factor (strategic factor),the state's intentions, and the scale of public support (volitional factor).

However, a clear difference exists between the models. Cline's reasoning leads to the estimation of only one type of power – "perceived power" (could be called geopolitical power) – while Sulek's model allows you to count three types of power – economic, military and geopolitical. Besides, Cline's model is typically exploratory, while Sulek's model is formal. In other words, in expert models the results always vary depending on the composition of the experts; in formal models the results are always the same (if the same data is used). Of course, after calculations through the use of formal models, the final assessment must be made by experts anyway.

2.2.4. Dimensional analysis

Part of powermetric measurement is dimensional analysis. All measurement operations are related to the dimensions of the measured quantities. Without this, the simplest operations of addition or subtraction cannot be performed in the natural sciences. After all, we know that

[53] Chin-Lung Chang, *A Measure of National Power*. Paper presented at an international seminar at the National University of Malaysia, 16–17 February, in Bangi, Malaysia, http://www.fgu.edu.tw/~academic/up1/malayconference1/papaerscollection.files/conferefncepapers/chang.pdf [dostęp: 30.09.2009].

kilograms are added to kilograms, meters to meters, seconds to seconds, watts to watts. Similar clarity does not exist in the social sciences.

In the social sciences, dimensional analysis is very underdeveloped, often ignored altogether. The glorious exception is economics, which distinguishes two basic dimensions – resources (R) and streams (R/T). A resource is the amount of a specific good at a given point in time (a good and well-known example is property); a stream is a resource flowing over time (a good and well-known example is income per month/year). The lack of dimensional analysis is a serious weakness of any attempt to measure the power of political units. As a result, it was not clear in the past what was being measured. With regard to political units, examples of streams could be, for example, gross domestic product produced per year or the volume of cargo transported per unit of time. A specific stream is the power of a political unit (as a type of sociological power) – it is a stream of energy over time. Performing permitted operations on resources and streams, in turn, leads to many derived dimensions. Dimensional analysis could shed more light on terms that abound in political science or military texts: power, force, geopolitical potential, combat potential.

In "normal" situations, a fairly close relationship exists between potential and power. In situations of "geopolitical upheaval" or "collision of tectonic plates" there can be quite a divergence. A contemporary example is Russia. After the collapse of the Soviet Union, it entered a long period of social, economic and political crisis, as a result of which its power weakened greatly. In contrast, its potential (in the form of accumulated weapons or manufacturing apparatus) has diminished to a much lesser extent. On a day-to-day basis, power is primarily used. Power is what is real and functioning; potential is what is possible. The former emphasizes the role of effects, the latter the role of resources. Derivative quantities, such as militarization rates, can play a helpful role.

We assume that all three types of power have a power dimension in the physical sense ($\frac{kg \times m^2}{s^3}$). Power in this sense is a flux of energy and means the amount of work done per unit of time. The formula also makes it possible to calculate the power in terms of potential energy, taken as the amount of resource at a given moment of time, but this is a more difficult and very labor-intensive issue. All the types of power mentioned are, of course, of the same dimension, but different in nature. Economic power reflects the balance of power between states (political units), achieved in the long process of historical development, and in the short term it cannot be increased by politicians' decisions (decreased – yes). In this sense, it has an objective character. It is different in the case of military power, which has a subjective character, since it depends directly on political decisions. Geopolitical power is indirect, although political decisions also have a strong influence on its size. Awareness of these differences is of great importance when evaluating international relations in terms of power relations. In the long term, economic power is decisive, so it is the main objective of rival powers. In a short-term assessment, especially in the context of armed conflict, priority is given to military power and, to a somewhat lesser extent, geopolitical power.

In order that the model expresses the power of political units in units of power, the variables used were given the following dimensions:

$D^{0.652}$ ($W^{0.652}$) – [electric current intensity];
$L^{0.217}$ ($S^{0.217}$) – [electric force];
$p^{0.109}$ – [displacement].

Hence:

$D^{0.652} \times T^{0.652}$ ($W^{0.652} \times T^{0.652}$) – [charge];
$L^{0.217} \times p^{0.109} \times$ ($S^{0.217} \times p^{0.109}$) – [voltage].

Let us emphasize again that the balance of power expressed in terms of power is sufficient for the purposes of identifying and assessing the international balance of power, although expanding the presentation to include potential (potential energy) would be a beneficial addition.

Any disciplined measurement requires the use of units of measurement. The natural sciences can serve as a model here, because in the social sciences this subject is heavily neglected. In the report, we attempt to use units of measurement of power, expressed in terms of power. We have taken 1 mir as the basic unit to express the power of the world (mir is world in Russian). From this it follows that the power of individual countries is a fraction of this size. For clarity of the results presented, the resulting fractions (decimal quantities) can be multiplied by any number. If you multiply them by 100, you will get the results as a percentage of the power of the world (then the power of the world = 100). In our case, it will be more convenient to multiply them by 1000 (then the power of the world = 1000), which means that we will express it in millimeters (abbreviated mM), or thousandths of the power of the world. In the case of small and very small countries, expressing their power in micrometers is more convenient (abbreviated μM), i.e., millionths of the world power (then world power = 1,000,000). We refer to the world as a whole by all three types of power, which means that each of these powers has a value equal to 1 (100, 1000).

2.2.5. Derived measures

Recall that the main measures included physical power, sociological power (including civilian, military and geopolitical power) and civilizational power. The derived measures are of two types: three measures of militarization of sociological power (GDP militarization, demographic militarization and economic militarization – overall) and three measures of efficiency, relating to civilizational and sociological power. These efficiency measures are the efficiency index of the transformation of physical energy into sociological energy, calculated on the basis of civilizational power; the index of the degree of organization of society, calculated on the basis of sociological power; and the product of these indices, called the integrated efficiency index which is an indicator that combines the "physical" side with the "social" side. Detailed definitions and formulas of these indicators will be given in the relevant sections.

PART III
SOCIOLOGICAL POWER 1992-2023

This chapter contains four groups of state rankings. The first includes the ranking of states by economic power, military power and geopolitical power (Table 6), along with an assessment of the international system in terms of polarity. The second group presents the ranking of states according to indicators of militarization (Table 8), the third according to criteria of superpower (Table 9), and the fourth according to increases and decreases in economic power (Table 10). In the latter case, we limit ourselves to economic power due to its most objective nature. The power of states is inherently relative, so we measure it against the power of the world as a fixed reference point. In this view, state power is, therefore, part of world power, which we treat as a certain whole. We decided that it would be most convenient to present the power of states in millimeters, that is, when the power of the world is equal to 1000.

3.1. Main measures

The main measures include three types of state power – sociological (economic) power, military power and geopolitical power.

Economic power is a synthetic expression of the collective action capacity of a certain population in time and space. We put it in relation to the world, so it is inherently slow to change. With economic power we reflect the balance of power achieved in a long historical process, so it is characterized by high inertia and cannot be changed in the short term. Thanks to this trait, forecasting the international balance of power can be quite reliable even over longer periods. Thus, it can be said that economic power is objective in nature, since in the short term politicians have no influence on it.

Military power is the second basic expression of the power of states with its limits set by economic power. In other words, it is a militarized form of economic power. It is militarized in a dual sense – economically, in terms of production (as a result of separating military spending from GDP) and demographically (as a result of separating a certain number of citizens from the general population for military service). The scale of the military burden on GDP and population can be significant. In peacetime, it can range from 1 to 10% of GDP and from 0.1 to 1.5% of the general population. During the threat of war, and especially during wartime, these numbers increase accordingly. Military power is more subjective in nature than economic power, since it depends directly on political decisions. These decisions are not arbitrary, of course, as they face constraints from public opinion, alliance ties, production capacity, etc.

In terms of military power, three groups of countries can be distinguished. The first is countries that have economic and military power at similar levels. The second group are countries that have significantly higher economic power than military power, meaning that they are poorly militarized. Finally, the third group are countries with significantly higher military power than economic power, countries that are highly militarized.

Table 7 Ranking of countries on the basis of economic, military and geopolitical power in 1992 and 2023 (in mM, i.e. world = 1000)

	1992 (world = 1000)						2023 (world = 1000)					
	Economic Power		Military Power		Geopolitical Power		Economic Power		Military Power		Geopolitical Power	
	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM
1	United States	158.962	United States	255.747	United States	223.485	China	161.785	United States	231.868	United States	206.684
2	Japan	68.488	China	59.881	China	52.401	United States	156.318	China	101.278	China	121.447
3	Germany	41.780	France	28.378	Japan	36.359	India	50.032	Russia	46.661	India	43.923
4	China	37.440	Russia	26.544	Germany	30.615	Brazil	27.004	India	40.869	Russia	39.562
5	France	31.180	Germany	25.032	France	29.312	Japan	26.208	Saudi Arabia	25.905	Germany	20.745
6	Italy	27.808	UK	23.034	Russia	26.601	Russia	25.363	France	19.360	Saudi Arabia	20.597
7	Russia	26.714	India	21.521	UK	23.814	Germany	24.874	UK	18.748	Japan	20.023
8	UK	25.372	Japan	20.295	India	22.420	France	19.394	Germany	18.681	Brazil	19.935
9	India	24.217	Saudi Arabia	20.246	Italy	19.879	UK	18.913	Ukraine	17.003	France	19.371
10	Canada	20.588	Italy	15.915	Canada	16.031	Canada	18.712	Japan	16.930	UK	18.803
11	Brazil	20.074	Canada	13.753	Saudi Arabia	15.529	Mexico	18.116	Brazil	16.400	Korea, Rep.	14.067
12	Spain	16.793	Korea, Rep.	12.344	Korea, Rep.	11.527	Indonesia	17.866	Korea, Rep.	15.885	Australia	13.991
13	Mexico	16.158	PRK	11.450	Brazil	11.029	Australia	14.602	Australia	13.685	Canada	13.855
14	Australia	12.336	Turkey	9.293	Spain	10.690	Italy	14.471	Italy	11.584	Italy	12.546
15	Argentina	10.088	Pakistan	9.057	Australia	9.986	Spain	11.659	Canada	11.426	Ukraine	12.235
16	Korea, Rep.	9.893	EGY	8.938	Turkey	8.769	Turkey	10.965	Algeria	9.648	Indonesia	10.831
17	Indonesia	9.599	Australia	8.812	Mexico	7.696	Korea, Rep.	10.431	Pakistan	8.609	Mexico	10.018
18	Turkey	7.721	Ukraine	8.644	Pakistan	7.434	Saudi Arabia	9.982	Poland	8.440	Spain	9.315
19	South Africa	7.135	TWN	8.254	TWN	7.360	Argentina	7.727	Spain	8.143	Turkey	8.258
20	Netherlands	7.108	Spain	7.638	Indonesia	7.335	Poland	6.738	Indonesia	7.314	Poland	7.873
21	Sweden	7.047	Brazil	6.506	Ukraine	7.259	Nigeria	6.648	Iran	7.072	Pakistan	7.852
22	Saudi Arabia	6.094	Indonesia	6.203	EGY	7.082	Pakistan	6.336	Turkey	6.905	Algeria	7.762
23	Thailand	5.916	Vietnam	5.991	Argentina	5.882	Iran	6.197	TWN	6.503	Iran	6.780
24	TWN	5.572	Serbia	5.724	Netherlands	5.544	Thailand	6.129	Israel	6.221	TWN	5.912

	1992 (world = 1000)						2023 (world = 1000)					
	Economic Power		Military Power		Geopolitical Power		Economic Power		Military Power		Geopolitical Power	
	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM
25	Switzerland	5.143	Croatia	5.659	Sweden	5.524	EGY	6.124	ARE	6.010	Vietnam	5.521
26	Belgium	4.877	Poland	5.615	Thailand	5.496	Philippines	5.778	Mexico	5.969	Thailand	5.158
27	Iran	4.680	Kuwait	5.421	Poland	5.274	Bangladesh	5.745	Iraq	5.900	Israel	5.080
28	Poland	4.592	Israel	5.400	South Africa	4.977	Netherlands	5.587	Vietnam	5.516	Iraq	5.071
29	Austria	4.529	Thailand	5.286	Vietnam	4.398	Vietnam	5.529	Thailand	4.672	ARE	5.055
30	Ukraine	4.489	ARE	4.977	Algeria	4.294	South Africa	5.301	Colombia	4.582	Colombia	4.707
31	Pakistan	4.189	Sweden	4.763	Israel	4.283	Colombia	4.957	Morocco	4.398	Netherlands	4.675
32	Nigeria	4.087	Netherlands	4.762	Malaysia	4.150	TWN	4.730	Netherlands	4.218	EGY	4.632
33	Philippines	3.839	Malaysia	4.760	Greece	3.849	Sweden	4.324	Romania	3.920	Philippines	4.478
34	Colombia	3.776	Algeria	4.729	ARE	3.800	Malaysia	4.218	EGY	3.886	Argentina	4.293
35	Greece	3.606	Greece	3.970	Colombia	3.614	Switzerland	4.190	Greece	3.830	Bangladesh	3.739
36	Norway	3.601	South Africa	3.899	Belgium	3.568	Algeria	3.992	Philippines	3.828	Romania	3.707
37	Algeria	3.426	Kazakhstan	3.839	VEN	3.521	Peru	3.767	Sweden	3.138	Morocco	3.685
38	EGY	3.370	Argentina	3.780	Norway	3.388	Chile	3.644	Oman	3.050	Nigeria	3.587
39	VEN	3.365	Belarus	3.602	Kazakhstan	3.237	Kazakhstan	3.575	Norway	2.969	Sweden	3.533
40	Finland	3.314	VEN	3.599	Switzerland	3.109	Ethiopia	3.532	Chile	2.865	South Africa	3.296
41	Denmark	3.283	Colombia	3.533	Nigeria	3.089	Belgium	3.481	Myanmar	2.821	Greece	3.252
42	Portugal	3.272	Mexico	3.465	Philippines	2.828	Iraq	3.412	Malaysia	2.759	Malaysia	3.245
43	Malaysia	2.931	Norway	3.282	Belarus	2.761	Romania	3.281	Bangladesh	2.736	Chile	3.125
44	Bangladesh	2.572	Cuba	3.055	Finland	2.582	Norway	3.258	Finland	2.718	Norway	3.066
45	Peru	2.560	Belgium	2.913	Austria	2.564	Austria	3.216	Singapore	2.613	Ethiopia	2.717
46	Chile	2.532	Romania	2.833	Romania	2.448	ARE	3.144	Argentina	2.577	Switzerland	2.708
47	Morocco	2.242	Bulgaria	2.808	Cuba	2.438	Ireland	2.901	Ethiopia	2.309	Finland	2.592
48	Israel	2.049	Oman	2.701	Morocco	2.386	Israel	2.798	South Africa	2.294	Kazakhstan	2.554
49	Kazakhstan	2.033	Nigeria	2.590	Peru	2.343	Ukraine	2.699	Qatar	2.157	Peru	2.483
50	Libya	1.803	Morocco	2.457	Denmark	2.332	Czech Republic	2.482	Kuwait	2.076	Oman	2.419
51	SYR	1.740	Hungary	2.412	Portugal	2.325	Sudan	2.355	Nigeria	2.056	Belgium	2.405

	1992 (world = 1000)						2023 (world = 1000)					
	Economic Power		Military Power		Geopolitical Power		Economic Power		Military Power		Geopolitical Power	
	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM
52	Hungary	1.693	Philippines	2.322	Chile	2.286	Finland	2.340	Kazakhstan	2.044	Myanmar	2.393
53	Romania	1.677	Peru	2.235	Hungary	2.172	Denmark	2.321	Czech Republic	2.020	Singapore	2.312
54	Ireland	1.656	Finland	2.216	Bulgaria	2.106	Portugal	2.289	Switzerland	1.967	Austria	2.259
55	New Zealand	1.579	Chile	2.163	Oman	2.016	Morocco	2.260	Belgium	1.866	Czech Republic	2.174
56	Czech Republic	1.551	Switzerland	2.092	Sudan	1.692	Kenya	2.108	Peru	1.841	Denmark	1.910
57	ARE	1.446	Sudan	2.070	Yemen, Rep.	1.518	Greece	2.096	Hungary	1.824	Hungary	1.830
58	Ethiopia	1.344	Yemen, Rep.	1.942	Bangladesh	1.477	COD	2.047	Azerbaijan	1.810	Kuwait	1.745
59	Vietnam	1.212	Denmark	1.856	Singapore	1.380	New Zealand	2.034	Austria	1.780	Portugal	1.687
60	Cuba	1.206	Portugal	1.851	Ecuador	1.227	Tanzania	1.893	Denmark	1.705	New Zealand	1.669
61	Ecuador	1.173	Singapore	1.602	Jordan	1.189	Hungary	1.841	New Zealand	1.486	Angola	1.561
62	COD	1.157	Jordan	1.595	Myanmar	1.149	Angola	1.800	Angola	1.441	Azerbaijan	1.511
63	Uzbekistan	1.149	Austria	1.581	Tanzania	1.075	Singapore	1.710	Jordan	1.412	COD	1.483
64	Belarus	1.079	Myanmar	1.502	COD	1.025	Uzbekistan	1.673	Portugal	1.386	Ireland	1.382
65	Cameroon	0.988	Tanzania	1.279	New Zealand	1.001	Ecuador	1.617	Sri Lanka	1.310	Kenya	1.366
66	Tunisia	0.950	Ecuador	1.253	Sri Lanka	0.990	Myanmar	1.536	Ecuador	1.206	Ecuador	1.343
67	Sudan	0.938	Turkmenistan	1.245	Tunisia	0.967	Cote d'Ivoire	1.404	COD	1.201	Tanzania	1.296
68	Singapore	0.935	Sri Lanka	1.114	Ireland	0.966	Ghana	1.376	Cambodia	1.187	Sri Lanka	1.260
69	Kenya	0.914	Mozambique	1.046	Turkmenistan	0.938	Guatemala	1.326	Slovakia	1.154	Jordan	1.191
70	Cote d'Ivoire	0.903	Tunisia	0.976	Kenya	0.836	DOM	1.238	Bulgaria	1.083	Slovakia	1.142
71	Angola	0.863	COD	0.960	Mozambique	0.829	Sri Lanka	1.160	Lithuania	1.069	Bulgaria	1.077
72	Slovakia	0.752	Bangladesh	0.930	Zimbabwe	0.769	Oman	1.158	Tanzania	0.997	Cambodia	1.008
73	Sri Lanka	0.742	Mongolia	0.851	Mongolia	0.629	Slovakia	1.118	Kenya	0.996	Uganda	0.950
74	Guatemala	0.721	Zimbabwe	0.832	Guatemala	0.606	Uganda	1.101	Mali	0.946	Lithuania	0.948
75	Bulgaria	0.702	Kenya	0.797	Uruguay	0.582	Kuwait	1.085	Serbia	0.926	Belarus	0.914
76	Uruguay	0.686	New Zealand	0.711	Uganda	0.573	Bulgaria	1.064	Tunisia	0.908	Serbia	0.904
77	Yemen, Rep.	0.670	Uganda	0.668	Bolivia	0.571	Cameroon	1.059	Belarus	0.880	DOM	0.897
78	DOM	0.670	Slovenia	0.633	Cameroon	0.501	Belarus	0.982	Uganda	0.874	Cote d'Ivoire	0.894

	1992 (world = 1000)						2023 (world = 1000)					
	Economic Power		Military Power		Geopolitical Power		Economic Power		Military Power		Geopolitical Power	
	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM
79	Tanzania	0.666	Ireland	0.621	Paraguay	0.465	Bolivia	0.939	Armenia	0.818	Tunisia	0.869
80	Oman	0.645	Azerbaijan	0.587	Georgia	0.436	Libya	0.928	DOM	0.726	Mali	0.848
81	Zimbabwe	0.642	Bolivia	0.565	Azerbaijan	0.419	Azerbaijan	0.914	Croatia	0.659	Croatia	0.698
82	Ghana	0.634	Guatemala	0.548	Cote d'Ivoire	0.419	Turkmenistan	0.887	Cote d'Ivoire	0.638	Ghana	0.697
83	Senegal	0.610	Uruguay	0.529	Senegal	0.386	Serbia	0.860	Ireland	0.622	Guatemala	0.690
84	Bolivia	0.584	Georgia	0.503	Ghana	0.386	Nepal	0.852	Nepal	0.564	Nepal	0.660
85	Paraguay	0.551	Armenia	0.493	El Salvador	0.386	Costa Rica	0.843	Estonia	0.550	Armenia	0.646
86	Madagascar	0.467	Moldova	0.489	DOM	0.384	Panama	0.830	Burkina Faso	0.531	Uruguay	0.608
87	Costa Rica	0.464	Nicaragua	0.477	Tajikistan	0.383	Uruguay	0.818	Latvia	0.526	Zambia	0.538
88	Niger	0.442	Lao PDR	0.457	Nicaragua	0.383	Tunisia	0.789	Uruguay	0.503	Burkina Faso	0.536
89	Myanmar	0.442	Tajikistan	0.457	Cyprus	0.379	Croatia	0.775	Niger	0.502	Niger	0.531
90	Panama	0.440	Cyprus	0.445	Armenia	0.371	Jordan	0.750	Chad	0.501	Latvia	0.498
91	Nepal	0.420	Paraguay	0.423	Lao PDR	0.357	Zambia	0.732	BIH	0.494	Estonia	0.493
92	PNG	0.413	Cambodia	0.407	Zambia	0.356	Paraguay	0.709	Botswana	0.462	Chad	0.487
93	Zambia	0.400	El Salvador	0.396	Panama	0.317	Lithuania	0.707	Slovenia	0.442	Senegal	0.483
94	Mozambique	0.396	BRN	0.352	Burkina Faso	0.317	Mozambique	0.670	Zambia	0.441	Slovenia	0.474
95	Mali	0.395	Zambia	0.335	Madagascar	0.304	Mali	0.653	Guinea	0.407	Paraguay	0.457
96	Honduras	0.391	Bahrain	0.287	Honduras	0.304	Senegal	0.652	Georgia	0.406	Guinea	0.449
97	Uganda	0.383	Burkina Faso	0.286	Nepal	0.285	Cambodia	0.649	Bahrain	0.405	BIH	0.448
98	Burkina Faso	0.379	Senegal	0.274	BRN	0.279	PNG	0.635	Senegal	0.399	Honduras	0.441
99	Jordan	0.376	Congo, Rep.	0.265	Botswana	0.266	Zimbabwe	0.626	Guatemala	0.372	Botswana	0.427
100	El Salvador	0.364	Ghana	0.262	Congo, Rep.	0.265	Niger	0.589	Namibia	0.368	Georgia	0.408
101	Guinea	0.344	Honduras	0.260	Mali	0.260	Honduras	0.587	Honduras	0.367	Mozambique	0.393
102	Gabon	0.324	Cameroon	0.257	PNG	0.246	Burkina Faso	0.545	Ghana	0.357	Cameroon	0.389
103	Turkmenistan	0.323	Panama	0.255	Namibia	0.243	Slovenia	0.537	Paraguay	0.330	Bahrain	0.356
104	Botswana	0.310	Botswana	0.244	Bahrain	0.236	Madagascar	0.537	Mauritania	0.330	Namibia	0.337
105	Luxembourg	0.309	DOM	0.242	Rwanda	0.220	Guinea	0.534	Cyprus	0.323	Zimbabwe	0.331

	1992 (world = 1000)						2023 (world = 1000)					
	Economic Power		Military Power		Geopolitical Power		Economic Power		Military Power		Geopolitical Power	
	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM
106	Georgia	0.302	Rwanda	0.233	Chad	0.215	Chad	0.460	Congo, Rep.	0.294	Mauritania	0.317
107	Lebanon	0.299	Madagascar	0.223	KGZ	0.211	Latvia	0.442	Luxembourg	0.263	Congo, Rep.	0.312
108	Namibia	0.292	Namibia	0.218	Niger	0.210	El Salvador	0.434	Mozambique	0.255	El Salvador	0.306
109	Chad	0.282	Nepal	0.217	Mauritania	0.187	Benin	0.432	BRN	0.243	Cyprus	0.305
110	Congo, Rep.	0.267	KGZ	0.194	TTO	0.170	Mongolia	0.429	El Salvador	0.242	Luxembourg	0.304
111	Iceland	0.254	Mali	0.193	Lebanon	0.170	Georgia	0.412	Gabon	0.234	Madagascar	0.296
112	Cyprus	0.246	Lithuania	0.185	Luxembourg	0.158	Somalia	0.394	TTO	0.233	PNG	0.294
113	KGZ	0.245	Albania	0.184	Haiti	0.157	Luxembourg	0.385	Rwanda	0.221	Gabon	0.267
114	Qatar	0.243	Chad	0.181	Albania	0.149	Estonia	0.379	MKD	0.205	Mongolia	0.253
115	Mauritania	0.239	Cote d'Ivoire	0.177	Malawi	0.149	Malawi	0.373	Togo	0.203	Benin	0.251
116	Tajikistan	0.236	PNG	0.163	CAF	0.123	Haiti	0.360	Zimbabwe	0.184	Rwanda	0.246
117	Malawi	0.227	Mauritania	0.161	Benin	0.118	Botswana	0.358	Madagascar	0.176	TTO	0.236
118	TTO	0.217	TTO	0.146	Jamaica	0.109	Lao PDR	0.357	Mongolia	0.165	Tajikistan	0.209
119	Haiti	0.216	Haiti	0.127	Bahamas, The	0.095	BIH	0.356	Tajikistan	0.164	Togo	0.209
120	Jamaica	0.207	Latvia	0.121	Fiji	0.092	Nicaragua	0.353	Benin	0.161	Nicaragua	0.206
121	Rwanda	0.196	Djibouti	0.110	Djibouti	0.088	Congo, Rep.	0.347	South Sudan	0.158	BRN	0.203
122	Nicaragua	0.195	Malawi	0.110	Lesotho	0.070	Gabon	0.334	Jamaica	0.157	MKD	0.202
123	Benin	0.195	Lebanon	0.105	Suriname	0.055	KGZ	0.318	Cabo Verde	0.149	Malawi	0.188
124	CAF	0.184	Estonia	0.104	Malta	0.053	Armenia	0.301	Nicaragua	0.133	Jamaica	0.183
125	Mongolia	0.183	Niger	0.093	Belize	0.031	Tajikistan	0.301	PNG	0.123	Guyana	0.145
126	MKD	0.170	CAF	0.093	Seychelles	0.021	Rwanda	0.296	CAF	0.114	Moldova	0.138
127	Togo	0.169	Fiji	0.090	Cabo Verde	0.016	Mauritania	0.291	Burundi	0.107	Haiti	0.135
128	Lao PDR	0.156	Bahamas, The	0.085	Afghanistan	N/A	Albania	0.289	Guyana	0.105	CAF	0.114
129	Iraq	0.143	Luxembourg	0.083	Somalia	N/A	Namibia	0.276	Malawi	0.096	Cabo Verde	0.113
130	Mauritius	0.136	Benin	0.080	Libya	N/A	Cyprus	0.270	Montenegro	0.091	Burundi	0.104
131	Bahrain	0.133	Lesotho	0.063	SYR	N/A	Iceland	0.266	Moldova	0.090	Montenegro	0.092
132	BRN	0.132	Jamaica	0.061	Uzbekistan	N/A	Bahrain	0.259	Bahamas, The	0.074	Bahamas, The	0.091

	1992 (world = 1000)						2023 (world = 1000)					
	Economic Power		Military Power		Geopolitical Power		Economic Power		Military Power		Geopolitical Power	
	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM
133	Armenia	0.127	Suriname	0.059	Eritrea	N/A	Lebanon	0.255	Fiji	0.055	Sierra Leone	0.071
134	Burundi	0.126	Malta	0.037	GNQ	N/A	TTO	0.242	Cameroon	0.054	Malta	0.068
135	Bahamas, The	0.116	Belize	0.029	PRK	N/A	Jamaica	0.235	Timor-Leste	0.050	Fiji	0.066
136	Sierra Leone	0.098	Seychelles	0.023	Iran	N/A	Moldova	0.233	Sierra Leone	0.043	Liberia	0.061
137	Fiji	0.098	Cabo Verde	0.011	Iraq	N/A	Guyana	0.224	Malta	0.042	Timor-Leste	0.050
138	Swaziland	0.090	Afghanistan	N/A	Ethiopia	N/A	Togo	0.222	Lesotho	0.040	Lesotho	0.046
139	Azerbaijan	0.085	San Marino	N/A	Qatar	N/A	MKD	0.196	GNB	0.038	GNB	0.044
140	Malta	0.084	South Sudan	N/A	Kuwait	N/A	GNQ	0.172	Belize	0.034	Belize	0.040
141	Lesotho	0.084	Somalia	N/A	CZE	N/A	Kosovo	0.142	Liberia	0.027	Gambia, The	0.035
142	Albania	0.081	BIH	N/A	Angola	N/A	Mauritius	0.135	Barbados	0.025	Barbados	0.033
143	Eritrea	0.070	Kosovo	N/A	Cambodia	N/A	Liberia	0.129	Haiti	0.023	Afghanistan	N/A
144	Barbados	0.061	Liberia	N/A	Slovakia	N/A	Sierra Leone	0.128	Gambia, The	0.023	Somalia	N/A
145	Gambia, The	0.060	Montenegro	N/A	Lithuania	N/A	Bahamas, The	0.126	Afghanistan	N/A	Libya	N/A
146	Guyana	0.051	Timor-Leste	N/A	Serbia	N/A	BRN	0.124	Albania	N/A	SYR	N/A
147	Suriname	0.046	STP	N/A	Croatia	N/A	Malta	0.118	Andorra	N/A	Uzbekistan	N/A
148	Djibouti	0.045	Palau	N/A	Estonia	N/A	CAF	0.114	ATG	N/A	Eritrea	N/A
149	Belize	0.037	Nauru	N/A	Latvia	N/A	Burundi	0.099	Bhutan	N/A	GNQ	N/A
150	Andorra	0.032	Iran	N/A	BIH	N/A	Montenegro	0.092	Bolivia	N/A	PRK	N/A
151	GNB	0.032	Libya	N/A	Slovenia	N/A	Fiji	0.086	Comoros	N/A	VEN	N/A
152	Comoros	0.031	SYR	N/A	Guinea	N/A	Swaziland	0.081	Costa Rica	N/A	Cuba	N/A
153	Liechtenstein	0.030	Czech Republic	N/A	Gabon	N/A	Suriname	0.078	Cuba	N/A	Sudan	N/A
154	Bhutan	0.030	Ethiopia	N/A	MKD	N/A	Djibouti	0.076	Djibouti	N/A	Yemen, Rep.	N/A
155	SLB	0.028	Uzbekistan	N/A	Togo	N/A	Gambia, The	0.059	Dominica	N/A	Turkmenistan	N/A
156	St. Lucia	0.028	Angola	N/A	South Sudan	N/A	Lesotho	0.058	GNQ	N/A	Lao PDR	N/A
157	Cabo Verde	0.027	Slovakia	N/A	Burundi	N/A	GNB	0.055	Eritrea	N/A	KGZ	N/A
158	Monaco	0.026	Costa Rica	N/A	Guyana	N/A	Maldives	0.055	Grenada	N/A	Lebanon	N/A
159	GNQ	0.019	Guinea	N/A	Montenegro	N/A	Belize	0.053	Iceland	N/A	Djibouti	N/A

	1992 (world = 1000)						2023 (world = 1000)					
	Economic Power		Military Power		Geopolitical Power		Economic Power		Military Power		Geopolitical Power	
	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM
160	ATG	0.018	Gabon	N/A	Moldova	N/A	Timor-Leste	0.051	Kiribati	N/A	Suriname	N/A
161	Vanuatu	0.018	Iceland	N/A	Timor-Leste	N/A	Barbados	0.049	PRK	N/A	Seychelles	N/A
162	Seychelles	0.017	Qatar	N/A	Sierra Leone	N/A	Cabo Verde	0.041	Kosovo	N/A	Qatar	N/A
163	Maldives	0.016	MKD	N/A	GNB	N/A	SLB	0.039	KGZ	N/A	South Sudan	N/A
164	Grenada	0.014	Togo	N/A	Liberia	N/A	Comoros	0.026	Lao PDR	N/A	San Marino	N/A
165	VCT	0.014	Iraq	N/A	Barbados	N/A	Andorra	0.026	Lebanon	N/A	Liechtenstein	N/A
166	Dominica	0.012	Mauritius	N/A	Gambia, The	N/A	St. Lucia	0.025	Libya	N/A	Bhutan	N/A
167	Samoa	0.012	Burundi	N/A	San Marino	N/A	Vanuatu	0.023	Liechtenstein	N/A	Monaco	N/A
168	FSM	0.011	Sierra Leone	N/A	Kosovo	N/A	Seychelles	0.020	Maldives	N/A	Tonga	N/A
169	KNA	0.010	Swaziland	N/A	STP	N/A	ATG	0.018	MHL	N/A	Costa Rica	N/A
170	Tonga	0.009	Eritrea	N/A	Palau	N/A	Samoa	0.016	Mauritius	N/A	Iceland	N/A
171	MHL	0.005	Barbados	N/A	Nauru	N/A	Grenada	0.014	FSM	N/A	Kosovo	N/A
172	Kiribati	0.004	Gambia, The	N/A	Costa Rica	N/A	VCT	0.012	Monaco	N/A	Mauritius	N/A
173	Tuvalu	0.001	Guyana	N/A	Iceland	N/A	STP	0.011	Nauru	N/A	Swaziland	N/A
174	Afghanistan	N/A	Andorra	N/A	Mauritius	N/A	KNA	0.010	Palau	N/A	Maldives	N/A
175	PRK	N/A	GNB	N/A	Swaziland	N/A	Dominica	0.009	Panama	N/A	SLB	N/A
176	San Marino	N/A	Comoros	N/A	Andorra	N/A	FSM	0.008	Samoa	N/A	Comoros	N/A
177	South Sudan	N/A	Liechtenstein	N/A	Comoros	N/A	Kiribati	0.006	San Marino	N/A	Andorra	N/A
178	Kuwait	N/A	Bhutan	N/A	Liechtenstein	N/A	MHL	0.004	STP	N/A	St. Lucia	N/A
179	Serbia	N/A	SLB	N/A	Bhutan	N/A	Palau	0.003	Seychelles	N/A	Vanuatu	N/A
180	Croatia	N/A	St. Lucia	N/A	SLB	N/A	Nauru	0.002	SLB	N/A	ATG	N/A
181	Lithuania	N/A	Monaco	N/A	St. Lucia	N/A	Tuvalu	0.001	Somalia	N/A	Samoa	N/A
182	Cambodia	N/A	GNQ	N/A	Monaco	N/A	Afghanistan	N/A	KNA	N/A	Grenada	N/A
183	Slovenia	N/A	ATG	N/A	ATG	N/A	PRK	N/A	St. Lucia	N/A	VCT	N/A
184	Latvia	N/A	Vanuatu	N/A	Vanuatu	N/A	San Marino	N/A	VCT	N/A	STP	N/A
185	Somalia	N/A	Maldives	N/A	Maldives	N/A	South Sudan	N/A	Sudan	N/A	KNA	N/A
186	Estonia	N/A	Grenada	N/A	Grenada	N/A	VEN	N/A	Suriname	N/A	Dominica	N/A

	1992 (world = 1000)						2023 (world = 1000)					
	Economic Power		Military Power		Geopolitical Power		Economic Power		Military Power		Geopolitical Power	
	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM
187	BIH	N/A	VCT	N/A	VCT	N/A	SYR	N/A	Swaziland	N/A	FSM	N/A
188	Moldova	N/A	Dominica	N/A	Dominica	N/A	Cuba	N/A	SYR	N/A	Kiribati	N/A
189	Kosovo	N/A	Samoa	N/A	Samoa	N/A	Yemen, Rep.	N/A	Tonga	N/A	MHL	N/A
190	Liberia	N/A	FSM	N/A	FSM	N/A	Qatar	N/A	Turkmenistan	N/A	Palau	N/A
191	Montenegro	N/A	KNA	N/A	KNA	N/A	Eritrea	N/A	Tuvalu	N/A	Nauru	N/A
192	Timor-Leste	N/A	Tonga	N/A	Tonga	N/A	Liechtenstein	N/A	Uzbekistan	N/A	Tuvalu	N/A
193	STP	N/A	MHL	N/A	MHL	N/A	Bhutan	N/A	Vanuatu	N/A	Bolivia	N/A
194	Palau	N/A	Kiribati	N/A	Kiribati	N/A	Monaco	N/A	VEN	N/A	Panama	N/A
195	Nauru	N/A	Tuvalu	N/A	Tuvalu	N/A	Tonga	N/A	Yemen, Rep.	N/A	Albania	N/A

3.2. Derived measures - indicators of militarization

There are three types of militarization: economic militarization, GDP militarization and demographic militarization. Militarization indicators are dimensionless quantities.

The economic militarization index is the ratio of military power to economic power, i.e.:

$$m_e = \frac{P_m}{P_e}.$$

It can also be interpreted as an indicator of mobilization, as it shows how much of the resources have been allocated (mobilized) for military (defense) purposes, and also as an indicator of defense readiness. It is the product of two indicators, as shown by the following formula:

$$m_e = \frac{MEX^{0.652} \times S^{0.217} \times a^{0.109}}{GDP^{0.652} \times L^{0.217} \times a^{0.109}}.$$

After simplification, the formula takes the form:

$$m_e = \frac{MEX^{0.652} \times S^{0.217}}{GDP^{0.652} \times L^{0.217}}, hence: \left(\frac{MEX^{0.652}}{GDP^{0.652}}\right) \times \left(\frac{S^{0.217}}{L^{0.217}}\right).$$

The first indicator (m_{GDP}) expresses GDP militarization, while the second (m_d) expresses demographic militarization.

$$m_{GDP} = \frac{MEX^{0.652}}{GDP^{0.652}},$$

$$m_d = \frac{S^{0.217}}{L^{0.217}}.$$

The above indicators are an important means of describing the defense policy of countries. Note that the militarization strategy is at the same time a strategy towards the civilian sector – an increasing rate of militarization (GDP and population) leads to a decreasing role of the civilian factor, and vice versa. Based on this reasoning, four types of strategy can be distinguished (see Table 7). In addition, there are a large number of intermediate situations. These indicators provide an approximation of the type of military strategy used by countries and the will to implement it.

Table 8 Strategies resulting from the degree of militarization of GDP and population

Militarization of population / Militarization of GDP	Low	High
Low	Strategy of low militarization of GDP and population. *Small armed forces, poorly armed and equipped. Contract, professional or conscript army.*	Strategy of low militarization of GDP, but high militarization of the population. *Large armed forces, poorly armed and equipped. Most likely from conscription.*
High	Strategy of high militarization of GDP, but low militarization of the population. *Small armed forces, very well armed and equipped. Most likely professional.*	Strategy of high militarization of GDP and militarization of the population. *Large armed forces, well armed and equipped. Most likely a combination of conscript and professional armies.*

Given that this is a model, you may find examples that do not fit exactly into the classification presented. Of course, one must keep in mind the conventionality of the "low" - "high" categories. In general, we have two pathways. The first is to consider the volumes below the world average as “low”, while volumes above the world average as “high.” The second is to refer to the size of military factor shares in GDP or population. Both theory and historical experience show that the share of military spending in GDP up to 3% can be described as peaceful. Between 5% and 7% can still be considered peaceful, but there is a clear increase in political-military tensions. Above 7-8% indicates a high level of economic and demographic resource mobilization. In the final assessment, comparing the results of the two approaches is best.

We count the militarization of a power in three forms: economic militarization as the share of military power in economic power, GDP militarization as the share of military spending in GDP, and demographic militarization as the share of the number of active duty soldiers in the general population (with appropriate power exponents – according to the model). In all three cases, the world militarization index takes the value of 1. We treat countries with militarization greater than 1 as highly militarized and those below 1 as weakly militarized (Table 8). The militarization thus understood is relative in nature, as it is related to the militarization of the world.

Three model situations are possible. The first situation – when the position of the state determined by all three types of militarization is similar – is a balanced position. However, it should be remembered that it can be achieved with different levels of militarization – high or low. The second is when the position resulting from GDP militarization is clearly higher than that resulting from demographic militarization (an unbalanced position: manufacturing, production-services tilt). And the third is when the position resulting from demographic militarization is clearly higher than the position resulting from GDP militarization (an unbalanced position: demographic tilt). Militarization indicators can be interpreted as mobilization ratios (since they show how much of the resources have been allocated for military or defense purposes), as well as readiness indicators (i.e., the degree to which the country is prepared to defend itself).

Table 9 Ranking of countries on the basis of economic militarization, GDP militarization and demographic militarization in 1992 and 2023 (world = 1)

	1992 (world = 1)						2023 (world = 1)					
	Economic Militarization		Militarization of GDP		Militarization of population		Economic Militarization		Militarization of GDP		Militarization of population	
	Country	me	Country	mgdp	Country	md	Country	me	Country	mgdp	Country	md
1	Azerbaijan	6.91	Kuwait	7.92	PRK	1.73	Ukraine	6.30	Cabo Verde	4.04	Eritrea	2.11
2	Vietnam	4.94	Azerbaijan	7.01	Israel	1.56	Cabo Verde	3.68	Ukraine	3.97	PRK	1.89
3	Mongolia	4.66	Mongolia	4.22	SYR	1.53	Armenia	2.72	Algeria	2.33	Ukraine	1.52
4	Jordan	4.25	Vietnam	3.96	ARE	1.48	Oman	2.63	Saudi Arabia	2.09	Israel	1.52
5	Oman	4.18	Turkmenistan	3.32	Jordan	1.46	Saudi Arabia	2.60	Oman	1.99	BRN	1.47
6	Bulgaria	4.00	Bulgaria	3.18	Croatia	1.43	Algeria	2.42	Armenia	1.84	Armenia	1.47
7	Armenia	3.89	Myanmar	3.09	Iraq	1.40	Israel	2.22	Mali	1.82	Greece	1.40
8	Turkmenistan	3.86	Oman	3.08	TWN	1.37	Azerbaijan	1.98	Kuwait	1.72	Sri Lanka	1.38
9	ARE	3.44	Armenia	3.00	Seychelles	1.37	BRN	1.95	Myanmar	1.70	Lebanon	1.36
10	Myanmar	3.40	Jordan	2.91	Russia	1.37	Morocco	1.95	Morocco	1.67	Korea, Rep.	1.36
11	Belarus	3.34	Saudi Arabia	2.83	Libya	1.36	Kuwait	1.91	Azerbaijan	1.61	Cyprus	1.33
12	Saudi Arabia	3.32	Yemen, Rep.	2.82	Oman	1.36	ARE	1.91	ARE	1.56	Oman	1.32
13	Lao PDR	2.93	Mozambique	2.75	Serbia	1.35	Jordan	1.88	Burkina Faso	1.55	Singapore	1.31
14	Yemen, Rep.	2.90	Belarus	2.67	Singapore	1.35	Russia	1.84	Iraq	1.55	Jordan	1.31
15	BRN	2.66	Tajikistan	2.62	BRN	1.33	Myanmar	1.84	Israel	1.47	Russia	1.28
16	Egypt, Arab Rep.	2.65	Nicaragua	2.58	Cuba	1.33	Cambodia	1.83	Cambodia	1.46	Lithuania	1.28
17	Mozambique	2.64	Lao PDR	2.55	Greece	1.31	Greece	1.83	Russia	1.45	SYR	1.26
18	Israel	2.64	Georgia	2.55	Qatar	1.31	Iraq	1.73	Jordan	1.44	Cambodia	1.25
19	Cuba	2.53	Egypt, Arab Rep.	2.39	Armenia	1.30	Bahrain	1.56	United States	1.35	Djibouti	1.24
20	Nicaragua	2.44	Djibouti	2.35	Korea, Rep.	1.30	Singapore	1.53	Pakistan	1.34	Saudi Arabia	1.24
21	Djibouti	2.44	Tanzania	2.34	Cambodia	1.29	Korea, Rep.	1.52	Bahrain	1.33	TWN	1.24
22	Albania	2.28	ARE	2.33	Bulgaria	1.26	Lithuania	1.51	BRN	1.32	Iran	1.23
23	Sudan	2.21	Ethiopia	2.31	Albania	1.25	United States	1.48	BIH	1.30	ARE	1.23

	1992 (world = 1)						2023 (world = 1)					
	Economic Militarization		Militarization of GDP		Militarization of population		Economic Militarization		Militarization of GDP		Militarization of population	
	Country	me	Country	mgdp	Country	md	Country	me	Country	mgdp	Country	md
24	Pakistan	2.16	Sudan	2.27	Belarus	1.25	Estonia	1.45	Greece	1.29	Myanmar	1.22
25	Bahrain	2.16	Pakistan	2.09	Vietnam	1.25	Mali	1.45	Estonia	1.25	Qatar	1.21
26	Tajikistan	1.94	BRN	1.99	Lebanon	1.25	BIH	1.39	Poland	1.24	Azerbaijan	1.21
27	Ukraine	1.93	Kazakhstan	1.94	Bahrain	1.24	TWN	1.38	Namibia	1.22	Uruguay	1.20
28	Tanzania	1.92	Ukraine	1.92	Angola	1.20	Pakistan	1.36	Botswana	1.22	Turkmenistan	1.19
29	Kazakhstan	1.89	Cuba	1.90	MKD	1.20	Namibia	1.33	Chad	1.18	Bulgaria	1.19
30	Cyprus	1.81	Albania	1.82	Turkey	1.20	Botswana	1.29	Singapore	1.18	Georgia	1.18
31	Uganda	1.74	Uganda	1.80	Cyprus	1.20	Poland	1.25	Lithuania	1.16	Bahrain	1.17
32	Singapore	1.71	China	1.79	BIH	1.18	Romania	1.19	Korea, Rep.	1.14	Morocco	1.16
33	Romania	1.69	Bahrain	1.74	Saudi Arabia	1.17	Cyprus	1.19	Tunisia	1.12	Belarus	1.16
34	Georgia	1.67	Rwanda	1.73	Iran	1.17	Latvia	1.19	CAF	1.11	Estonia	1.16
35	Malaysia	1.62	Cyprus	1.51	Romania	1.16	Finland	1.16	Burundi	1.11	Thailand	1.15
36	United States	1.61	Malaysia	1.48	Turkmenistan	1.16	Tunisia	1.15	Timor-Leste	1.11	DOM	1.15
37	China	1.60	Romania	1.45	Lao PDR	1.15	Iran	1.14	TWN	1.11	Colombia	1.15
38	Sri Lanka	1.50	United States	1.43	El Salvador	1.14	Mauritania	1.13	Romania	1.11	Belize	1.15
39	TWN	1.48	Sri Lanka	1.40	Belgium	1.14	Sri Lanka	1.13	Latvia	1.10	Vietnam	1.15
40	Hungary	1.43	Algeria	1.33	Uruguay	1.14	Chad	1.09	Mauritania	1.08	Bahamas, The	1.15
41	Algeria	1.38	Suriname	1.30	Hungary	1.13	Burundi	1.08	Finland	1.04	South Sudan	1.14
42	Seychelles	1.34	Zimbabwe	1.29	Poland	1.13	Serbia	1.08	United Kingdom	1.04	Norway	1.13
43	Suriname	1.30	Singapore	1.27	Norway	1.13	MKD	1.04	Togo	1.02	Croatia	1.12
44	Zimbabwe	1.30	Hungary	1.26	Morocco	1.13	Slovakia	1.03	Guinea	1.01	Cuba	1.12
45	Korea, Rep.	1.25	Israel	1.25	Slovenia	1.13	Bulgaria	1.02	India	1.00	VEN	1.12
46	Poland	1.22	Kenya	1.21	United States	1.12	CAF	1.00	Uganda	0.99	Iraq	1.12
47	Turkey	1.20	COD	1.20	France	1.12	France	1.00	Slovakia	0.98	Fiji	1.11
48	Rwanda	1.19	India	1.14	GNB	1.11	Vietnam	1.00	Australia	0.97	Kuwait	1.11
49	Greece	1.10	VEN	1.11	Egypt, Arab Rep.	1.11	United Kingdom	0.99	Niger	0.97	Turkey	1.11

	1992 (world = 1)						2023 (world = 1)					
	Economic Militarization		Militarization of GDP		Militarization of population		Economic Militarization		Militarization of GDP		Militarization of population	
	Country	me	Country	mgdp	Country	md	Country	me	Country	mgdp	Country	md
50	Morocco	1.10	Burkina Faso	1.10	Sweden	1.11	Hungary	0.99	Serbia	0.97	Serbia	1.11
51	El Salvador	1.09	Poland	1.08	Mongolia	1.11	Montenegro	0.99	France	0.97	United States	1.10
52	VEN	1.07	TWN	1.08	Myanmar	1.10	Georgia	0.99	Hungary	0.94	Ethiopia	1.10
53	Ecuador	1.07	Tunisia	1.04	Fiji	1.10	Timor-Leste	0.98	Congo, Rep.	0.93	Egypt, Arab Rep.	1.09
54	Tunisia	1.03	Ecuador	1.02	Malaysia	1.10	Burkina Faso	0.97	MKD	0.93	El Salvador	1.09
55	Russia	0.99	Lesotho	1.01	Chile	1.10	TTO	0.96	Iran	0.92	Namibia	1.09
56	Congo, Rep.	0.99	Turkey	1.00	Austria	1.10	Australia	0.94	TTO	0.91	MKD	1.09
57	Bolivia	0.97	Congo, Rep.	0.99	Finland	1.09	Colombia	0.92	Cyprus	0.90	Lao PDR	1.09
58	Colombia	0.94	Seychelles	0.98	Italy	1.08	Togo	0.92	Albania	0.89	Malta	1.09
59	Fiji	0.92	Morocco	0.97	Sri Lanka	1.07	Norway	0.91	Vietnam	0.88	Romania	1.08
60	Norway	0.91	Bolivia	0.97	Netherlands	1.07	Belarus	0.90	Mauritius	0.87	Latvia	1.08
61	France	0.91	KGZ	0.96	Portugal	1.07	Niger	0.85	Maldives	0.86	Guyana	1.08
62	United Kingdom	0.91	Korea, Rep.	0.96	Denmark	1.06	Croatia	0.85	Lesotho	0.86	Barbados	1.07
63	Thailand	0.89	El Salvador	0.95	Germany	1.05	Congo, Rep.	0.85	Montenegro	0.86	Chile	1.07
64	India	0.89	Colombia	0.95	Spain	1.05	Slovenia	0.82	Bulgaria	0.85	Botswana	1.06
65	Peru	0.87	Nigeria	0.93	Ecuador	1.05	India	0.82	Georgia	0.83	Finland	1.06
66	Kenya	0.87	Zambia	0.92	Djibouti	1.04	Czech Republic	0.81	Sweden	0.83	BIH	1.06
67	Chile	0.85	United Kingdom	0.88	Algeria	1.04	Italy	0.80	Czech Republic	0.82	Mauritania	1.06
68	Zambia	0.84	Thailand	0.87	United Kingdom	1.03	Angola	0.80	Sri Lanka	0.81	Malaysia	1.05
69	COD	0.83	Peru	0.85	Pakistan	1.03	Uganda	0.79	Netherlands	0.81	Slovakia	1.05
70	KGZ	0.79	Greece	0.84	Namibia	1.03	Chile	0.79	Norway	0.81	Hungary	1.05
71	Botswana	0.79	Fiji	0.84	Yemen, Rep.	1.03	Guinea	0.76	Slovenia	0.81	TTO	1.05
72	Belize	0.77	Indonesia	0.81	Thailand	1.03	Thailand	0.76	Colombia	0.80	Montenegro	1.05
73	Uruguay	0.77	France	0.81	Peru	1.02	Netherlands	0.76	New Zealand	0.80	Suriname	1.05
74	Paraguay	0.77	Haiti	0.81	Gabon	1.02	Germany	0.75	Zambia	0.79	Nepal	1.04
75	Guatemala	0.76	Norway	0.81	Guatemala	1.02	Ecuador	0.75	Senegal	0.79	Algeria	1.04

	1992 (world = 1)						2023 (world = 1)					
	Economic Militarization		Militarization of GDP		Militarization of population		Economic Militarization		Militarization of GDP		Militarization of population	
	Country	m_e	Country	m_{gdp}	Country	m_d	Country	m_e	Country	m_{gdp}	Country	m_d
76	Burkina Faso	0.75	Belize	0.81	Malta	1.01	Rwanda	0.74	Italy	0.79	Poland	1.03
77	Lesotho	0.75	Paraguay	0.79	Panama	1.01	Denmark	0.73	Tanzania	0.79	Angola	1.03
78	Namibia	0.75	Botswana	0.78	Mauritania	1.01	New Zealand	0.73	Germany	0.78	France	1.03
79	Bahamas, The	0.73	TTO	0.78	Botswana	1.01	Sweden	0.73	Angola	0.78	Mongolia	1.03
80	Australia	0.71	Chile	0.78	Zimbabwe	1.00	Gabon	0.70	Philippines	0.78	Tunisia	1.02
81	Sweden	0.68	Bahamas, The	0.77	Ukraine	1.00	Spain	0.70	Ecuador	0.77	Slovenia	1.02
82	TTO	0.67	Guatemala	0.75	Bolivia	1.00	GNB	0.69	Luxembourg	0.77	Pakistan	1.01
83	Mauritania	0.67	Philippines	0.75	Congo, Rep.	1.00	Luxembourg	0.68	Belarus	0.76	Italy	1.01
84	Netherlands	0.67	Australia	0.73	Suriname	1.00	Lesotho	0.68	Rwanda	0.76	Spain	1.00
85	Finland	0.67	Russia	0.73	Azerbaijan	0.99	Jamaica	0.67	Croatia	0.76	Portugal	1.00
86	Canada	0.67	Canada	0.73	Tunisia	0.98	Philippines	0.66	GNB	0.74	Czech Republic	1.00
87	Honduras	0.67	Namibia	0.73	Colombia	0.98	Nepal	0.66	Denmark	0.74	Austria	0.99
88	Indonesia	0.65	Honduras	0.71	Moldova	0.98	Malaysia	0.65	Gabon	0.74	Denmark	0.99
89	Chad	0.64	Mali	0.70	Chad	0.98	Ethiopia	0.65	Chile	0.73	Afghanistan	0.98
90	Nigeria	0.63	Uruguay	0.68	Australia	0.98	Japan	0.65	Honduras	0.71	Rwanda	0.98
91	Philippines	0.60	Ghana	0.67	Kazakhstan	0.97	Fiji	0.64	China	0.71	Peru	0.98
92	Germany	0.60	Mauritania	0.67	Sudan	0.97	Belize	0.64	Spain	0.70	Burundi	0.98
93	Belgium	0.60	CAF	0.66	Uganda	0.97	Egypt, Arab Rep.	0.63	Jamaica	0.70	Australia	0.97
94	Haiti	0.59	South Africa	0.66	Paraguay	0.97	Turkey	0.63	Kenya	0.69	Switzerland	0.97
95	Panama	0.58	Chad	0.65	Cabo Verde	0.96	China	0.63	Tajikistan	0.69	Ecuador	0.97
96	Italy	0.57	Malawi	0.65	Ireland	0.96	Honduras	0.63	Japan	0.68	United Kingdom	0.97
97	Portugal	0.57	Nepal	0.63	VEN	0.96	Uruguay	0.62	COD	0.68	Sudan	0.97
98	Denmark	0.57	Netherlands	0.63	Mozambique	0.96	Senegal	0.61	Canada	0.67	Germany	0.96
99	South Africa	0.55	Finland	0.61	Belize	0.96	Canada	0.61	Brazil	0.66	Jamaica	0.96
100	Nepal	0.52	Sweden	0.61	Bahamas, The	0.95	Brazil	0.61	Thailand	0.66	Gabon	0.95
101	CAF	0.51	Senegal	0.59	Nicaragua	0.95	Portugal	0.61	Panama	0.65	Paraguay	0.95

	1992 (world = 1)						2023 (world = 1)					
	Economic Militarization		Militarization of GDP		Militarization of population		Economic Militarization		Militarization of GDP		Militarization of population	
	Country	me	Country	mgdp	Country	md	Country	me	Country	mgdp	Country	md
102	Mali	0.49	Benin	0.59	Honduras	0.94	Zambia	0.60	Nepal	0.63	Kazakhstan	0.94
103	Malawi	0.48	Madagascar	0.58	Afghanistan	0.93	COD	0.59	Bolivia	0.63	Japan	0.94
104	Madagascar	0.48	Panama	0.58	New Zealand	0.93	DOM	0.59	Malaysia	0.62	Belgium	0.94
105	Spain	0.45	PNG	0.57	DOM	0.92	Bahamas, The	0.58	Portugal	0.61	Moldova	0.94
106	New Zealand	0.45	Germany	0.57	Canada	0.92	Kazakhstan	0.57	Kazakhstan	0.61	Netherlands	0.94
107	Senegal	0.45	Denmark	0.53	GNQ	0.92	El Salvador	0.56	Mozambique	0.60	GNB	0.93
108	Malta	0.44	Portugal	0.53	Switzerland	0.91	Austria	0.55	Ethiopia	0.59	Chad	0.93
109	Ghana	0.41	Italy	0.53	Zambia	0.91	Tajikistan	0.54	Bangladesh	0.59	Zimbabwe	0.92
110	Benin	0.41	Belgium	0.52	Guyana	0.90	Belgium	0.54	Egypt, Arab Rep.	0.58	New Zealand	0.92
111	Switzerland	0.41	Bangladesh	0.50	China	0.89	Tanzania	0.53	Fiji	0.57	Nicaragua	0.91
112	Cabo Verde	0.40	New Zealand	0.49	TTO	0.86	Barbados	0.52	Belgium	0.57	Canada	0.91
113	PNG	0.40	Argentina	0.45	Luxembourg	0.85	Peru	0.49	Turkey	0.57	Brazil	0.91
114	Ireland	0.38	Switzerland	0.45	Mexico	0.85	Bangladesh	0.48	Cote d'Ivoire	0.57	Mexico	0.91
115	Argentina	0.37	Malta	0.43	Japan	0.84	Kenya	0.47	Austria	0.56	Cabo Verde	0.91
116	Bangladesh	0.36	Spain	0.43	Argentina	0.84	Switzerland	0.47	Belize	0.56	Congo, Rep.	0.91
117	DOM	0.36	Cabo Verde	0.42	Brazil	0.84	Guyana	0.47	South Africa	0.52	KGZ	0.90
118	Lebanon	0.35	Costa Rica	0.41	Lithuania	0.83	Paraguay	0.47	Uruguay	0.51	CAF	0.90
119	Austria	0.35	Cameroon	0.40	South Africa	0.83	Cote d'Ivoire	0.45	Bahamas, The	0.51	Ireland	0.90
120	Brazil	0.32	DOM	0.39	KGZ	0.82	South Africa	0.43	El Salvador	0.51	Argentina	0.89
121	Japan	0.30	Ireland	0.39	Nepal	0.82	Indonesia	0.41	DOM	0.51	Timor-Leste	0.89
122	Jamaica	0.29	Brazil	0.39	Tanzania	0.82	Gambia, The	0.39	Peru	0.50	Gambia, The	0.88
123	Luxembourg	0.27	Jamaica	0.38	Madagascar	0.82	Moldova	0.39	Paraguay	0.49	Togo	0.88
124	Cameroon	0.26	Niger	0.36	Philippines	0.81	Mongolia	0.38	Barbados	0.49	China	0.88
125	Mexico	0.21	Japan	0.35	Indonesia	0.79	Mozambique	0.38	Switzerland	0.48	Honduras	0.88
126	Niger	0.21	Austria	0.32	Guinea	0.79	Nicaragua	0.38	Madagascar	0.48	Indonesia	0.88
127	Cote d'Ivoire	0.20	Luxembourg	0.32	Sierra Leone	0.78	Benin	0.37	Benin	0.47	Sweden	0.88

	1992 (world = 1)						2023 (world = 1)					
	Economic Militarization		Militarization of GDP		Militarization of population		Economic Militarization		Militarization of GDP		Militarization of population	
	Country	me	Country	mgdp	Country	md	Country	me	Country	mgdp	Country	md
128	Afghanistan	N/A	Cote d'Ivoire	0.31	India	0.78	Malta	0.36	Indonesia	0.46	COD	0.87
129	Angola	N/A	Lebanon	0.28	Jamaica	0.78	Argentina	0.33	Gambia, The	0.44	Uzbekistan	0.87
130	Andorra	N/A	Mexico	0.25	Togo	0.77	Sierra Leone	0.33	Guyana	0.43	Niger	0.85
131	ATG	N/A	Mauritius	0.22	Estonia	0.77	Mexico	0.33	Costa Rica	0.43	Philippines	0.85
132	Burundi	N/A	Afghanistan	N/A	CAF	0.77	Madagascar	0.33	Nigeria	0.42	South Africa	0.85
133	BIH	N/A	Angola	N/A	Senegal	0.76	Nigeria	0.31	Nicaragua	0.41	Yemen, Rep.	0.84
134	Barbados	N/A	ATG	N/A	Lesotho	0.75	Zimbabwe	0.29	Moldova	0.41	Sierra Leone	0.82
135	Bhutan	N/A	Dominica	N/A	Malawi	0.74	Guatemala	0.28	Sierra Leone	0.41	Guatemala	0.82
136	Comoros	N/A	FSM	N/A	Tajikistan	0.74	Ghana	0.26	Mongolia	0.37	India	0.82
137	Costa Rica	N/A	Guinea	N/A	Haiti	0.73	Malawi	0.26	Argentina	0.37	Cote d'Ivoire	0.80
138	Czech Republic	N/A	Guyana	N/A	Burundi	0.73	Ireland	0.21	Malawi	0.36	Uganda	0.80
139	Dominica	N/A	Cambodia	N/A	Latvia	0.73	Liberia	0.21	Ghana	0.36	Bangladesh	0.80
140	Eritrea	N/A	Liberia	N/A	Bangladesh	0.73	PNG	0.19	Mexico	0.36	Mali	0.80
141	Estonia	N/A	St. Lucia	N/A	Kenya	0.72	Haiti	0.06	Guatemala	0.34	Tajikistan	0.79
142	Ethiopia	N/A	Moldova	N/A	Mali	0.70	Cameroon	0.05	ATG	0.34	Benin	0.79
143	FSM	N/A	Qatar	N/A	Benin	0.70	Afghanistan	N/A	Malta	0.33	Cameroon	0.79
144	Gabon	N/A	Somalia	N/A	PNG	0.69	Bhutan	N/A	Liberia	0.32	Lesotho	0.79
145	Guinea	N/A	Serbia	N/A	COD	0.69	Cuba	N/A	Zimbabwe	0.32	Senegal	0.78
146	Gambia, The	N/A	Slovakia	N/A	Gambia, The	0.69	Djibouti	N/A	PNG	0.29	Somalia	0.77
147	GNB	N/A	SYR	N/A	Rwanda	0.69	Eritrea	N/A	Ireland	0.24	Zambia	0.76
148	GNQ	N/A	VCT	N/A	Burkina Faso	0.69	GNQ	N/A	Iceland	0.17	Guinea	0.76
149	Grenada	N/A	Andorra	N/A	Nigeria	0.68	KGZ	N/A	Haiti	0.13	Nigeria	0.74
150	Guyana	N/A	Eritrea	N/A	Uzbekistan	0.67	Lao PDR	N/A	Cameroon	0.06	GNQ	0.73
151	Croatia	N/A	Gabon	N/A	Cameroon	0.65	Lebanon	N/A	Afghanistan	N/A	Malawi	0.71
152	Iran	N/A	Croatia	N/A	Georgia	0.65	Libya	N/A	Qatar	N/A	Ghana	0.69
153	Iraq	N/A	KNA	N/A	Cote d'Ivoire	0.64	Liechtenstein	N/A	Somalia	N/A	Madagascar	0.69

	1992 (world = 1)						2023 (world = 1)					
	Economic Militarization		Militarization of GDP		Militarization of population		Economic Militarization		Militarization of GDP		Militarization of population	
	Country	me	Country	mgdp	Country	md	Country	me	Country	mgdp	Country	md
154	Iceland	N/A	Liechtenstein	N/A	Ghana	0.61	Monaco	N/A	SYR	N/A	Kenya	0.68
155	Cambodia	N/A	Lithuania	N/A	Niger	0.59	PRK	N/A	Eritrea	N/A	Tanzania	0.67
156	Kiribati	N/A	MKD	N/A	Andorra	N/A	Qatar	N/A	Liechtenstein	N/A	PNG	0.66
157	KNA	N/A	Montenegro	N/A	ATG	N/A	Sudan	N/A	PRK	N/A	Liberia	0.66
158	Kuwait	N/A	PRK	N/A	Barbados	N/A	San Marino	N/A	South Sudan	N/A	Mozambique	0.64
159	Liberia	N/A	Sierra Leone	N/A	Bhutan	N/A	Somalia	N/A	Tonga	N/A	Burkina Faso	0.63
160	Libya	N/A	South Sudan	N/A	Comoros	N/A	South Sudan	N/A	Bhutan	N/A	Haiti	0.48
161	St. Lucia	N/A	STP	N/A	Costa Rica	N/A	Suriname	N/A	Monaco	N/A	Liechtenstein	N/A
162	Liechtenstein	N/A	Togo	N/A	Czech Republic	N/A	Seychelles	N/A	Uzbekistan	N/A	Tonga	N/A
163	Lithuania	N/A	Timor-Leste	N/A	Dominica	N/A	SYR	N/A	GNQ	N/A	Bhutan	N/A
164	Latvia	N/A	Tonga	N/A	Eritrea	N/A	Turkmenistan	N/A	San Marino	N/A	Monaco	N/A
165	Monaco	N/A	Kosovo	N/A	Ethiopia	N/A	Tonga	N/A	Libya	N/A	San Marino	N/A
166	Moldova	N/A	Burundi	N/A	Grenada	N/A	Uzbekistan	N/A	Turkmenistan	N/A	Dominica	N/A
167	Maldives	N/A	Bhutan	N/A	Iceland	N/A	VEN	N/A	Yemen, Rep.	N/A	FSM	N/A
168	MHL	N/A	Monaco	N/A	Kiribati	N/A	Yemen, Rep.	N/A	Lao PDR	N/A	St. Lucia	N/A
169	MKD	N/A	Kiribati	N/A	Kosovo	N/A	Albania	N/A	Djibouti	N/A	VCT	N/A
170	Montenegro	N/A	Grenada	N/A	Kuwait	N/A	Andorra	N/A	Sudan	N/A	Andorra	N/A
171	Mauritius	N/A	Iceland	N/A	Liberia	N/A	ATG	N/A	Cuba	N/A	KNA	N/A
172	Nauru	N/A	SLB	N/A	Liechtenstein	N/A	Bolivia	N/A	Suriname	N/A	STP	N/A
173	Palau	N/A	Uzbekistan	N/A	Maldives	N/A	Comoros	N/A	VEN	N/A	Kosovo	N/A
174	PRK	N/A	Czech Republic	N/A	MHL	N/A	Costa Rica	N/A	Seychelles	N/A	Kiribati	N/A
175	Qatar	N/A	Iraq	N/A	Mauritius	N/A	Dominica	N/A	KGZ	N/A	Grenada	N/A
176	SLB	N/A	Slovenia	N/A	FSM	N/A	FSM	N/A	Lebanon	N/A	SLB	N/A
177	Sierra Leone	N/A	Samoa	N/A	Monaco	N/A	Grenada	N/A	Dominica	N/A	Samoa	N/A
178	San Marino	N/A	Vanuatu	N/A	Montenegro	N/A	Iceland	N/A	FSM	N/A	Vanuatu	N/A
179	Somalia	N/A	Comoros	N/A	Nauru	N/A	Kiribati	N/A	St. Lucia	N/A	Comoros	N/A

	1992 (world = 1)						2023 (world = 1)					
	Economic Militarization		Militarization of GDP		Militarization of population		Economic Militarization		Militarization of GDP		Militarization of population	
	Country	me	Country	mgdp	Country	md	Country	me	Country	mgdp	Country	md
180	Serbia	N/A	Gambia, The	N/A	Palau	N/A	KNA	N/A	VCT	N/A	Swaziland	N/A
181	South Sudan	N/A	Swaziland	N/A	Samoa	N/A	St. Lucia	N/A	Andorra	N/A	Palau	N/A
182	STP	N/A	Estonia	N/A	San Marino	N/A	Maldives	N/A	KNA	N/A	Nauru	N/A
183	Slovakia	N/A	GNQ	N/A	STP	N/A	MHL	N/A	STP	N/A	Tuvalu	N/A
184	Slovenia	N/A	Latvia	N/A	Slovakia	N/A	Mauritius	N/A	Kosovo	N/A	MHL	N/A
185	Swaziland	N/A	Palau	N/A	SLB	N/A	Nauru	N/A	Kiribati	N/A	Seychelles	N/A
186	SYR	N/A	Nauru	N/A	Somalia	N/A	Panama	N/A	Grenada	N/A	Libya	N/A
187	Togo	N/A	Tuvalu	N/A	South Sudan	N/A	Palau	N/A	SLB	N/A	Albania	N/A
188	Timor-Leste	N/A	Barbados	N/A	KNA	N/A	SLB	N/A	Samoa	N/A	Mauritius	N/A
189	Tonga	N/A	BIH	N/A	St. Lucia	N/A	STP	N/A	Vanuatu	N/A	Maldives	N/A
190	Tuvalu	N/A	San Marino	N/A	VCT	N/A	Swaziland	N/A	Comoros	N/A	Luxembourg	N/A
191	Uzbekistan	N/A	GNB	N/A	Swaziland	N/A	Tuvalu	N/A	Swaziland	N/A	Panama	N/A
192	VCT	N/A	MHL	N/A	Timor-Leste	N/A	VCT	N/A	Palau	N/A	Bolivia	N/A
193	Vanuatu	N/A	Maldives	N/A	Tonga	N/A	Vanuatu	N/A	Nauru	N/A	Costa Rica	N/A
194	Samoa	N/A	Iran	N/A	Tuvalu	N/A	Samoa	N/A	Tuvalu	N/A	ATG	N/A
195	Kosovo	N/A	Libya	N/A	Vanuatu	N/A	Kosovo	N/A	MHL	N/A	Iceland	N/A

3.3. States by the power status

The criteria for power status can be grasped in two main ways – sectorally and synthetically. In the first case, we talk about military, economic, raw material and energy powers, etc. In the second, we rely on synthetic measures of power, assigning countries to appropriate ranges. In Table 9 we present the classification of powers using synthetic measures of power based on the adopted criteria.

Table 10 Classification of the power status of states based on synthetic measures of power

Power status	Symbol	Criteria (in % of world power)
Superpower	XP	over 18
World Power	WP	12–18
Great Power	GP	7–12
Medium Power	MP	3–7
Local Power	LP	1–3
Small Power	SP	0.1–1
Micro Power	PP	less than 0.1

On the basis of economic power, throughout the period under review the United States met the criteria for a world power (with the exception of 2001, when it achieved superpower status). China went from a middle power (1992-2004) through a great power (2005-2011) to a world power (2012-2021). India was a local power (1992-2002) and then a middle power (2003-2021). Japan was a middle power, except from 1993-1995 when it was a great power. Russia, on the other hand, was a local power, with the exception of 2008 and 2011-2014, when it was a middle power.

On the basis of military power throughout the period, the United States was the only superpower. China was, respectively, a regional power (1992-2000), a great power (2001-2004), again a middle power (2005-2010), and then a great power (2011-2021). India advanced from a local power (1992-2008) to a middle power (2009-2021). Russia only met the criteria of a local power in 1992, 1997-2002, and a middle power in the remaining years (recall that we do not include nuclear weapons).

On the basis of geopolitical power, the United States was a superpower throughout the period. China reached the status of a middle power (1992-2001), then a great power (2002-2004), only to fall again to the level of a middle power (2005-2008). It was a great power from 2009-2017 and a world power from 2018-2021. India was a local power from 1992-2006 and a middle power in the following years. Russia from 1992-2006 was a local power (except in 1993 and 2004 when it was a middle power). As of 2007, it remains a middle power.

Note that we calculate the power of states in terms of power, which is a stream of energy. The results of the calculation in terms of resources (that is, power in terms of potential energy) may be different. After the end of the Cold War, there was a significant economic and demographic demilitarization in many countries of the world, but post-Soviet states were most affected. Russia is a particular case in point – after the Soviet era it had a huge stockpile of weapons and military equipment (its value is slowly declining), but its military spending has radically decreased and the size of its armed forces has declined. Hence, such a significant decline in power.

3.4. Winners and losers in the international balance of power from 1992 to 2023

Recall that power struggles are a zero-sum game, meaning that increases in the power of some countries are accompanied by decreases in the power of other countries. The sum of increases and decreases expressed in accepted units (here, in mM) is zero. This observation, of course, does not apply to percentage increases/decreases. In Table 10 we present the ranking of countries according to percentage increases and decreases in economic power in relation to the world. In evaluating the power gains and declines of individual countries, it is important to keep in mind the reference year as its slight change can cause large shifts in the list. Therefore, comparing several variants is advisable. The year 1992 as a reference year makes good sense, since it is the first year after the contractual date of the end of the Cold War. Other criteria can also be used, such as the year of the start or end of an economic crisis, armed conflict, etc.

Table 11 Countries with economic power increase and decrease: 2023 vs 1992

Increase (2023 to 1992)				Decrease (2023 to 1992)			
Country	mM	Percentages	Change of position	Country	mM	Percentages	Change of position
Equatorial Guinea	0.15	816.62	+19	Japan	-42.28	-61.73	-3
Azerbaijan[54]	0.72	378.77	+42	Libya	-0.87	-48.53	-30
Vietnam	4.32	356.26	+30	Italy	-13.34	-47.96	-8
Guyana	0.17	343.50	+9	Greece	-1.51	-41.87	-22
China	124.34	332.11	+3	Germany	-16.91	-40.46	-4
Albania	0.21	258.38	+14	Ukraine	-1.79	-39.86	-19
Myanmar	1.09	247.68	+23	Sweden	-2.72	-38.64	-12
Maldives	0.04	235.72	+5	Central African Republic	-0.07	-38.05	-24
Uganda	0.72	187.52	+23	France	-11.79	-37.80	-3
Tanzania	1.23	184.15	+19	Spain	-5.13	-30.57	-3
Turkmenistan	0.56	175.00	+21	Lesotho	-0.03	-30.51	-15
Ethiopia	2.19	162.88	+18	Micronesia, Fed. Sts.	0.00	-30.45	-8
Sudan	1.42	151.10	+16	Portugal	-0.98	-30.05	-12
Armenia	0.17	137.35	+9	Finland	-0.97	-29.39	-12
Mongolia	0.25	134.62	+15	Denmark	-0.96	-29.30	-12
Kenya	1.19	130.67	+13	Austria	-1.31	-28.99	-16
Lao PDR	0.20	128.86	+10	Belgium	-1.40	-28.62	-15
Bangladesh	3.17	123.37	+17	Dominica	0.00	-28.26	-9
Benin	0.24	121.16	+14	Marshall Islands	0.00	-26.11	-7
ARE	1.70	117.47	+11	South Africa	-1.83	-25.71	-11
Ghana	0.74	116.97	+14	United Kingdom	-6.46	-25.46	-1

[54] Data from 1993

Increase (2023 to 1992)				Decrease (2023 to 1992)			
Country	mM	Percentages	Change of position	Country	mM	Percentages	Change of position
Angola	0.94	108.63	+9	Argentina	-2.36	-23.40	-4
India	25.81	106.60	+6	Burundi	-0.03	-21.71	-15
Nepal	0.43	102.86	+7	Netherlands	-1.52	-21.40	-8
Jordan	0.37	99.53	+9	Barbados	-0.01	-19.95	-17
Romania	1.60	95.66	+10	Andorra	-0.01	-18.88	-15
Bahrain	0.13	94.69	-1	Switzerland	-0.95	-18.53	-10
Panama	0.39	88.66	+4	Tunisia	-0.16	-16.91	-22
Indonesia	8.27	86.12	+5	Taiwan, Province of China	-0.84	-15.12	-8
DOM	0.57	84.69	+8	Lebanon	-0.04	-14.62	-26
Guatemala	0.61	83.97	+5	Comoros	0.00	-14.58	-12
Zambia	0.33	83.15	+2	VCT	0.00	-13.23	-7
Singapore	0.78	82.91	+5	Fiji	-0.01	-11.95	-14
Costa Rica	0.38	81.89	+2	Swaziland	-0.01	-10.04	-14
Egypt, Arab Rep.	2.75	81.69	+13	Norway	-0.34	-9.50	-8
Nicaragua	0.16	80.76	+2	St. Lucia	0.00	-9.31	-10
Oman	0.51	79.44	+8	Canada	-1.88	-9.11	0
Congo, Dem. Rep.	0.89	76.90	+4	Belarus	-0.10	-9.00	-14
Kazakhstan	1.54	75.84	+10	Brunei Darussalam	-0.01	-6.06	-14
Guinea-Bissau	0.02	75.40	-6	Namibia	-0.02	-5.53	-21
Ireland	1.25	75.17	+7	Russia	-1.35	-5.06	1
Suriname	0.03	70.42	-6	Zimbabwe	-0.02	-2.47	-18
Mozambique	0.27	69.16	+0	Gambia, The	0.00	-2.03	-10
Djibouti	0.03	68.97	-6	United States	-2.64	-1.66	-1
Haiti	0.14	66.56	+3	Antigua and Barbuda	0.00	-1.15	-9
Mali	0.26	65.54	+0	Grenada	0.00	-0.84	-7
Malawi	0.15	64.73	+2				
Saudi Arabia	3.89	63.81	+4				
Chad	0.18	62.77	+3				
Nigeria	2.56	62.65	+11				
Bolivia	0.35	60.83	+5				
Czech Republic	0.93	59.99	+6				
Sri Lanka	0.42	56.44	+2				
Cote d'Ivoire	0.50	55.49	+3				
Guinea	0.19	55.09	-4				
PNG	0.22	53.71	-6				
Bulgaria	0.36	51.56	-1				
Rwanda	0.10	51.53	-5				
Pakistan	2.15	51.28	+9				
Philippines	1.94	50.49	+7				
Honduras	0.20	50.35	-5				
Slovakia	0.37	48.58	-1				
Cabo Verde	0.01	48.35	-5				
Peru	1.21	47.15	+8				
Poland	2.15	46.75	+8				

Increase (2023 to 1992)				Decrease (2023 to 1992)			
Country	mM	Percentages	Change of position	Country	mM	Percentages	Change of position
Uzbekistan	0.52	45.66	-1				
Chile	1.11	43.94	+8				
Malaysia	1.29	43.92	+9				
Burkina Faso	0.17	43.83	-4				
Belize	0.02	42.73	-10				
Turkey	3.24	42.02	+2				
Malta	0.03	40.74	-7				
Solomon Islands	0.01	40.61	-8				
Samoa	0.00	39.38	-3				
Ecuador	0.44	37.80	-4				
Georgia	0.11	36.60	-5				
Israel	0.75	36.57	+0				
Brazil	6.93	34.52	+7				
Niger	0.15	33.13	-12				
Iran	1.52	32.41	+4				
Colombia	1.18	31.30	+3				
Togo	0.05	31.29	-11				
Kiribati	0.00	30.66	-5				
Sierra Leone	0.03	30.57	-8				
Congo, Rep.	0.08	30.07	-11				
Kyrgyz Republic	0.07	29.82	-10				
Vanuatu	0.01	29.05	-6				
Paraguay	0.16	28.79	-7				
New Zealand	0.45	28.76	-4				
Tuvalu	0.00	28.21	-8				
Tajikistan	0.07	27.70	-9				
Luxembourg	0.08	24.69	-8				
Mauritania	0.05	21.53	-12				
El Salvador	0.07	19.40	-8				
Uruguay	0.13	19.26	-11				
Australia	2.27	18.37	+1				
Algeria	0.57	16.53	+1				
Seychelles	0.00	15.70	-6				
Macedonia, FYR	0.03	15.46	-13				
Botswana	0.05	15.32	-13				
Madagascar	0.07	14.98	-18				
Jamaica	0.03	14.01	-15				
Mexico	1.96	12.12	+2				
TTO	0.02	11.50	-16				
Cyprus	0.02	9.71	-18				
Hungary	0.15	8.74	-9				
Bahamas, The	0.01	8.58	-10				
Cameroon	0.07	7.21	-12				
Senegal	0.04	6.85	-13				

Increase (2023 to 1992)				Decrease (2023 to 1992)			
Country	mM	Percentages	Change of position	Country	mM	Percentages	Change of position
Korea, Rep.	0.54	5.44	-1				
Iceland	0.01	4.36	-20				
Thailand	0.21	3.59	-1				
Gabon	0.01	3.10	-20				
Morocco	0.02	0.78	-8				

The results in the table above are very interesting, perhaps surprising to some. Even if many expected China's great ascendancy, probably few realized the great decline in Japan's power. It is easy to see that in terms of economic power, the biggest winners are the medium and underdeveloped countries, and the biggest losers are the highly developed countries of the West, especially Western Europe. In other words, the international balance of power has become a little more balanced. The conclusion flows from this, contrary to many claims, that globalization has the power to equalize development levels. This, in turn, radically changes the balance of power (especially in favor of populous countries), which, in retrospect, may prove to be a destabilizing force.

3.5. Regional distribution of power

The division into regions – due to the multiplicity of criteria – is always a matter of consensus, based on more or less legitimate considerations. In this regard, we have followed the practice of the World Bank. We present changes in the regional balance of power on the basis of economic power, while pointing out that these changes do not necessarily coincide with changes in the global balance. For example, a country losing globally may be gaining regionally, and vice versa. Table 11 shows regions in 1992 and 2023.

Table 12 Economic power of regions in 1992, 2023 (world = 100)

Region	Economic power of the regions (in%)		Increases/Decreases 2023/1992 (in %)
	1992	2023	
Europe & Central Asia	24.70	19.62	-20.590
East Asia & Pacific	16.13	26.50	+64.334
Latin America & Caribbean	6.70	7.64	+13.917
Middle East & North Africa	3.04	4.33	+42.345
North America	17.95	17.50	-2.517
South Asia	3.22	6.42	+99.378
Sub-Saharan Africa	2.76	4.11	+49.020

Table 13 Share of European and Central Asian countries in the economic power of the region and the world in 1992 and 2023 (in %)

Position	1992			2023		
	Country	in % of power		Country	in % of power	
		of the region	of the world		of the region	of the world
1	Germany	16.912	4.178	Russia	12.928	2.536
2	France	12.621	3.118	Germany	12.679	2.487
3	Italy	11.256	2.781	France	9.886	1.939
4	Russia	10.813	2.671	United Kingdom	9.640	1.891
5	United Kingdom	10.270	2.537	Italy	7.376	1.447
6	Spain	6.797	1.679	Spain	5.943	1.166
7	Turkey	3.125	0.772	Turkey	5.589	1.096
8	Netherlands	2.877	0.711	Poland	3.435	0.674
9	Sweden	2.853	0.705	Netherlands	2.848	0.559
10	Switzerland	2.082	0.514	Sweden	2.204	0.432
11	Belgium	1.974	0.488	Switzerland	2.136	0.419
12	Poland	1.859	0.459	Kazakhstan	1.822	0.358
13	Austria	1.833	0.453	Belgium	1.774	0.348
14	Ukraine	1.817	0.449	Romania	1.673	0.328
15	Greece	1.460	0.361	Norway	1.661	0.326
16	Norway	1.457	0.360	Austria	1.639	0.322
17	Finland	1.342	0.331	Ireland	1.479	0.290
18	Denmark	1.329	0.328	Ukraine	1.376	0.270
19	Portugal	1.325	0.327	Czech Republic	1.265	0.248
20	Kazakhstan	0.823	0.203	Finland	1.193	0.234
21	Hungary	0.685	0.169	Denmark	1.183	0.232
22	Romania	0.679	0.168	Portugal	1.167	0.229
23	Ireland	0.670	0.166	Greece	1.069	0.210
24	Czech Republic	0.628	0.155	Hungary	0.938	0.184
25	Uzbekistan	0.465	0.115	Uzbekistan	0.853	0.167
26	Belarus	0.437	0.108	Slovakia	0.570	0.112
27	Slovakia	0.305	0.075	Bulgaria	0.542	0.106
28	Bulgaria	0.284	0.070	Belarus	0.501	0.098
29	Turkmenistan	0.131	0.032	Azerbaijan	0.466	0.091
30	Luxembourg	0.125	0.031	Turkmenistan	0.452	0.089
31	Georgia	0.122	0.030	Serbia	0.438	0.086
32	Iceland	0.103	0.025	Croatia	0.395	0.077
33	Cyprus	0.100	0.025	Lithuania	0.361	0.071
34	Kyrgyz Republic	0.099	0.024	Slovenia	0.274	0.054
35	Tajikistan	0.095	0.024	Latvia	0.225	0.044
36	Macedonia, FYR	0.069	0.017	Georgia	0.210	0.041
37	Armenia	0.051	0.013	Luxembourg	0.196	0.039
38	Azerbaijan	0.034	0.008	Estonia	0.193	0.038
39	Albania	0.033	0.008	Bosnia and Herzegovina	0.181	0.036
40	Greenland	0.024	0.006	Kyrgyz Republic	0.162	0.032

Position	1992			2023		
	Country	in % of power		Country	in % of power	
		of the region	of the world		of the region	of the world
41	Andorra	0.013	0.003	Armenia	0.153	0.030
42	Liechtenstein	0.012	0.003	Tajikistan	0.153	0.030
43	Monaco	0.011	0.003	Albania	0.147	0.029
44	Bosnia and Herzegovina	N/A	N/A	Cyprus	0.138	0.027
45	Channel Islands	N/A	N/A	Iceland	0.135	0.027
46	Estonia	N/A	N/A	Moldova	0.119	0.023
47	Faroe Islands	N/A	N/A	Macedonia, FYR	0.100	0.020
48	Gibraltar	N/A	N/A	Kosovo	0.072	0.014
49	Croatia	N/A	N/A	Montenegro	0.047	0.009
50	Isle of Man	N/A	N/A	Andorra	0.013	0.003
51	Lithuania	N/A	N/A	Channel Islands	N/A	N/A
52	Latvia	N/A	N/A	Faroe Islands	N/A	N/A
53	Moldova	N/A	N/A	Gibraltar	N/A	N/A
54	Montenegro	N/A	N/A	Greenland	N/A	N/A
55	San Marino	N/A	N/A	Isle of Man	N/A	N/A
56	Serbia	N/A	N/A	Liechtenstein	N/A	N/A
57	Slovenia	N/A	N/A	Monaco	N/A	N/A
58	Kosovo	N/A	N/A	San Marino	N/A	N/A
-	**Europe & Central Asia**	**100.00**	**24.705**	**Europe & Central Asia**	**100.00**	**19.618**

Table 14 Share of East Asian and Pacific countries in the economic power of the region and the world in 1992 and 2023 (in %)

Position	1992			2023		
	Country	in % of power		Country	in % of power	
		of the region	of the world		of the region	of the world
1	Japan	42.473	6.849	China	61.054	16.178
2	China	23.218	3.744	Japan	9.890	2.621
3	Australia	7.650	1.234	Indonesia	6.742	1.787
4	Korea, Rep.	6.135	0.989	Australia	5.510	1.460
5	Indonesia	5.953	0.960	Korea, Rep.	3.936	1.043
6	Thailand	3.669	0.592	Thailand	2.313	0.613
7	Taiwan, Province of China	3.455	0.557	Philippines	2.180	0.578
8	Philippines	2.381	0.384	Vietnam	2.086	0.553
9	Malaysia	1.818	0.293	Taiwan, Province of China	1.785	0.473
10	New Zealand	0.979	0.158	Malaysia	1.592	0.422
11	Vietnam	0.751	0.121	New Zealand	0.767	0.203
12	Singapore	0.580	0.094	Singapore	0.645	0.171
13	Myanmar	0.274	0.044	Myanmar	0.580	0.154
14	Papua New Guinea	0.256	0.041	Cambodia	0.245	0.065
15	Mongolia	0.113	0.018	Papua New Guinea	0.240	0.063
16	Lao PDR	0.097	0.016	Mongolia	0.162	0.043
17	Brunei Darussalam	0.082	0.013	Lao PDR	0.135	0.036
18	Fiji	0.061	0.010	Brunei Darussalam	0.047	0.012
19	Solomon Islands	0.017	0.003	Fiji	0.032	0.009
20	Vanuatu	0.011	0.002	Timor-Leste	0.019	0.005
21	Samoa	0.007	0.001	Solomon Islands	0.015	0.004
22	Micronesia, Fed. Sts.	0.007	0.001	Vanuatu	0.009	0.002
23	Tonga	0.006	0.001	Samoa	0.006	0.002
24	Marshall Islands	0.003	0.001	Micronesia, Fed. Sts.	0.003	0.001
25	Kiribati	0.003	0.0004	Kiribati	0.002	0.001
26	Tuvalu	0.0004	0.0001	Marshall Islands	0.001	0.0004
27	Cambodia	N/A	N/A	Palau	0.001	0.0003
28	Nauru	N/A	N/A	Nauru	0.001	0.0002
29	Palau	N/A	N/A	Tuvalu	0.0003	0.0001
30	Korea, Dem. People's Rep.	N/A	N/A	Korea, Dem. People's Rep.	N/A	N/A
31	Timor-Leste	N/A	N/A	Tonga	N/A	N/A
-	**East Asia & Pacific**	**100.00**	**16.125**	**East Asia & Pacific**	**100.00**	**26.499**

Table 15 Share of North American countries in the economic power of the region and the world in 1992 and 2023 (in %)

Position	1992			2023		
	Country	in % of power		Country	in % of power	
		of the region	of the world		of the region	of the world
1	United States	88.534	15.896	United States	89.309	15.632
2	Canada	11.466	2.059	Canada	10.691	1.871
-	**North America**	**100.00**	**17.955**	**North America**	**100.00**	**17.503**

Table 16 Share of Latin American and Caribbean countries in the economic power of the region and the world in 1992 and 2023 (in %)

Position	1992			2023		
	Country	in % of power		Country	in % of power	
		of the region	of the world		of the region	of the world
1	Brazil	29.943	2.007	Brazil	35.362	2.700
2	Mexico	24.101	1.616	Mexico	23.723	1.812
3	Argentina	15.047	1.009	Argentina	10.118	0.773
4	Colombia	5.632	0.378	Colombia	6.491	0.496
5	Venezuela, RB	5.019	0.337	Peru	4.933	0.377
6	Peru	3.819	0.256	Chile	4.772	0.364
7	Chile	3.777	0.253	Ecuador	2.117	0.162
8	Cuba	1.798	0.121	Guatemala	1.737	0.133
9	Ecuador	1.750	0.117	Dominican Republic	1.621	0.124
10	Guatemala	1.075	0.072	Bolivia	1.229	0.094
11	Uruguay	1.023	0.069	Costa Rica	1.104	0.084
12	Dominican Republic	1.000	0.067	Panama	1.086	0.083
13	Bolivia	0.870	0.058	Uruguay	1.071	0.082
14	Paraguay	0.822	0.055	Paraguay	0.929	0.071
15	Costa Rica	0.692	0.046	Honduras	0.769	0.059
16	Panama	0.656	0.044	El Salvador	0.569	0.043
17	Honduras	0.583	0.039	Haiti	0.472	0.036
18	El Salvador	0.543	0.036	Nicaragua	0.462	0.035
19	Trinidad and Tobago	0.324	0.022	Trinidad and Tobago	0.317	0.024
20	Haiti	0.322	0.022	Jamaica	0.308	0.024
21	Jamaica	0.308	0.021	Guyana	0.294	0.022
22	Nicaragua	0.291	0.020	Bahamas, The	0.165	0.013
23	Bahamas, The	0.173	0.012	Suriname	0.102	0.008
24	Barbados	0.091	0.006	Belize	0.069	0.005
25	Guyana	0.075	0.005	Barbados	0.064	0.005
26	Suriname	0.068	0.005	St. Lucia	0.033	0.003
27	Belize	0.055	0.004	Antigua and Barbuda	0.024	0.002
28	St. Lucia	0.041	0.003	Grenada	0.019	0.001
29	Antigua and Barbuda	0.028	0.002	VCT	0.016	0.001

Position	1992			2023		
	Country	in % of power		Country	in % of power	
		of the region	of the world		of the region	of the world
30	Grenada	0.021	0.001	St. Kitts and Nevis	0.013	0.001
31	VCT	0.021	0.001	Dominica	0.011	0.001
32	Dominica	0.018	0.001	Cuba	N/A	N/A
33	St. Kitts and Nevis	0.015	0.001	Venezuela, RB	N/A	N/A
-	**Latin America & Caribbean**	**100.00**	**6.704**	**Latin America & Caribbean**	**100.00**	**7.637**

Table 17 Share of Middle Eastern and North African countries in the economic power of the region and the world in 1992 and 2023 (in %)

Position	1992			2023		
	Country	in % of power		Country	in % of power	
		of the region	of the world		of the region	of the world
1	Saudi Arabia	20.020	0.609	Saudi Arabia	23.039	0.998
2	Iran	15.377	0.468	Iran	14.304	0.620
3	Algeria	11.255	0.343	Egypt, Arab Rep.	14.134	0.612
4	Egypt, Arab Rep.	11.073	0.337	Algeria	9.213	0.399
5	Morocco	7.367	0.224	Iraq	7.875	0.341
6	Israel	6.730	0.205	United Arab Emirates	7.257	0.314
7	Libya	5.922	0.180	Israel	6.457	0.280
8	Syrian Arab Republic	5.718	0.174	Morocco	5.215	0.226
9	United Arab Emirates	4.750	0.145	Oman	2.673	0.116
10	Tunisia	3.120	0.095	Kuwait	2.505	0.109
11	Yemen, Rep.	2.203	0.067	Libya	2.141	0.093
12	Oman	2.121	0.065	Tunisia	1.821	0.079
13	Jordan	1.234	0.038	Jordan	1.730	0.075
14	Lebanon	0.982	0.030	Bahrain	0.597	0.026
15	Qatar	0.798	0.024	Lebanon	0.589	0.026
16	Iraq	0.469	0.014	Malta	0.273	0.012
17	Bahrain	0.437	0.013	Djibouti	0.176	0.008
18	Malta	0.276	0.008	Qatar	N/A	N/A
19	Djibouti	0.148	0.005	Syrian Arab Republic	N/A	N/A
20	Kuwait	N/A	N/A	Yemen, Rep.	N/A	N/A
-	**Middle East & North Africa**	**100.00**	**3.044**	**Middle East & North Africa**	**100.00**	**4.333**

Table 18 Share of South Asian countries in the economic power of the region and the world in 1992 and 2023 (in %)

Position	1992			2023		
	Country	in % of power		Country	in % of power	
		of the region	of the world		of the region	of the world
1	India	75.242	2.422	India	77.955	5.003
2	Pakistan	13.014	0.419	Pakistan	9.873	0.634
3	Bangladesh	7.991	0.257	Bangladesh	8.951	0.574
4	Sri Lanka	2.304	0.074	Sri Lanka	1.808	0.116
5	Nepal	1.305	0.042	Nepal	1.328	0.085
6	Bhutan	0.094	0.003	Maldives	0.085	0.005
7	Maldives	0.051	0.002	Afghanistan	N/A	N/A
8	Afghanistan	N/A	N/A	Bhutan	N/A	N/A
-	**South Asia**	**100.00**	**3.219**	**South Asia**	**100.00**	**6.418**

Table 19 Share of Sub-Saharan African countries in the economic power of the region and the world in 1992 and 2023 (in %)

Position	1992			2023		
	Country	in % of power		Country	in % of power	
		of the region	of the world		of the region	of the world
1	South Africa	25.889	0.713	Nigeria	16.187	0.665
2	Nigeria	14.831	0.409	South Africa	12.905	0.530
3	Ethiopia	4.875	0.134	Ethiopia	8.600	0.353
4	Congo, Dem. Rep.	4.199	0.116	Sudan	5.734	0.236
5	Cameroon	3.584	0.099	Kenya	5.131	0.211
6	Sudan	3.403	0.094	Congo, Dem. Rep.	4.984	0.205
7	Kenya	3.315	0.091	Tanzania	4.610	0.189
8	Cote d'Ivoire	3.277	0.090	Angola	4.383	0.180
9	Angola	3.131	0.086	Cote d'Ivoire	3.419	0.140
10	Tanzania	2.418	0.067	Ghana	3.350	0.138
11	Zimbabwe	2.330	0.064	Uganda	2.681	0.110
12	Ghana	2.301	0.063	Cameroon	2.578	0.106
13	Senegal	2.213	0.061	Zambia	1.782	0.073
14	Madagascar	1.694	0.047	Mozambique	1.631	0.067
15	Niger	1.605	0.044	Mali	1.591	0.065
16	Zambia	1.450	0.040	Senegal	1.586	0.065
17	Mozambique	1.437	0.040	Zimbabwe	1.525	0.063
18	Mali	1.432	0.039	Niger	1.434	0.059
19	Uganda	1.389	0.038	Burkina Faso	1.327	0.054
20	Burkina Faso	1.375	0.038	Madagascar	1.307	0.054
21	Guinea	1.248	0.034	Guinea	1.299	0.053
22	Gabon	1.175	0.032	Chad	1.120	0.046
23	Botswana	1.126	0.031	Benin	1.051	0.043
24	Namibia	1.061	0.029	Somalia	0.959	0.039
25	Chad	1.025	0.028	Malawi	0.909	0.037

Position	1992			2023		
	Country	in % of power		Country	in % of power	
		of the region	of the world		of the region	of the world
26	Congo, Rep.	0.969	0.027	Botswana	0.871	0.036
27	Mauritania	0.868	0.024	Congo, Rep.	0.846	0.035
28	Malawi	0.822	0.023	Gabon	0.813	0.033
29	Rwanda	0.709	0.020	Rwanda	0.721	0.030
30	Benin	0.709	0.020	Mauritania	0.708	0.029
31	Central African Republic	0.667	0.018	Namibia	0.672	0.028
32	Togo	0.612	0.017	Togo	0.540	0.022
33	Mauritius	0.492	0.014	Equatorial Guinea	0.420	0.017
34	Burundi	0.457	0.013	Mauritius	0.330	0.014
35	Sierra Leone	0.356	0.010	Liberia	0.315	0.013
36	Swaziland	0.325	0.009	Sierra Leone	0.312	0.013
37	Lesotho	0.304	0.008	Central African Republic	0.277	0.011
38	Eritrea	0.254	0.007	Burundi	0.240	0.010
39	Gambia, The	0.217	0.006	Swaziland	0.196	0.008
40	Guinea-Bissau	0.114	0.003	Gambia, The	0.143	0.006
41	Comoros	0.112	0.003	Lesotho	0.142	0.006
42	Cabo Verde	0.099	0.003	Guinea-Bissau	0.135	0.006
43	Equatorial Guinea	0.068	0.002	Cabo Verde	0.099	0.004
44	Seychelles	0.063	0.002	Comoros	0.064	0.003
45	Liberia	N/A	N/A	Seychelles	0.049	0.002
46	Somalia	N/A	N/A	Sao Tome and Principe	0.027	0.001
47	South Sudan	N/A	N/A	Eritrea	N/A	N/A
48	Sao Tome and Principe	N/A	N/A	South Sudan	N/A	N/A
-	**Sub-Saharan Africa**	**100.00**	**2.756**	**Sub-Saharan Africa**	**100.00**	**4.107**

3.6. Distribution of power in the European Union

We study the distribution of power in the European Union solely on the basis of economic power, according to successive enlargements. We calculate the power of the Union as a whole in two variants – as the sum of the powers of the constituent countries and as the power of the Union as a unified entity. Having these data, we calculate the coefficient of structural compatibility as the quotient of the two previous values.

Table 20 Share of European Union countries in the economic power of the world from 1993 to 2021 2023 (in mM, i.e. world = 1000)

Country	1992	1994	1995	1997	1999	2001	2003	2004	2006	2007	2009	2011	2012	2013	2015	2017	2019	2020	2021	2022	2023
Belgium	4.88	4.70	4.85	4.38	4.32	3.96	4.33	4.41	4.23	4.29	4.24	3.93	3.74	3.79	3.56	3.56	3.54	3.55	3.58	3.38	3.48
France	31.18	29.11	29.63	27.35	27.11	25.22	27.56	27.87	26.58	26.84	26.31	24.01	22.65	22.90	21.24	20.92	20.57	20.47	20.25	18.89	19.39
Netherlands	7.11	6.86	7.16	6.68	6.81	6.53	7.15	7.16	6.90	7.00	6.91	6.22	5.82	5.88	5.47	5.48	5.53	5.65	5.59	5.31	5.59
Luxembourg	0.31	0.32	0.33	0.31	0.33	0.32	0.36	0.37	0.38	0.39	0.40	0.38	0.37	0.39	0.37	0.38	0.38	0.40	0.41	0.38	0.39
Germany	41.78	40.04	41.30	36.66	35.45	32.05	34.02	33.88	31.60	31.81	30.69	28.49	26.93	27.40	26.04	26.24	25.83	26.14	25.56	24.15	24.87
Italy	27.81	23.08	22.40	22.81	22.29	20.82	22.84	23.05	21.74	21.81	21.09	19.02	17.59	17.57	16.17	15.94	15.35	15.02	14.77	13.84	14.47
Denmark	3.28	3.12	3.24	3.06	3.02	2.82	3.05	3.09	2.99	2.99	2.91	2.67	2.53	2.56	2.40	2.42	2.39	2.47	2.44	2.35	2.32
Ireland	1.66	1.57	1.66	1.84	2.02	2.12	2.51	2.59	2.63	2.70	2.41	2.13	2.02	2.05	2.39	2.48	2.66	2.83	2.89	2.91	2.90
UK	25.37	23.24	24.07	26.04	26.66	25.68	26.81	27.55	26.69	26.91	22.25	20.86	20.76	20.78	21.92	19.58	19.46	19.29	19.52	18.37	18.91
Greece	3.61	3.39	3.50	3.54	3.44	3.27	3.82	3.95	3.85	3.93	3.90	3.09	2.74	2.66	2.36	2.26	2.18	2.11	2.12	2.05	2.10
Spain	16.79	14.06	14.39	13.78	14.08	13.69	15.79	16.26	16.34	16.77	16.45	14.38	13.15	13.07	12.22	12.28	12.16	11.74	11.58	11.05	11.66
Portugal	3.27	2.91	3.03	2.96	3.05	2.90	3.19	3.22	3.08	3.12	3.05	2.68	2.43	2.45	2.28	2.30	2.31	2.28	2.22	2.16	2.29
Austria	4.53	4.37	4.53	4.10	4.05	3.72	4.04	4.09	3.94	4.00	3.96	3.64	3.47	3.51	3.31	3.33	3.31	3.31	3.25	3.12	3.22
Finland	3.31	2.94	3.24	3.07	3.12	2.96	3.21	3.25	3.10	3.19	3.07	2.85	2.69	2.72	2.52	2.52	2.47	2.54	2.49	2.31	2.34
Sweden	7.05	5.74	5.91	5.81	5.73	5.18	5.76	5.83	5.57	5.67	5.10	5.36	5.15	5.25	4.86	4.83	4.57	4.71	4.78	4.42	4.32
CZE	1.55	1.79	1.93	1.93	1.94	1.94	2.25	2.33	2.49	2.61	2.68	2.52	2.33	2.30	2.16	2.26	2.36	2.36	2.38	2.34	2.48
Cyprus	0.25	0.24	0.28	0.27	0.28	0.27	0.31	0.32	0.32	0.33	0.34	0.31	0.29	0.27	0.25	0.26	0.26	0.26	0.26	0.26	0.27
Estonia	N/A	N/A	0.22	0.23	0.24	0.25	0.30	0.32	0.35	0.39	0.35	0.34	0.33	0.34	0.33	0.34	0.36	0.36	0.37	0.37	0.38
Lithuania	N/A	N/A	0.40	0.46	0.47	0.49	0.58	0.61	0.65	0.72	0.66	0.64	0.62	0.64	0.60	0.61	0.64	0.66	0.67	0.68	0.71
Latvia	N/A	N/A	0.30	0.32	0.34	0.35	0.39	0.41	0.48	0.56	0.49	0.43	0.43	0.44	0.42	0.42	0.43	0.43	0.44	0.44	0.44
Malta	0.08	0.08	0.08	0.08	0.09	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.10	0.10	0.11	0.11	0.11	0.11	0.12
Poland	4.59	4.77	5.22	5.52	5.60	5.89	5.78	5.91	6.44	6.85	6.74	6.66	6.30	6.35	6.10	6.14	6.33	6.45	6.42	6.27	6.74
Slovakia	0.75	0.84	0.92	0.94	0.97	0.96	1.13	1.19	1.23	1.29	1.28	1.20	1.14	1.15	1.09	1.08	1.10	1.12	1.09	1.05	1.12
Slovenia	N/A	N/A	0.59	0.57	0.59	0.55	0.62	0.63	0.62	0.65	0.65	0.58	0.53	0.53	0.50	0.51	0.53	0.53	0.54	0.52	0.54
Hungary	1.69	1.70	1.65	1.64	1.63	1.69	2.06	2.16	2.07	2.16	2.01	1.85	1.71	1.73	1.67	1.71	1.78	1.76	1.78	1.70	1.84

Bulgaria	0.70	0.63	0.90	0.63	0.69	0.69	0.80	0.85	0.90	0.98	1.05	0.98	0.93	0.92	0.88	0.92	0.96	0.98	0.99	1.01	1.06
Romania	1.68	1.76	1.89	1.79	1.75	1.84	2.08	2.27	2.79	3.24	3.12	2.82	2.64	2.78	2.69	2.85	3.01	3.06	3.06	3.06	3.28
Croatia	N/A	N/A	0.83	0.84	0.81	0.77	0.91	0.94	0.96	0.99	0.98	0.86	0.79	0.79	0.72	0.73	0.74	0.71	0.73	0.72	0.78
European Union	**167**	**155**	**152.4**	**169.2**	**168.9**	**162.4**	**165.7**	**161.5**	**150.1**	**151.2**	**155.9**	**164.4**	**180.5**	**176.2**	**174.3**	**181.3**	**179.6**	**172.2**	**161.2**	**158.1**	**149.3**

Figure 4 Economic power of the European Union from 1992 to 2023(in mM, i.e. world = 1000)

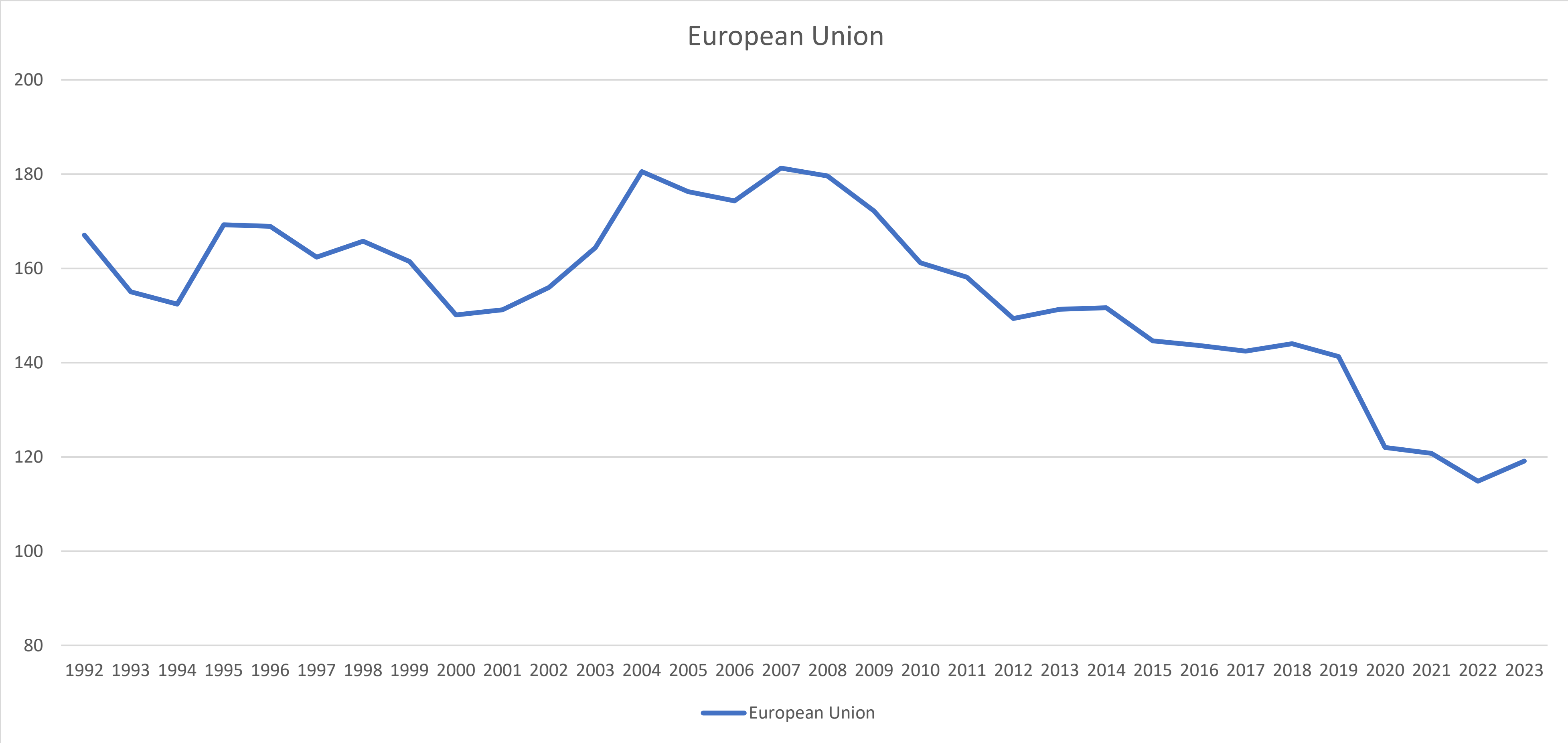


Table 21 Share of European Union countries in the organization's economic power from 1992 to 2023 (EU = 100)

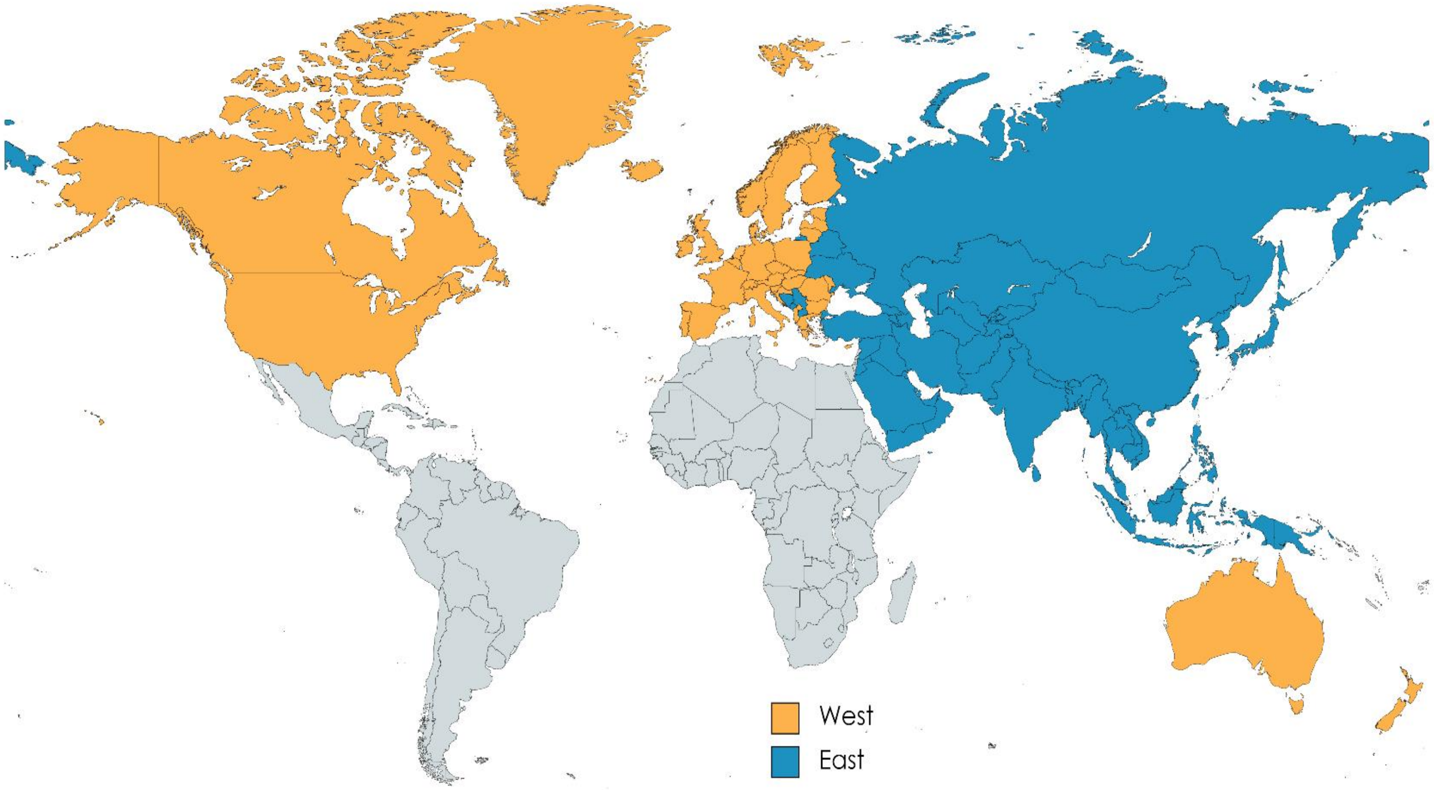
Country	1992	1994	1995	1997	1999	2001	2003	2004	2006	2007	2009	2011	2013	2015	2017	2019	2020	2021	2022	2023
Belgium	2.92	3.08	2.87	2.70	2.68	2.62	2.63	2.44	2.43	2.37	2.46	2.49	2.50	2.46	2.50	2.50	2.91	2.96	2.94	2.92
France	18.67	19.10	17.51	16.84	16.79	16.68	16.76	15.44	15.25	14.81	15.28	15.19	15.14	14.69	14.69	14.56	16.77	16.77	16.45	16.29
Netherlands	4.26	4.50	4.23	4.11	4.22	4.32	4.35	3.97	3.96	3.86	4.01	3.93	3.88	3.78	3.85	3.91	4.63	4.63	4.63	4.69
Luxembourg	0.19	0.21	0.19	0.19	0.20	0.21	0.22	0.20	0.22	0.22	0.23	0.24	0.25	0.26	0.27	0.27	0.33	0.34	0.34	0.32
Germany	25.01	26.27	24.40	22.57	21.96	21.20	20.69	18.77	18.13	17.55	17.83	18.02	18.11	18.01	18.42	18.28	21.42	21.17	21.03	20.89
Italy	16.65	15.15	13.24	14.05	13.81	13.77	13.89	12.77	12.47	12.03	12.25	12.03	11.61	11.18	11.19	10.87	12.31	12.23	12.05	12.15
Denmark	1.97	2.05	1.91	1.88	1.87	1.86	1.85	1.71	1.72	1.65	1.69	1.69	1.69	1.66	1.70	1.69	2.02	2.02	2.05	1.95
Ireland	0.99	1.03	0.98	1.13	1.25	1.40	1.53	1.43	1.51	1.49	1.40	1.35	1.36	1.65	1.74	1.88	2.32	2.40	2.53	2.44
UK	15.19	15.25	14.23	16.04	16.51	16.98	16.31	15.26	15.31	14.85	12.92	13.19	13.73	15.16	13.75	13.77				
Greece	2.16	2.22	2.07	2.18	2.13	2.17	2.32	2.19	2.21	2.17	2.27	1.95	1.76	1.63	1.59	1.54	1.33	1.42	1.79	1.76
Spain	10.05	9.23	8.50	8.49	8.72	9.05	9.60	9.01	9.38	9.25	9.55	9.09	8.64	8.45	8.62	8.61	7.43	7.76	9.62	9.79
Portugal	1.96	1.91	1.79	1.82	1.89	1.92	1.94	1.78	1.77	1.72	1.77	1.69	1.62	1.58	1.62	1.63	1.44	1.49	1.88	1.92
Austria			2.68	2.53	2.51	2.46	2.46	2.26	2.26	2.21	2.30	2.31	2.32	2.29	2.34	2.34	2.10	2.18	2.72	2.70
Finland			1.91	1.89	1.93	1.96	1.95	1.80	1.78	1.76	1.78	1.80	1.80	1.74	1.77	1.75	1.61	1.67	2.01	1.97
Sweden			3.49	3.58	3.55	3.42	3.50	3.23	3.19	3.13	2.96	3.39	3.47	3.36	3.39	3.24	2.98	3.20	3.85	3.63
CZE								1.29	1.43	1.44	1.56	1.59	1.52	1.50	1.59	1.67	1.49	1.60	2.03	2.08
Cyprus								0.18	0.18	0.18	0.20	0.20	0.18	0.17	0.18	0.19	0.17	0.17	0.22	0.23
Estonia								0.18	0.20	0.22	0.20	0.21	0.23	0.23	0.24	0.26	0.23	0.25	0.33	0.32
Lithuania								0.34	0.37	0.39	0.39	0.40	0.42	0.41	0.43	0.45	0.42	0.45	0.59	0.59
Latvia								0.23	0.28	0.31	0.28	0.27	0.29	0.29	0.30	0.31	0.28	0.29	0.38	0.37
Malta								0.05	0.05	0.05	0.05	0.06	0.06	0.07	0.07	0.08	0.07	0.07	0.09	0.10
Poland								3.27	3.69	3.78	3.92	4.21	4.20	4.22	4.31	4.48	4.08	4.30	5.46	5.66
Slovakia								0.66	0.70	0.71	0.74	0.76	0.76	0.75	0.76	0.78	0.71	0.73	0.92	0.94
Slovenia								0.35	0.35	0.36	0.38	0.36	0.35	0.35	0.36	0.37	0.34	0.36	0.45	0.45

Hungary								1.20	1.19	1.19	1.17	1.17	1.14	1.15	1.20	1.26	1.11	1.19	1.48	1.55
Bulgaria										0.54	0.61	0.62	0.61	0.61	0.64	0.68	0.62	0.66	0.88	0.89
Romania										1.79	1.81	1.78	1.84	1.86	2.00	2.13	1.93	2.05	2.66	2.76
Croatia													0.52	0.50	0.52	0.53	0.45	0.49	0.63	0.65
European Union	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

3.8. East-West distribution of power

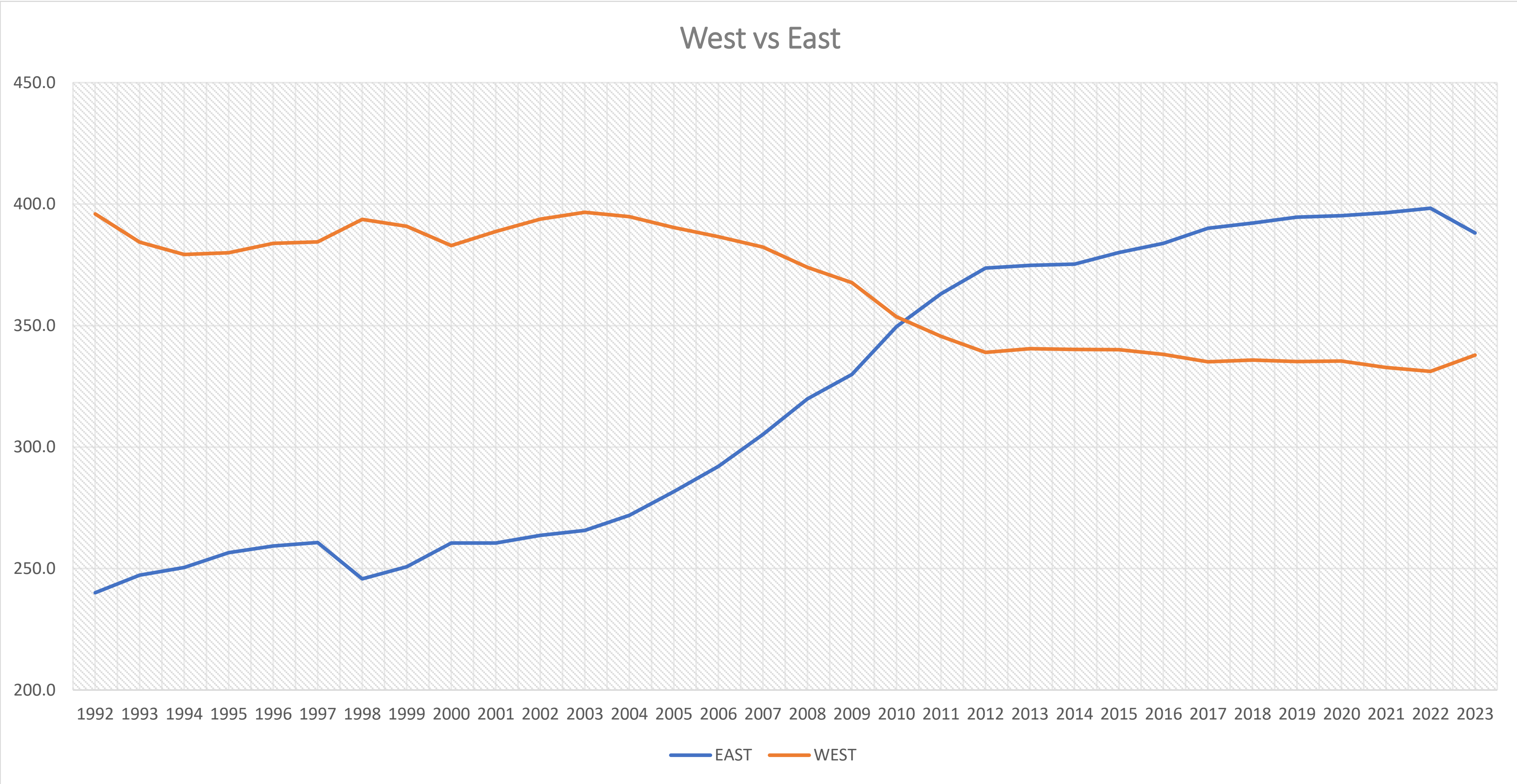
For years, there has been talk of the twilight of the West. We ask ourselves, do the indicators of power confirm this? Let's start with a definition. According to the division we have adopted, the West includes the European Union, Norway, Switzerland, the United States, Canada, Australia and New Zealand, while the East consists of Asia (excluding Russia), Russia, Bosnia and Herzegovina, Montenegro, Serbia, and Oceania (excluding New Zealand). The division between the West and East is illustrated in Map 1. The cycles of economic power of the East and West from 1992 to 2023 are shown in Figure 5. During the period under review, i.e., from 1992 to 2023, the gap between the economic power of the East and West decreased rapidly, disappearing in 2010, meaning that since 2011 the West has lost its dominance over the East. Since then, a slight downward trend in the economic power of the West has occurred, followed by a slight upward trend in the economic power of the East. Nevertheless, the forces are aligned. In other words, the East and West remain in strategic equilibrium, and this state may continue for a long time to come.

Picture 1. West vs East



Created with mapchart.net

Figure 5 Economic power of the West and East from 1992 to 2023 (in mM, i.e. world = 1000)



3.9. States in the power cycle

States, like all living organisms and even elements of inanimate nature, go through a kind of life cycle – in this case, – the cycle of state power. What is this cycle? It is a process of state transformation expressed by the formation of its relative power in the international system which takes place in several phases. In a few words, these phases are the growth phase, the peak phase and the decline phase. This power cycle theory was introduced into the study of international relations by American researcher Charles Doran.[55] Many authors have referred to this theory, and attempts have also been made to test it. In order to represent the power cycle, expressing the power of states in quantitative terms is necessary. According to Charles Doran's theorem, the curve of growth and decline of states takes the shape of the so-called logistic curve (slanted letter S) and its mirror image. In the first half of the cycle, growth is initially slow, then accelerates, only to decelerate again and asymptotically move towards a saturated state; in the second half, the process goes in the opposite direction. To represent the power cycle, it is necessary to express the power of states in quantitative terms.

The logistic curve has been used in an attempt to study various phenomena: it has been observed, for example, that the logistic curve corresponds to the development of organisms with limited food resources. This regularity can be transferred to states as major participants in international relations – in this case, the limited resource is the power of the world, of which there is always 100%, and states compete for the largest possible share of this 100%. Not surprisingly, after rapid growth, the environment puts up more and more resistance, the rate of growth decreases, reaches the peak of its capacity, and then gives way to other participants, causing a decline in the capacity of the [environment?].

Crucial to understanding the cycle of power is understanding the nature of a zero-sum game. The power of the world adds up to 100% at any point in time, so if some rise, others must fall. This concept is not always well understood. Politicians, guided by economic growth indicators (e.g., in the form of GDP), often misread changes in power since the directions of change in GDP and the directions of change in power do not necessarily coincide; it could be that GDP is rising and power is falling, or vice versa – GDP is falling and power is rising. This is because the increase/decrease of a country's power is a function of changes in the international system as a whole. In Part II (Methodology), we showed the systematics of absolute and relative increases/decreases.

The graphs presented below refer not so much to cycles of force, but rather to fragments of them. Actual power cycles generally last much longer. Studies of several hundred years show that different countries have different power cycles, and it is difficult to see any regularity here. They can be relatively short but with a large amplitude (e.g., the Prussia/Germany cycle at the turn of the 19th century, or Japan's power cycle after World War II). By contrast, Russia is going through a very long cycle, having reached the peak of its power at the end of the 18th

[55] Cf.: Ch.F. Doran, *The Politics of Assimilation: Hegemony and Its Aftermath*, Baltimore 1971; Idem, *Systems in Crisis. New Imperatives of High Politics at Century's End*, Cambridge 1991; Idem, *Economics, Philosophy of History, and the "Single Dynamic" of Power Cycle Theory. Expectations, Competition, and Statecraft*, "International Political Science Review" 2003, vol. 24, p. 13–49.

century and since then the trend of its power has been downward, with large fluctuations at certain historical moments (the rise of the Soviet Union, World War II, the collapse of the Soviet Union). Instead of one very long cycle, it can be broken into several smaller cycles. Figures 7-13 show the power cycles (actually, fragments of power cycles) of the thirty countries with the greatest economic power from 1992-2023.

Figure 6 Countries with the greatest economic power from 1961 to 2023 (in mM, i.e., world = 1000; order of countries from 2023; positions 1-2)

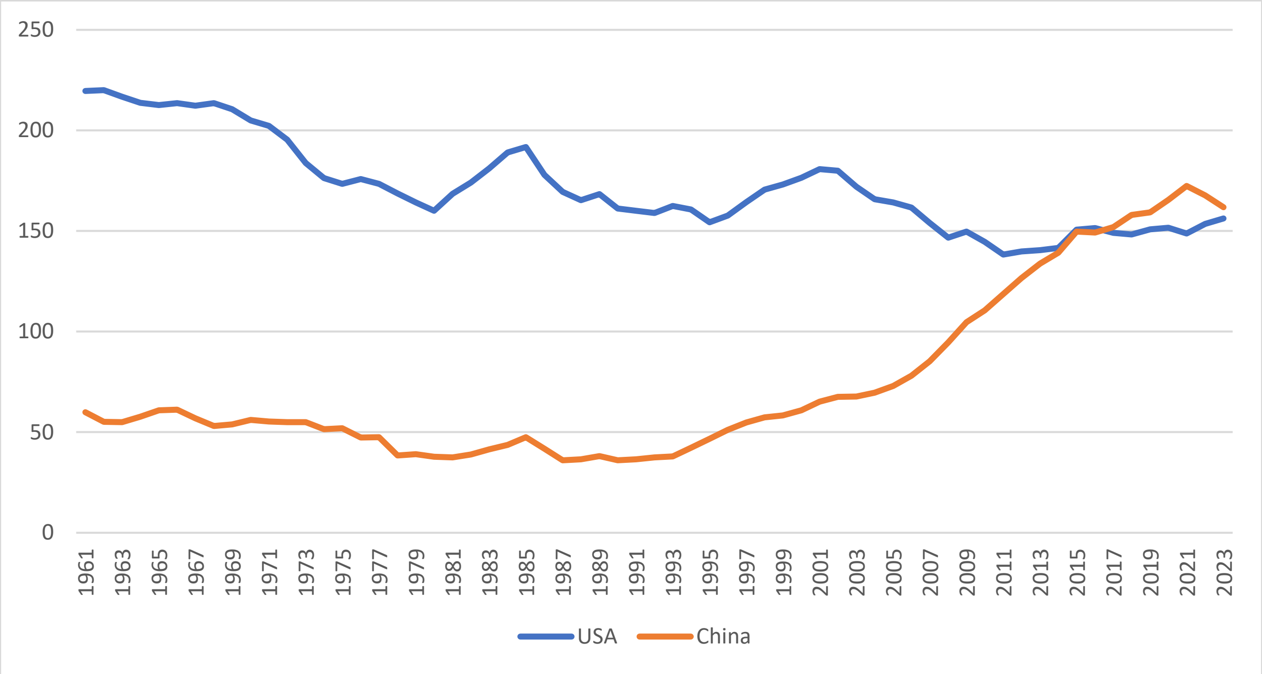


Figure 7 Countries with the greatest economic power from 1961 to 2023 (in mM, i.e., world = 1000; order of countries from 2023; positions 3-5)

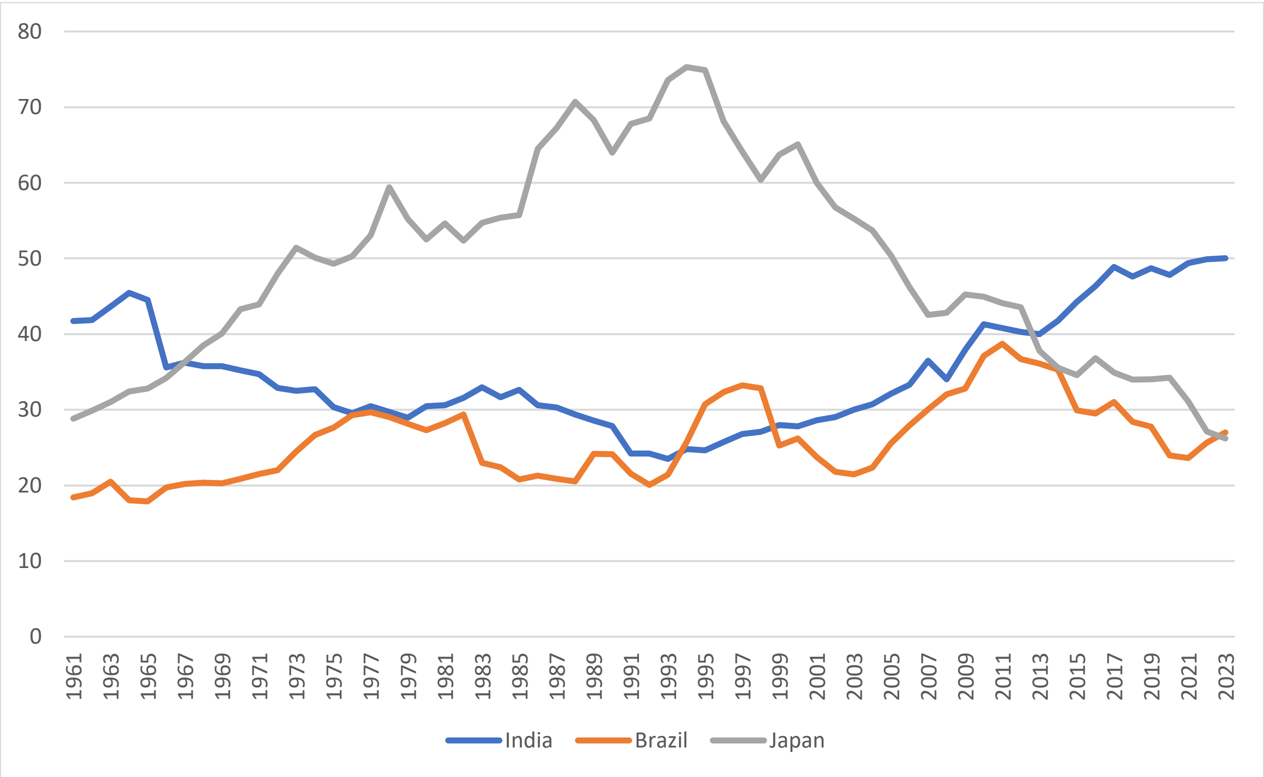


Figure 8 Countries with the greatest economic power from 1992 to 2023 (in mM, that is, world = 1000; order of countries from 2023; positions 6-10)

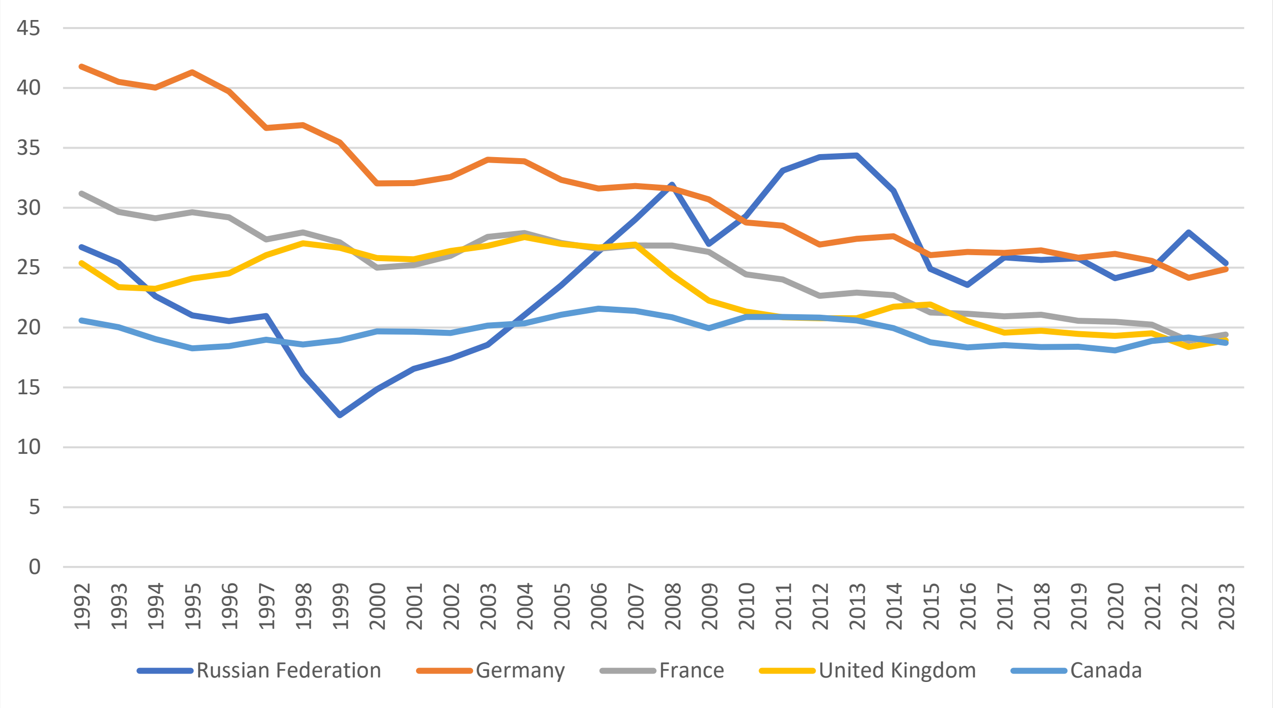


Figure 9 Countries with the greatest economic power in 1992-2023 (in mM, i.e., world = 1000; order of countries in 2023; positions 11-15)

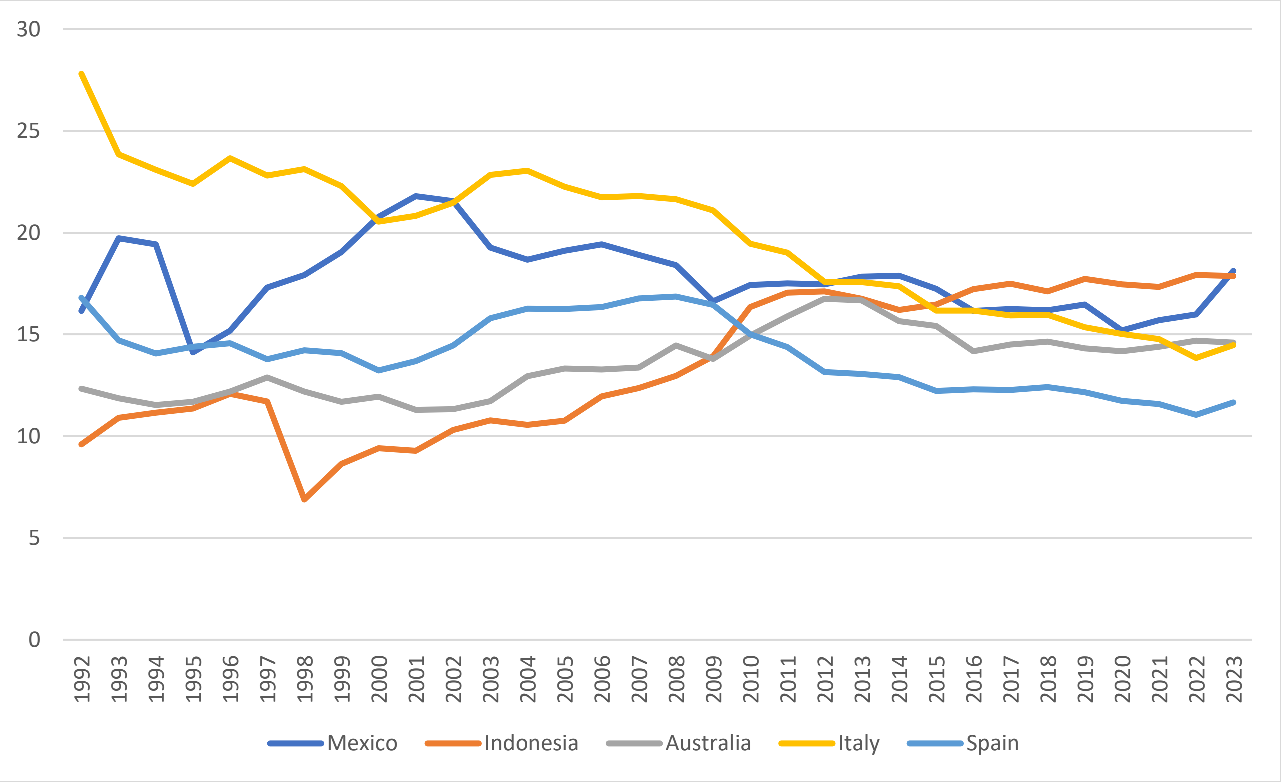


Figure 10 Countries with the greatest economic power in 1992-2023 (in mM, or world 1000; order of countries in 2023; positions 16-20)

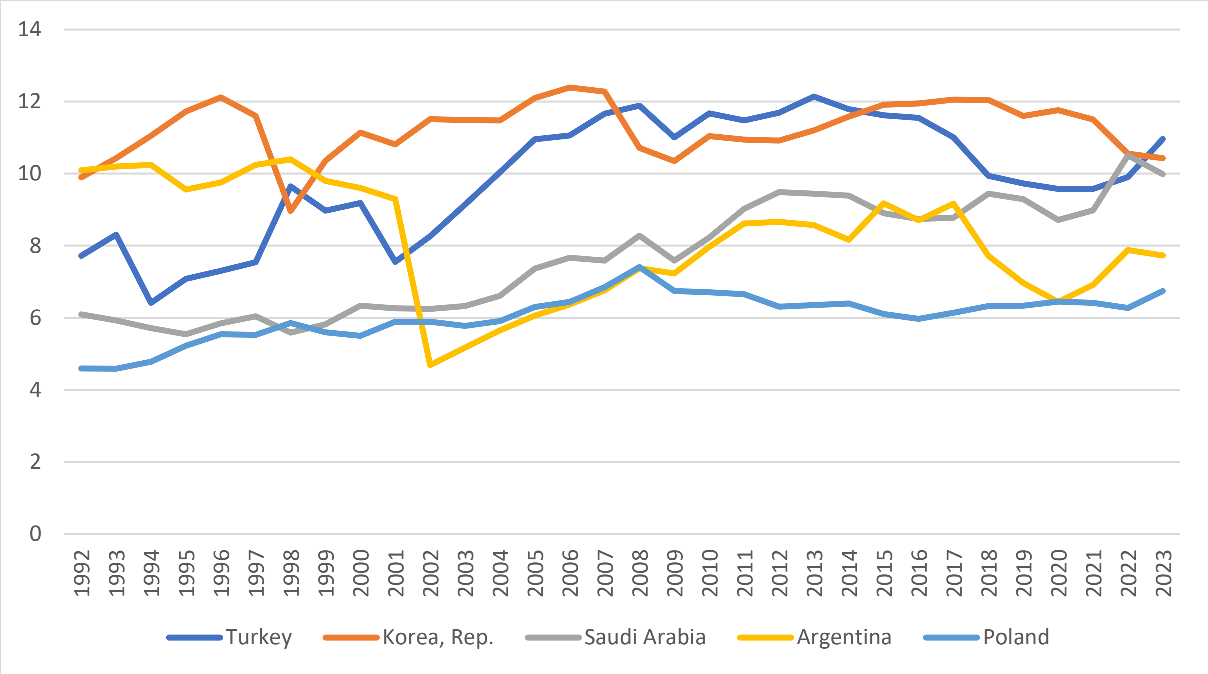


Figure 11 Countries with the greatest economic power in 1992-2023 (in mM, or world 1000; order of countries in 2023; positions 21-25)

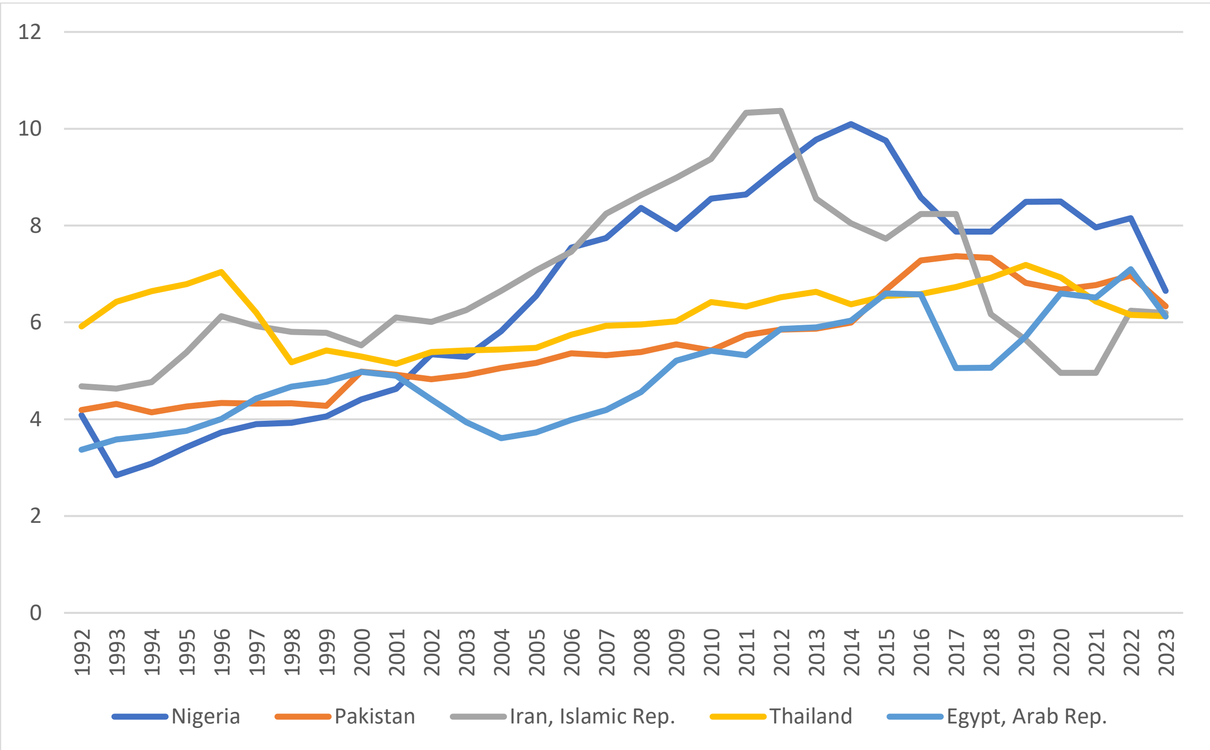
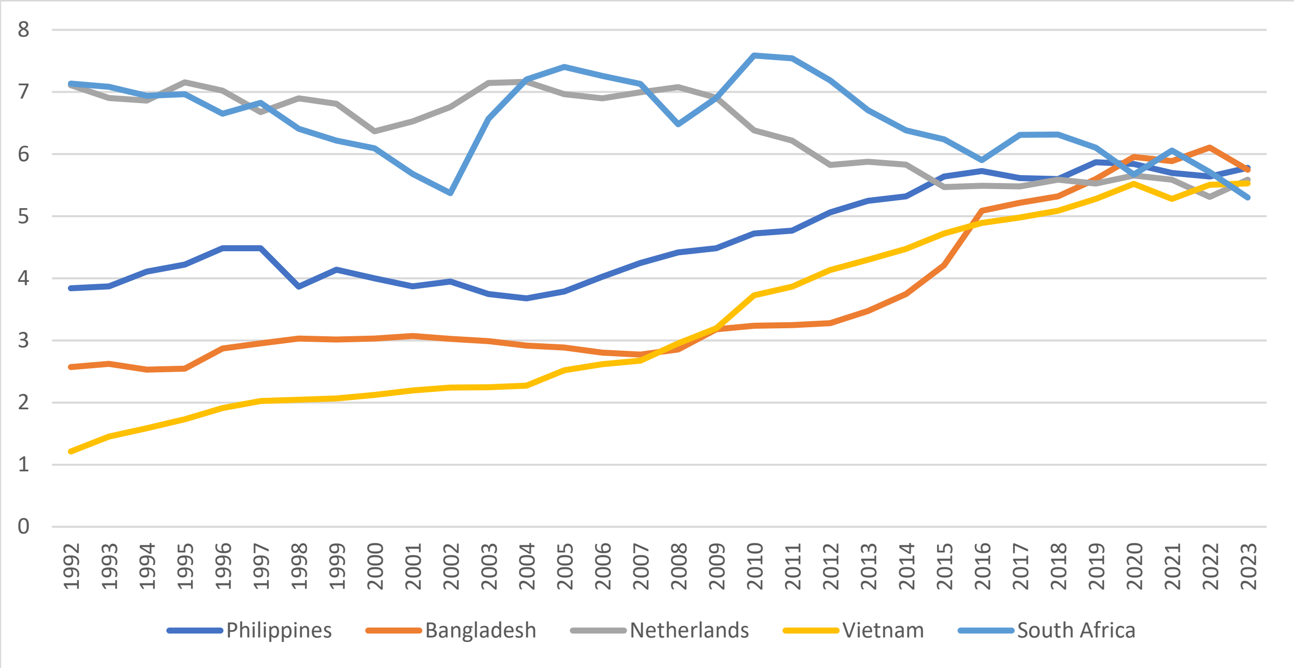


Figure 12 Countries with the greatest economic power from 1992 to 2023 (in mM, or world 1000; order of countries from 2023; positions 26-30)



PART IV
CIVILIZATIONAL POWER 2001-2022

This chapter contains the results of measuring the civilizational power of countries in 2001 and 2022 (this time constraint is due to the availability of the latest data for physical power) along with three measures of efficiency: the efficiency of transformation of physical power into sociological power (calculated on the basis of civilizational power), the index of social organization (calculated on the basis of sociological power), and the integrated index of efficiency (which is the product of the two above measures of efficiency). Thus, we will present two main lists of countries: (1) according to civilizational power and its components and (2) according to measures of fitness, which will be helpful in assessing the type of civilization of selected countries. Measures of efficiency will allow us to build three lists of countries: two on the basis of sub-indices and one on the basis of the integrated index, decisive for the final assessment. The integrated proficiency index was built differently than the index developed by Ian Morris but conveys similar information.

As a reminder, civilizational power is the sum of physical power and sociological power. As countries are at different levels of development, their positioning according to these two types of power varies greatly. From the viewpoint of the study on the international balance of power, sociological power is decisive, but fitness indicators allow an in-depth assessment of state capabilities.

In the calculation, the physical power and sociological power of the world are treated as separate entities and equal to 1, which means that the power of individual countries is a fraction of this magnitude. We can then multiply the obtained results by 100, 1,000 or even 1,000,000 (for very small countries to avoid multiple decimal places). In our case, for physical power and sociological power, we assume that the power of the world equals 1; from the definition adopted, it follows that the civilizational power of the world equals 2.

4.1. Main measures

The main measures include physical power, sociological power and the sum of these, civilizational power. This is the power of human action. Physical power plays the role of inputs, while sociological power plays the role of effects. For us, the effects and efficiency are most interesting, that is, the ratio of effects to inputs. To calculate this, we need core measures (Table 25).

Table 22 Ranking of countries on the basis of physical, sociological and civilizational power in 1992 and 2022 (for physical power and sociological power world = 1000; for civilizational power world = 2000)

	1992 (world = 1000)						2022 (world = 1000)					
	Physical Power		Sociological Power (Economic power)		Civilizational power		Physical Power		Sociological Power (Economic power)		Civilizational power	
	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM
1	United States	248.581	United States	158.962	United States	407.543	China	289.651	China	167.777	China	457.429
2	Russia	104.042	Japan	68.488	Russia	130.756	United States	157.828	United States	153.540	United States	311.368
3	China	86.501	Germany	41.780	Japan	125.436	India	58.703	India	49.895	India	108.598
4	Japan	56.948	China	37.440	China	123.941	Russia	54.181	Russia	27.937	Russia	82.118
5	Germany	43.151	France	31.180	Germany	84.931	Japan	28.122	Japan	27.111	Japan	55.233
6	UK	28.112	Italy	27.808	France	59.253	Iran	22.481	Brazil	25.636	Brazil	43.562
7	France	28.073	Russia	26.714	UK	53.484	Canada	20.423	Germany	24.145	Germany	42.615
8	Ukraine	27.045	UK	25.372	Italy	47.289	Korea, Rep.	20.320	Canada	19.158	Canada	39.581
9	Canada	26.401	India	24.217	India	47.051	Saudi Arabia	19.029	France	18.889	Indonesia	33.077
10	India	22.834	Canada	20.588	Canada	46.989	Germany	18.470	UK	18.368	France	32.692
11	Italy	19.481	Brazil	20.074	Brazil	32.774	Brazil	17.925	Indonesia	17.922	Korea, Rep.	30.869
12	Korea, Rep.	14.894	Spain	16.793	Ukraine	31.533	Indonesia	15.155	Mexico	15.989	UK	29.582
13	Mexico	14.662	Mexico	16.158	Mexico	30.820	France	13.803	Australia	14.690	Saudi Arabia	29.535
14	Kazakhstan	13.043	Australia	12.336	Spain	28.882	Mexico	12.592	Italy	13.842	Iran	28.722
15	Brazil	12.699	Argentina	10.088	Korea, Rep.	24.786	UK	11.214	Spain	11.049	Mexico	28.582
16	Spain	12.089	Korea, Rep.	9.893	Australia	23.185	Australia	10.280	Korea, Rep.	10.550	Australia	24.970

	1992 (world = 1000)						2022 (world = 1000)					
	Physical Power		Sociological Power (Economic power)		Civilizational power		Physical Power		Sociological Power (Economic power)		Civilizational power	
	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM
17	Poland	11.837	Indonesia	9.599	South Africa	18.485	Turkey	10.032	Saudi Arabia	10.506	Italy	23.509
18	South Africa	11.350	Turkey	7.721	Netherlands	17.619	Italy	9.667	Turkey	9.909	Turkey	19.941
19	Saudi Arabia	10.920	South Africa	7.135	Indonesia	17.273	South Africa	9.526	Nigeria	8.151	Spain	19.454
20	Australia	10.849	Netherlands	7.108	Saudi Arabia	17.014	Spain	8.405	Argentina	7.883	South Africa	15.238
21	Netherlands	10.511	Sweden	7.047	Poland	16.428	Thailand	8.352	EGY	7.099	Thailand	14.507
22	Iran	9.749	Saudi Arabia	6.094	Argentina	15.778	TWN	8.192	Pakistan	6.971	EGY	13.837
23	Indonesia	7.674	Thailand	5.916	Kazakhstan	15.076	ARE	7.802	Poland	6.269	Argentina	13.623
24	Belgium	6.799	TWN	5.572	Iran	14.430	Poland	6.752	Iran	6.241	Poland	13.021
25	TWN	6.390	Switzerland	5.143	Turkey	13.375	EGY	6.738	Thailand	6.156	TWN	12.930
26	Romania	5.886	Belgium	4.877	Sweden	12.263	Malaysia	6.583	Bangladesh	6.106	Pakistan	12.822
27	Argentina	5.690	Iran	4.680	TWN	11.962	Vietnam	6.395	South Africa	5.713	Vietnam	11.902
28	Turkey	5.654	Poland	4.592	Belgium	11.676	Singapore	6.182	Philippines	5.640	Nigeria	11.268
29	VEN	5.625	Austria	4.529	Thailand	10.171	Pakistan	5.851	Vietnam	5.507	ARE	11.051
30	Sweden	5.216	Ukraine	4.489	VEN	8.990	Argentina	5.739	Netherlands	5.311	Malaysia	10.967
31	Czech Republic	5.050	Pakistan	4.189	Switzerland	8.105	Kazakhstan	5.688	Colombia	4.923	Netherlands	10.827
32	Uzbekistan	4.842	Nigeria	4.087	Pakistan	7.625	Netherlands	5.516	TWN	4.738	Kazakhstan	8.976
33	ARE	4.783	Philippines	3.839	Romania	7.563	Algeria	4.372	Sweden	4.415	Bangladesh	8.864
34	Belarus	4.454	Colombia	3.776	EGY	7.427	Iraq	4.274	Malaysia	4.383	Philippines	8.618

	1992 (world = 1000)						2022 (world = 1000)					
	Physical Power		Sociological Power (Economic power)		Civilizational power		Physical Power		Sociological Power (Economic power)		Civilizational power	
	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM
35	Thailand	4.255	Greece	3.606	Austria	7.361	Belgium	3.986	Switzerland	4.060	Algeria	7.917
36	EGY	4.056	Norway	3.601	Algeria	7.280	Qatar	3.665	Norway	3.758	Iraq	7.893
37	Algeria	3.855	Algeria	3.426	Greece	6.663	Ukraine	3.653	Peru	3.635	Singapore	7.847
38	Pakistan	3.437	EGY	3.370	CZE	6.601	Nigeria	3.117	Iraq	3.619	Belgium	7.362
39	Finland	3.101	VEN	3.365	Finland	6.416	Uzbekistan	3.087	Algeria	3.544	Colombia	7.150
40	Greece	3.057	Finland	3.314	Norway	6.331	Turkmenistan	3.027	Chile	3.498	Sweden	7.047
41	Hungary	3.001	Denmark	3.283	Nigeria	6.294	Philippines	2.979	Belgium	3.376	Ukraine	6.261
42	Switzerland	2.962	Portugal	3.272	ARE	6.229	Kuwait	2.857	Kazakhstan	3.288	Chile	5.776
43	Azerbaijan	2.903	Malaysia	2.931	Colombia	6.159	Bangladesh	2.759	ARE	3.249	Norway	5.588
44	Malaysia	2.846	Bangladesh	2.572	Uzbekistan	5.991	VEN	2.699	Austria	3.118	Switzerland	5.557
45	Singapore	2.841	Peru	2.560	Malaysia	5.777	Czech Republic	2.694	Ethiopia	3.064	Peru	5.048
46	Austria	2.832	Chile	2.532	Philippines	5.755	Sweden	2.632	Romania	3.057	Czech Republic	5.029
47	Norway	2.731	Morocco	2.242	Denmark	5.593	Oman	2.349	Israel	2.914	Romania	4.979
48	Bulgaria	2.680	Israel	2.049	Belarus	5.533	Chile	2.278	Ireland	2.910	Austria	4.971
49	PRK	2.636	Kazakhstan	2.033	Portugal	5.428	Colombia	2.228	Ukraine	2.608	Qatar	4.902
50	Slovakia	2.497	Libya	1.803	Hungary	4.693	Romania	1.921	Denmark	2.354	Uzbekistan	4.671
51	Iraq	2.467	SYR	1.740	Chile	4.059	Austria	1.853	Czech Republic	2.335	Kuwait	4.073
52	Colombia	2.384	Hungary	1.693	Singapore	3.776	Norway	1.830	Finland	2.307	Finland	3.985

	1992 (world = 1000)						2022 (world = 1000)					
	Physical Power		Sociological Power (Economic power)		Civilizational power		Physical Power		Sociological Power (Economic power)		Civilizational power	
	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM
53	Denmark	2.310	Romania	1.677	Israel	3.552	Finland	1.678	Morocco	2.248	Israel	3.921
54	Nigeria	2.206	Ireland	1.656	Peru	3.470	Hungary	1.658	Kenya	2.240	Ireland	3.917
55	Portugal	2.156	New Zealand	1.579	Bangladesh	3.402	Greece	1.637	Portugal	2.159	Morocco	3.803
56	Philippines	1.915	CZE	1.551	Bulgaria	3.383	Belarus	1.580	Angola	2.142	Greece	3.691
57	New Zealand	1.649	ARE	1.446	SYR	3.273	Morocco	1.555	Greece	2.054	Oman	3.585
58	Qatar	1.548	Ethiopia	1.344	Libya	3.270	Switzerland	1.497	New Zealand	2.053	Portugal	3.546
59	SYR	1.533	Vietnam	1.212	Slovakia	3.249	Peru	1.414	COD	1.920	Ethiopia	3.546
60	Chile	1.527	Cuba	1.206	New Zealand	3.228	Portugal	1.387	Tanzania	1.883	Hungary	3.357
61	Israel	1.503	Ecuador	1.173	Morocco	3.194	Libya	1.334	Hungary	1.699	Denmark	3.340
62	Libya	1.468	COD	1.157	Azerbaijan	2.988	Bahrain	1.334	Singapore	1.665	New Zealand	3.079
63	Lithuania	1.414	Uzbekistan	1.149	Ireland	2.765	Bulgaria	1.227	Ecuador	1.627	Kenya	2.753
64	Cuba	1.219	Belarus	1.079	Iraq	2.610	PRK	1.124	Uzbekistan	1.584	Angola	2.711
65	Ireland	1.109	Cameroon	0.988	Cuba	2.424	TTO	1.084	Myanmar	1.492	Belarus	2.601
66	Kuwait	1.038	Tunisia	0.950	Ecuador	1.950	Azerbaijan	1.061	Sudan	1.480	Ecuador	2.530
67	Morocco	0.952	Sudan	0.938	Vietnam	1.864	New Zealand	1.026	Ghana	1.369	Myanmar	2.326
68	Peru	0.910	Singapore	0.935	Qatar	1.791	Israel	1.007	Cote d'Ivoire	1.333	Tanzania	2.235
69	Turkmenistan	0.887	Kenya	0.914	Tunisia	1.516	Ireland	1.007	Guatemala	1.300	Bulgaria	2.235
70	Bangladesh	0.830	Cote d'Ivoire	0.903	Ethiopia	1.504	Serbia	0.987	Qatar	1.237	Libya	2.228

	1992 (world = 1000)						2022 (world = 1000)					
	Physical Power		Sociological Power (Economic power)		Civilizational power		Physical Power		Sociological Power (Economic power)		Civilizational power	
	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM
71	Georgia	0.821	Angola	0.863	COD	1.356	Denmark	0.986	Oman	1.236	COD	2.079
72	Croatia	0.821	Slovakia	0.752	Oman	1.247	Ecuador	0.902	DOM	1.219	Azerbaijan	2.057
73	Ecuador	0.777	Sri Lanka	0.742	Kenya	1.219	Slovakia	0.856	Kuwait	1.216	Ghana	2.005
74	TTO	0.735	Guatemala	0.721	Turkmenistan	1.209	Myanmar	0.834	Sri Lanka	1.103	Sudan	1.970
75	Bahrain	0.715	Bulgaria	0.702	Yemen, Rep.	1.186	Tunisia	0.693	Uganda	1.072	Slovakia	1.907
76	Vietnam	0.652	Uruguay	0.686	Cameroon	1.169	DOM	0.686	Slovakia	1.052	DOM	1.905
77	KGZ	0.649	Yemen, Rep.	0.670	Zimbabwe	1.167	SYR	0.668	Cameroon	1.031	Guatemala	1.800
78	Moldova	0.626	DOM	0.670	Sudan	1.157	Panama	0.639	Belarus	1.021	Serbia	1.784
79	Oman	0.602	Tanzania	0.666	Georgia	1.123	Ghana	0.636	Bulgaria	1.008	Cote d'Ivoire	1.696
80	Slovenia	0.602	Oman	0.645	Angola	1.097	Lebanon	0.616	Azerbaijan	0.996	Sri Lanka	1.628
81	Latvia	0.593	Zimbabwe	0.642	DOM	1.085	Cuba	0.603	Bolivia	0.926	Bahrain	1.605
82	Tunisia	0.566	Ghana	0.634	Cote d'Ivoire	1.069	Jordan	0.581	Libya	0.894	Tunisia	1.484
83	Mongolia	0.537	Senegal	0.610	Sri Lanka	0.997	Angola	0.569	Nepal	0.875	Panama	1.445
84	Zimbabwe	0.525	Bolivia	0.584	TTO	0.953	Sri Lanka	0.524	Panama	0.806	Bolivia	1.419
85	Armenia	0.522	Paraguay	0.551	Panama	0.938	Kenya	0.513	Uruguay	0.799	TTO	1.332
86	Yemen, Rep.	0.516	Madagascar	0.467	Guatemala	0.937	Croatia	0.503	Serbia	0.797	Jordan	1.319
87	Tajikistan	0.513	Costa Rica	0.464	Uruguay	0.932	Guatemala	0.500	Tunisia	0.791	Uganda	1.248
88	Panama	0.498	Niger	0.442	KGZ	0.894	BIH	0.500	Zambia	0.778	Cameroon	1.248

	1992 (world = 1000)						2022 (world = 1000)					
	Physical Power		Sociological Power (Economic power)		Civilizational power		Physical Power		Sociological Power (Economic power)		Civilizational power	
	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM
89	Jordan	0.477	Myanmar	0.442	Jordan	0.853	Bolivia	0.493	Costa Rica	0.745	Croatia	1.225
90	Luxembourg	0.466	Panama	0.440	Bahrain	0.848	Sudan	0.490	Jordan	0.738	Nepal	1.175
91	DOM	0.415	Nepal	0.420	Bolivia	0.847	Ethiopia	0.481	Croatia	0.723	Lithuania	1.087
92	BIH	0.371	PNG	0.413	Ghana	0.836	Lithuania	0.406	Paraguay	0.715	Uruguay	1.069
93	Lebanon	0.344	Zambia	0.400	Tanzania	0.788	Slovenia	0.405	Lithuania	0.680	Paraguay	1.037
94	Estonia	0.344	Mozambique	0.396	Luxembourg	0.775	Lao PDR	0.366	PNG	0.647	Costa Rica	1.016
95	Jamaica	0.338	Mali	0.395	Tajikistan	0.748	Cote d'Ivoire	0.363	Cambodia	0.642	Zambia	1.014
96	Kenya	0.305	Honduras	0.391	Senegal	0.731	Georgia	0.361	Mali	0.625	Cambodia	1.000
97	MKD	0.291	Uganda	0.383	Mongolia	0.719	Cambodia	0.358	Mozambique	0.624	Slovenia	0.925
98	Bolivia	0.264	Burkina Faso	0.379	Paraguay	0.678	Tanzania	0.351	Senegal	0.620	Mozambique	0.922
99	Sri Lanka	0.255	Jordan	0.376	Myanmar	0.673	BRN	0.348	Honduras	0.572	Zimbabwe	0.864
100	Uruguay	0.246	El Salvador	0.364	Costa Rica	0.659	Mongolia	0.323	Zimbabwe	0.546	Honduras	0.857
101	Cyprus	0.240	Guinea	0.344	Armenia	0.649	Paraguay	0.321	Niger	0.533	Senegal	0.846
102	Angola	0.234	Gabon	0.324	Lebanon	0.643	Zimbabwe	0.318	Burkina Faso	0.532	BIH	0.844
103	Myanmar	0.231	Turkmenistan	0.323	Zambia	0.572	Nepal	0.300	Madagascar	0.526	Mali	0.793
104	Sudan	0.219	Botswana	0.310	Jamaica	0.545	Mozambique	0.298	Slovenia	0.520	PNG	0.759
105	Guatemala	0.216	Luxembourg	0.309	Honduras	0.527	KGZ	0.298	Guinea	0.510	Lao PDR	0.731
106	Ghana	0.202	Georgia	0.302	PNG	0.523	Honduras	0.285	Chad	0.460	Georgia	0.729

	1992 (world = 1000)						2022 (world = 1000)					
	Physical Power		Sociological Power (Economic power)		Civilizational power		Physical Power		Sociological Power (Economic power)		Civilizational power	
	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM
107	COD	0.199	Lebanon	0.299	El Salvador	0.515	Armenia	0.281	Latvia	0.439	Mongolia	0.718
108	Costa Rica	0.196	Namibia	0.292	Madagascar	0.514	Costa Rica	0.271	El Salvador	0.434	El Salvador	0.684
109	Albania	0.184	Chad	0.282	Cyprus	0.486	Uruguay	0.270	Benin	0.408	Burkina Faso	0.662
110	Cameroon	0.181	Congo, Rep.	0.267	Niger	0.481	Tajikistan	0.270	Mongolia	0.395	Latvia	0.642
111	Zambia	0.172	Iceland	0.254	Nepal	0.471	Luxembourg	0.255	Luxembourg	0.384	Luxembourg	0.639
112	Cote d'Ivoire	0.166	Cyprus	0.246	MKD	0.460	El Salvador	0.250	Botswana	0.379	Guinea	0.623
113	BRN	0.163	KGZ	0.245	Mozambique	0.446	Zambia	0.236	Haiti	0.375	Madagascar	0.619
114	Ethiopia	0.160	Qatar	0.243	Gabon	0.445	Senegal	0.226	Estonia	0.373	Niger	0.595
115	El Salvador	0.151	Mauritania	0.239	Uganda	0.433	Yemen, Rep.	0.221	Georgia	0.368	Benin	0.578
116	Iceland	0.139	Tajikistan	0.236	Botswana	0.426	Jamaica	0.220	Malawi	0.366	KGZ	0.574
117	Honduras	0.136	Malawi	0.227	Mali	0.418	Cameroon	0.216	Lao PDR	0.365	Tajikistan	0.552
118	Mauritania	0.136	TTO	0.217	Burkina Faso	0.403	Moldova	0.211	Gabon	0.349	Armenia	0.551
119	Paraguay	0.127	Haiti	0.216	Guinea	0.394	Latvia	0.203	Congo, Rep.	0.345	Botswana	0.551
120	Tanzania	0.122	Jamaica	0.207	Iceland	0.394	Malta	0.200	BIH	0.345	Estonia	0.536
121	Senegal	0.122	Rwanda	0.196	Mauritania	0.376	Iceland	0.191	Nicaragua	0.333	Chad	0.508
122	Gabon	0.122	Nicaragua	0.195	Namibia	0.343	Afghanistan	0.183	Somalia	0.318	BRN	0.484
123	Botswana	0.116	Benin	0.195	Congo, Rep.	0.309	Uganda	0.176	Mauritania	0.296	Nicaragua	0.483
124	PNG	0.110	CAF	0.184	Nicaragua	0.299	Botswana	0.171	Rwanda	0.293	Iceland	0.445

	1992 (world = 1000)						2022 (world = 1000)					
	Physical Power		Sociological Power (Economic power)		Civilizational power		Physical Power		Sociological Power (Economic power)		Civilizational power	
	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM
125	Nicaragua	0.104	Mongolia	0.183	Chad	0.297	Benin	0.170	Namibia	0.287	Gabon	0.443
126	Mauritius	0.095	MKD	0.170	BRN	0.295	Mali	0.168	Tajikistan	0.282	Jamaica	0.443
127	BHS	0.092	Togo	0.169	Malawi	0.265	Kosovo	0.168	KGZ	0.276	Haiti	0.440
128	Malta	0.092	Lao PDR	0.156	Albania	0.264	Kiribati	0.168	Bahrain	0.271	Moldova	0.433
129	Afghanistan	0.083	Iraq	0.143	Haiti	0.255	Estonia	0.163	Armenia	0.269	Cyprus	0.419
130	Suriname	0.071	Mauritius	0.136	Mauritius	0.231	Cyprus	0.163	Albania	0.263	Congo, Rep.	0.417
131	Djibouti	0.071	Bahrain	0.133	Rwanda	0.228	MKD	0.162	Cyprus	0.256	Malawi	0.411
132	Barbados	0.059	BRN	0.132	Benin	0.228	COD	0.160	Iceland	0.253	Albania	0.406
133	Nepal	0.050	Armenia	0.127	BHS	0.208	Nicaragua	0.150	TTO	0.248	Mauritania	0.401
134	Mozambique	0.050	Burundi	0.126	Togo	0.204	Albania	0.143	Jamaica	0.223	Namibia	0.392
135	Uganda	0.050	BHS	0.116	CAF	0.196	Burkina Faso	0.130	Moldova	0.221	MKD	0.358
136	Guinea	0.050	Sierra Leone	0.098	Malta	0.176	Mauritius	0.118	Guyana	0.218	Somalia	0.338
137	Namibia	0.050	Fiji	0.098	Lao PDR	0.171	GNQ	0.115	Togo	0.210	Rwanda	0.331
138	Madagascar	0.047	Swaziland	0.090	Burundi	0.141	Guinea	0.113	MKD	0.197	Malta	0.308
139	Congo, Rep.	0.042	Azerbaijan	0.085	Fiji	0.139	PNG	0.112	GNQ	0.174	Kosovo	0.305
140	Fiji	0.042	Malta	0.084	Sierra Leone	0.131	Mauritania	0.105	Kosovo	0.137	GNQ	0.289
141	Niger	0.039	Lesotho	0.084	Barbados	0.120	Namibia	0.105	BRN	0.136	Guyana	0.276
142	Malawi	0.039	Albania	0.081	Swaziland	0.119	Gabon	0.095	Sierra Leone	0.135	Togo	0.270

	1992 (world = 1000)						2022 (world = 1000)					
	Physical Power		Sociological Power (Economic power)		Civilizational power		Physical Power		Sociological Power (Economic power)		Civilizational power	
	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM
143	Haiti	0.039	Eritrea	0.070	Suriname	0.117	Madagascar	0.093	Mauritius	0.130	Mauritius	0.248
144	Togo	0.036	Barbados	0.061	Djibouti	0.116	Bhutan	0.080	Liberia	0.126	BHS	0.199
145	Guyana	0.036	Gambia, The	0.060	Lesotho	0.093	BHS	0.078	BHS	0.121	Kiribati	0.173
146	Rwanda	0.033	Guyana	0.051	Guyana	0.086	Congo, Rep.	0.072	Burundi	0.111	Sierra Leone	0.167
147	Benin	0.033	Suriname	0.046	Gambia, The	0.069	Haiti	0.065	CAF	0.111	Montenegro	0.145
148	Sierra Leone	0.033	Djibouti	0.045	Belize	0.052	Niger	0.062	Malta	0.108	Liberia	0.143
149	Swaziland	0.030	Belize	0.037	GNB	0.043	Montenegro	0.062	Swaziland	0.086	Suriname	0.135
150	Mali	0.024	Andorra	0.032	Seychelles	0.038	Togo	0.060	Montenegro	0.084	Burundi	0.131
151	Burkina Faso	0.024	GNB	0.032	St. Lucia	0.036	Guyana	0.058	Fiji	0.083	Swaziland	0.121
152	Somalia	0.024	Comoros	0.031	ATG	0.036	Suriname	0.057	Suriname	0.078	CAF	0.120
153	Seychelles	0.021	Liechtenstein	0.030	Bhutan	0.036	Chad	0.048	Djibouti	0.071	Fiji	0.116
154	Cambodia	0.021	Bhutan	0.030	Comoros	0.034	Maldives	0.048	Lesotho	0.069	Maldives	0.102
155	ATG	0.018	SLB	0.028	SLB	0.034	South Sudan	0.048	Timor-Leste	0.065	Lesotho	0.093
156	Chad	0.015	St. Lucia	0.028	Cabo Verde	0.030	Malawi	0.045	Gambia, The	0.059	Djibouti	0.089
157	Lao PDR	0.015	Cabo Verde	0.027	GNQ	0.025	Rwanda	0.038	Maldives	0.054	Timor-Leste	0.080
158	Burundi	0.015	Monaco	0.026	Vanuatu	0.021	Swaziland	0.035	GNB	0.050	Barbados	0.078
159	Belize	0.015	GNQ	0.019	Grenada	0.020	Fiji	0.033	Belize	0.049	Gambia, The	0.071
160	Liberia	0.015	ATG	0.018	Maldives	0.019	Sierra Leone	0.032	Barbados	0.046	Belize	0.069

	1992 (world = 1000)						2022 (world = 1000)					
	Physical Power		Sociological Power (Economic power)		Civilizational power		Physical Power		Sociological Power (Economic power)		Civilizational power	
	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM
161	CAF	0.012	Vanuatu	0.018	Samoa	0.018	Barbados	0.032	SLB	0.039	GNB	0.059
162	GNB	0.012	Seychelles	0.017	VCT	0.017	Lesotho	0.023	Cabo Verde	0.039	Cabo Verde	0.055
163	Lesotho	0.009	Maldives	0.016	Dominica	0.015	Somalia	0.020	Comoros	0.026	SLB	0.046
164	Gambia, The	0.009	Grenada	0.014	KNA	0.013	Burundi	0.020	Andorra	0.025	St. Lucia	0.038
165	St. Lucia	0.009	VCT	0.014	Tonga	0.012	Belize	0.020	St. Lucia	0.023	Seychelles	0.036
166	Bhutan	0.006	Dominica	0.012	FSM	0.011	Seychelles	0.020	Vanuatu	0.022	ATG	0.035
167	SLB	0.006	Samoa	0.012	Eritrea	N/A	Djibouti	0.018	ATG	0.017	Comoros	0.034
168	GNQ	0.006	FSM	0.011	Andorra	N/A	ATG	0.018	Seychelles	0.016	Vanuatu	0.029
169	Grenada	0.006	KNA	0.010	Liechtenstein	N/A	Liberia	0.017	Samoa	0.015	Samoa	0.024
170	Samoa	0.006	Tonga	0.009	Monaco	N/A	Cabo Verde	0.017	Grenada	0.014	Grenada	0.023
171	Nauru	0.006	MHL	0.005	MHL	N/A	Timor-Leste	0.015	VCT	0.012	VCT	0.018
172	Comoros	0.003	Kiribati	0.004	Kiribati	N/A	St. Lucia	0.015	STP	0.011	KNA	0.016
173	Cabo Verde	0.003	Tuvalu	0.001	Tuvalu	N/A	Eritrea	0.015	KNA	0.009	STP	0.014
174	Vanuatu	0.003	Afghanistan	N/A	Afghanistan	N/A	Gambia, The	0.012	Dominica	0.009	Dominica	0.014
175	Maldives	0.003	BIH	N/A	BIH	N/A	CAF	0.008	FSM	0.007	FSM	0.011
176	VCT	0.003	Cambodia	N/A	Cambodia	N/A	GNB	0.008	Kiribati	0.005	Nauru	0.003
177	Dominica	0.003	Croatia	N/A	Croatia	N/A	Comoros	0.008	MHL	0.004	Andorra	N/A
178	KNA	0.003	Estonia	N/A	Estonia	N/A	Samoa	0.008	Nauru	0.002	MHL	N/A

	1992 (world = 1000)						2022 (world = 1000)					
	Physical Power		Sociological Power (Economic power)		Civilizational power		Physical Power		Sociological Power (Economic power)		Civilizational power	
	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM	Country	mM
179	Tonga	0.003	PRK	N/A	PRK	N/A	Grenada	0.008	Tuvalu	0.001	Tuvalu	N/A
180	STP	0.003	Kosovo	N/A	Kosovo	N/A	SLB	0.007	Afghanistan	N/A	Afghanistan	N/A
181	FSM	0.000	Kuwait	N/A	Kuwait	N/A	Vanuatu	0.007	Bhutan	N/A	Bhutan	N/A
182	Eritrea	N/A	Latvia	N/A	Latvia	N/A	VCT	0.007	Cuba	N/A	Cuba	N/A
183	Andorra	N/A	Liberia	N/A	Liberia	N/A	KNA	0.007	Eritrea	N/A	Eritrea	N/A
184	Liechtenstein	N/A	Lithuania	N/A	Lithuania	N/A	Dominica	0.005	Lebanon	N/A	Lebanon	N/A
185	Monaco	N/A	Moldova	N/A	Moldova	N/A	STP	0.003	Liechtenstein	N/A	Liechtenstein	N/A
186	MHL	N/A	Montenegro	N/A	Montenegro	N/A	FSM	0.003	Monaco	N/A	Monaco	N/A
187	Kiribati	N/A	Nauru	N/A	Nauru	N/A	Tonga	0.003	Palau	N/A	Palau	N/A
188	Tuvalu	N/A	Palau	N/A	Palau	N/A	Nauru	0.002	PRK	N/A	PRK	N/A
189	Kosovo	N/A	San Marino	N/A	San Marino	N/A	Andorra	N/A	San Marino	N/A	San Marino	N/A
190	Montenegro	N/A	STP	N/A	STP	N/A	MHL	N/A	South Sudan	N/A	South Sudan	N/A
191	Palau	N/A	Serbia	N/A	Serbia	N/A	Tuvalu	N/A	SYR	N/A	SYR	N/A
192	San Marino	N/A	Slovenia	N/A	Slovenia	N/A	Liechtenstein	N/A	Turkmenistan	N/A	Turkmenistan	N/A
193	Serbia	N/A	Somalia	N/A	Somalia	N/A	Monaco	N/A	Tonga	N/A	Tonga	N/A
194	South Sudan	N/A	South Sudan	N/A	South Sudan	N/A	Palau	N/A	VEN	N/A	VEN	N/A
195	Timor-Leste	N/A	Timor-Leste	N/A	Timor-Leste	N/A	San Marino	N/A	Yemen, Rep.	N/A	Yemen, Rep.	N/A

4.2. Measures of efficiency

To assess the type (level) of civilization, we need three measures of efficiency – two partial and one integrated. The first is the ratio of sociological power (SOP) to physical power (PHP), i.e. e_s; this indicator shows the efficiency of transformation of physical energy into sociological energy and is a dimensionless quantity. In other words, this indicator is the efficiency of transformation, so it applies to all civilizational power. It should be remembered that this relationship is not linear and has historically changed. At the beginning of human development, it was relatively high, in the early days of industrialization it began to fall, and then – in the post-industrial era – it began to rise again. It is expressed by the following formula:

$$e_s = \frac{SOP}{PHP}.$$

where:
SOP – sociological power
PHP – physical power
e_s - efficiency of transformation of physical energy into sociological energy indicator

This indicator can be given in reverse form, as a ratio of physical power to sociological power, or as an indicator of the energy intensity of sociological power. In the economic literature, for example, it is widespread to calculate the energy intensity of GDP as the ratio of the amount of energy used to produce a unit of GDP. This remark also applies to the second indicator, but in the Report we highlight efficiency indicators rather than input intensity indicators.

The energy intensity index could also be expressed as the share of physical power in civilizational power. It would have a different numerical value but would convey the same information. The ratio of physical power to sociological power in a country depends on many factors, such as the stage of development, the structure of the economy, territorial extent, population density, climate, and the level of organization, management, knowledge, skills and social discipline. Both measures can be called the information quotient – a measure of the sophistication of organizational, production and service processes in a society; in other words, it is a measure of mastery of nature; to put it another way, it is a measure of the "informativeness of society." It tends to zero or, in its inverted form, to infinity.

The second indicator is more complex in nature. This indicator expresses the level of socio-economic development, the level of social productivity in time and space, or the level of organization of society (e_o) – it is only concerned with sociological power and is, in fact, a broad view of social productivity - broad because it is the productivity of society captured not only in time but also in space. This means that a country with a high GDP per capita but sparsely populated will have a lower index than a country with the same level of GDP per capita but densely populated. This indicator has the dimension of specific conductivity. It is calculated according to the following formula[56]:

$$e_o = \frac{GDP^{0.652}}{L^{0.217} \times a^{0.217}}.$$

A comment of a more general nature is drawn against this background. Trends in energy intensity in various countries considered over a longer period have a fixed pattern – up to a certain point, energy intensity increases, then (as a rule, more slowly) decreases (this pattern is similar to the so-called bell curve). For example, the UK's GDP energy intensity rose until about 1880, and then began to slowly decline. This change in trend for the United States occurred about 40 years later, and for Russia only around 2000. Japan reached this point around 1970 (although as early as 1920 was not much lower), while China reached it twice – the first time around 1960, the second time around 1980. The world reached a maximum in energy intensity around 1910 (about 10 years before the United States), which remained without much fluctuation until 1970; from that year it began to decline noticeably.[57]

The third indicator, the integrated efficiency index (*iei*), is simply the product of two sub-indices:

$$iei = e_s \times e_o.$$

We call it "integrated" as it integrates measures of fitness relating to physical power and sociological power. This measure is highly synthetic yet information-rich. It avoids the one-sidedness that characterizes both indicators that focus solely on physical factors and solely on sociological factors. Undoubtedly, it deserves to be called an "Index of Civilization," but unlike, for example, the Kardashov scale, it is relative rather than absolute in nature.[58]

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[56] M. Sułek, *Podstawy potęgonomii i potęgometrii*, op.cit., p. 106–107; R. Białoskórski, Ł. Kiczma, M. Sułek, *Potęga państw 2018. Międzynarodowy układ sił w procesie zmian* (The Power of States 2018: The International Balance of Power in Transition). A powerometric report, Warszawa 2018, p. 133 and the following.

[57] Cf. Ch. Rűhl, P. Appleby, J. Fennema, A. Naumov, M. Schaffer, E*conomic Development and the Demand for Energy: A Historical Perspective on the Next 20 Years."* Energy Policy 50, 2012 p. 9, 14.

[58] Kardashov scale - a classification of the technical sophistication of civilizations, proposed by Russian astronomer Nikolai Kardashov in 1964. Kardashov used the amount of energy used by a civilization as a criterion for classification.

Table 23 Effectiveness of transformation of physical power into sociological power (e_s), indicator organization of society (e_o) and integrated efficiency indicator (iei) in 1992 and 2022 (world = 1)

	1992 (world = 1)						2022 (world = 1)					
	e_s		e_o		iei		e_s		e_o		iei	
	Country		Country		Country		Country		Country		Country	
1	Chad	19.055	Japan	2.399	Japan	2.885	Somalia	15.929	Singapore	2.000	Switzerland	2.945
2	Mali	16.641	Germany	1.792	Switzerland	2.268	CAF	13.378	United States	1.435	Israel	2.644
3	Burkina Faso	15.970	Monaco	1.774	Italy	2.096	COD	12.010	Germany	1.190	Ireland	2.375
4	CAF	15.495	Italy	1.468	Germany	1.735	Chad	9.531	United Kingdom	1.126	United Kingdom	1.844
5	Niger	11.476	United States	1.422	France	1.470	Niger	8.657	Japan	1.109	Denmark	1.751
6	Lao PDR	10.524	United Kingdom	1.419	Austria	1.366	Malawi	8.144	Netherlands	1.103	Germany	1.555
7	Comoros	10.411	Netherlands	1.347	Israel	1.325	Rwanda	7.641	Switzerland	1.086	United States	1.396
8	Madagascar	9.842	France	1.324	Denmark	1.310	Liberia	7.568	Korea, Rep.	0.974	Norway	1.228
9	Lesotho	9.424	Switzerland	1.306	United Kingdom	1.281	Ethiopia	6.368	Israel	0.914	France	1.207
10	Cabo Verde	9.221	Singapore	1.245	Spain	1.218	Uganda	6.071	France	0.882	Italy	1.206
11	Burundi	8.488	Belgium	1.116	Sweden	1.020	GNB	6.040	Belgium	0.870	Luxembourg	1.190
12	Ethiopia	8.392	Israel	0.972	Netherlands	0.911	SLB	5.895	TWN	0.843	Austria	1.089
13	Nepal	8.334	Denmark	0.922	United States	0.909	PNG	5.803	Italy	0.842	Japan	1.069
14	Mozambique	7.856	TWN	0.904	Portugal	0.817	Haiti	5.775	China	0.831	Netherlands	1.062
15	Uganda	7.597	Spain	0.877	Belgium	0.801	Madagascar	5.641	Qatar	0.823	Sweden	0.857
16	Guinea	6.825	Austria	0.854	TWN	0.788	Burundi	5.575	Ireland	0.822	Spain	0.815
17	Gambia, The	6.721	Korea, Rep.	0.841	Comoros	0.731	Tanzania	5.361	Luxembourg	0.789	New Zealand	0.748
18	Congo, Rep.	6.433	Sweden	0.755	Burkina Faso	0.717	Gambia, The	5.055	Denmark	0.733	Belgium	0.737
19	Vanuatu	6.129	Luxembourg	0.675	Norway	0.717	Congo, Rep.	4.824	ARE	0.695	Bangladesh	0.675
20	Rwanda	5.994	Norway	0.544	Ireland	0.698	Cameroon	4.764	Austria	0.647	Portugal	0.635
21	Benin	5.987	Portugal	0.538	Greece	0.614	Guinea	4.507	Spain	0.620	Costa Rica	0.631
22	Malawi	5.880	Greece	0.520	Argentina	0.574	Kenya	4.368	Norway	0.598	Australia	0.628
23	COD	5.825	ARE	0.512	Korea, Rep.	0.559	Timor-Leste	4.367	Kuwait	0.576	Uruguay	0.586
24	Namibia	5.799	Finland	0.495	Finland	0.529	Sierra Leone	4.266	Bahrain	0.566	Ethiopia	0.578
25	Haiti	5.609	Liechtenstein	0.492	Mali	0.489	Burkina Faso	4.099	Sweden	0.511	Haiti	0.577

	1992 (world = 1)						2022 (world = 1)					
	e_s		e_o		iei		e_s		e_o		iei	
	Country		Country		Country		Country		Country		Country	
26	Maldives	5.485	Canada	0.482	Cabo Verde	0.487	Djibouti	3.864	Malta	0.473	COD	0.575
27	Tanzania	5.481	Ireland	0.467	Cote d'Ivoire	0.483	Angola	3.762	Czech Republic	0.464	Rwanda	0.573
28	Cameroon	5.461	Bahrain	0.383	Maldives	0.480	Guyana	3.736	Poland	0.457	Singapore	0.539
29	Cote d'Ivoire	5.440	Mexico	0.383	Cameroon	0.471	Mali	3.715	Canada	0.456	Finland	0.531
30	Bhutan	5.079	Australia	0.375	Chad	0.458	Gabon	3.673	Australia	0.440	Romania	0.524
31	Senegal	5.016	Malta	0.366	St. Lucia	0.456	Cote d'Ivoire	3.672	Saudi Arabia	0.412	Nigeria	0.508
32	Togo	4.744	Argentina	0.324	VCT	0.452	Togo	3.504	Portugal	0.408	Korea, Rep.	0.506
33	VCT	4.686	Turkey	0.300	Luxembourg	0.448	Vanuatu	3.305	Finland	0.387	Estonia	0.498
34	SLB	4.658	New Zealand	0.289	Senegal	0.434	Zambia	3.289	Mexico	0.376	Kenya	0.498
35	Paraguay	4.320	Qatar	0.288	Australia	0.426	STP	3.158	Turkey	0.375	Uganda	0.493
36	Sudan	4.275	Poland	0.284	CAF	0.424	Comoros	3.076	New Zealand	0.374	TWN	0.488
37	Dominica	4.102	Saudi Arabia	0.282	Mexico	0.422	Sudan	3.024	India	0.359	DOM	0.487
38	PNG	3.764	South Africa	0.280	Uruguay	0.419	Lesotho	2.969	Greece	0.345	Guatemala	0.486
39	Angola	3.683	Barbados	0.278	Bangladesh	0.415	Uruguay	2.962	Hungary	0.332	Philippines	0.483
40	Guatemala	3.330	Andorra	0.276	Turkey	0.410	Nepal	2.919	Romania	0.329	China	0.481
41	KNA	3.316	Hungary	0.275	Singapore	0.410	Israel	2.893	Malaysia	0.327	Mexico	0.477
42	GNQ	3.170	Czech Republic	0.265	Ethiopia	0.404	Ireland	2.888	Slovakia	0.325	Colombia	0.453
43	Ghana	3.145	BRN	0.262	KNA	0.395	Mauritania	2.825	Slovenia	0.322	Peru	0.446
44	St. Lucia	3.100	Thailand	0.259	Lesotho	0.393	Costa Rica	2.744	Russia	0.311	Greece	0.432
45	Bangladesh	3.098	Cyprus	0.255	Guatemala	0.382	Namibia	2.741	Indonesia	0.309	Lithuania	0.428
46	Tonga	3.076	Russia	0.251	Philippines	0.381	Senegal	2.738	Bangladesh	0.305	Canada	0.427
47	Swaziland	3.019	Malaysia	0.240	Niger	0.378	Switzerland	2.712	Brazil	0.298	Brazil	0.427
48	Sierra Leone	3.008	Brazil	0.231	Madagascar	0.377	Nigeria	2.615	Thailand	0.287	Latvia	0.426
49	Kenya	2.992	TTO	0.226	Canada	0.376	Guatemala	2.603	TTO	0.275	PNG	0.426
50	Sri Lanka	2.908	Mauritius	0.202	Nepal	0.368	Peru	2.571	DOM	0.274	Poland	0.425
51	Honduras	2.864	SYR	0.202	Brazil	0.365	Fiji	2.483	Vietnam	0.264	Malawi	0.416
52	Peru	2.812	Slovakia	0.201	Gambia, The	0.363	Belize	2.458	Argentina	0.257	Slovenia	0.413

	1992 (world = 1)						2022 (world = 1)					
	e_s		e_o		iei		e_s		e_o		iei	
	Country		Country		Country		Country		Country		Country	
53	Uruguay	2.786	Iceland	0.197	Iceland	0.360	Swaziland	2.455	Cyprus	0.256	Tanzania	0.409
54	Botswana	2.684	Ukraine	0.197	Thailand	0.360	Benin	2.405	Lithuania	0.256	Somalia	0.407
55	Gabon	2.663	VEN	0.193	Costa Rica	0.353	Denmark	2.388	BRN	0.255	Cyprus	0.402
56	GNB	2.659	Philippines	0.190	Rwanda	0.351	Cabo Verde	2.330	Philippines	0.255	Czech Republic	0.402
57	Belize	2.491	BHS	0.189	Peru	0.349	Estonia	2.285	Chile	0.253	Cote d'Ivoire	0.400
58	Grenada	2.423	Chile	0.183	Paraguay	0.344	FSM	2.237	Croatia	0.246	Slovakia	0.399
59	El Salvador	2.406	Cuba	0.182	Morocco	0.343	Paraguay	2.226	Maldives	0.241	Chile	0.389
60	Costa Rica	2.369	India	0.180	Burundi	0.339	Nicaragua	2.225	Barbados	0.240	Angola	0.381
61	Fiji	2.356	China	0.172	Haiti	0.337	Bangladesh	2.213	Panama	0.236	Turkey	0.370
62	Morocco	2.356	Lebanon	0.167	Dominica	0.337	Botswana	2.211	Costa Rica	0.230	Indonesia	0.365
63	Zambia	2.324	Indonesia	0.167	Congo, Rep.	0.336	Colombia	2.210	Oman	0.224	Guyana	0.363
64	Bolivia	2.212	Colombia	0.161	Malta	0.335	Latvia	2.159	Bulgaria	0.221	Sri Lanka	0.357
65	Philippines	2.004	Libya	0.157	Guinea	0.332	Ghana	2.152	Andorra	0.220	Croatia	0.354
66	Samoa	1.966	DOM	0.154	Sri Lanka	0.312	Sri Lanka	2.103	Egypt, Arab Rep.	0.220	Cameroon	0.354
67	Myanmar	1.910	ATG	0.154	Namibia	0.308	Mozambique	2.095	Iraq	0.219	Argentina	0.354
68	Nicaragua	1.882	Uruguay	0.150	El Salvador	0.304	Norway	2.054	Estonia	0.218	Barbados	0.350
69	Vietnam	1.858	Costa Rica	0.149	Chile	0.303	Honduras	2.009	South Africa	0.217	Hungary	0.340
70	Nigeria	1.853	St. Lucia	0.147	Mauritius	0.289	New Zealand	2.002	Mauritius	0.212	Gabon	0.327
71	Iceland	1.826	Morocco	0.146	Barbados	0.285	Philippines	1.893	Colombia	0.205	Ecuador	0.315
72	Argentina	1.773	Oman	0.144	Uganda	0.283	Bolivia	1.879	Uruguay	0.198	India	0.305
73	Mauritania	1.753	Romania	0.143	Lao PDR	0.282	Samoa	1.860	Latvia	0.197	Panama	0.298
74	Switzerland	1.736	Tunisia	0.140	New Zealand	0.276	Albania	1.834	Azerbaijan	0.196	BHS	0.297
75	Tunisia	1.677	Iran	0.139	Gabon	0.274	Ecuador	1.803	Iceland	0.195	ARE	0.289
76	Chile	1.658	Panama	0.139	Grenada	0.265	Cambodia	1.794	Nigeria	0.194	El Salvador	0.287
77	DOM	1.615	Seychelles	0.136	Cyprus	0.262	Myanmar	1.789	BHS	0.192	Chad	0.280
78	Austria	1.599	Belarus	0.135	Colombia	0.254	DOM	1.777	Guatemala	0.187	Qatar	0.278
79	Colombia	1.584	Bangladesh	0.134	DOM	0.249	El Salvador	1.738	Serbia	0.184	Guinea	0.278

	1992 (world = 1)						2022 (world = 1)					
	e_s		e_o		iei		e_s		e_o		iei	
	Country		Country		Country		Country		Country		Country	
80	Brazil	1.581	Ecuador	0.130	Malaysia	0.247	VCT	1.730	Iran	0.182	Maldives	0.270
81	Portugal	1.518	El Salvador	0.126	BHS	0.239	Dominica	1.723	Ecuador	0.175	Nepal	0.261
82	Ecuador	1.510	Algeria	0.126	Benin	0.236	Zimbabwe	1.717	Peru	0.174	Congo, Rep.	0.261
83	Ireland	1.494	Jamaica	0.125	Tunisia	0.235	Grenada	1.706	Sri Lanka	0.170	Iceland	0.258
84	Mauritius	1.430	Peru	0.124	Togo	0.233	Austria	1.682	Pakistan	0.170	Malta	0.256
85	Italy	1.427	Pakistan	0.119	SYR	0.229	Sweden	1.677	El Salvador	0.165	Ghana	0.249
86	Denmark	1.421	KNA	0.119	Honduras	0.228	Lithuania	1.674	Belarus	0.157	Niger	0.248
87	Guyana	1.421	Egypt, Arab Rep.	0.118	Swaziland	0.221	United Kingdom	1.638	Kazakhstan	0.156	Kuwait	0.245
88	Thailand	1.390	Nigeria	0.117	Mozambique	0.220	Romania	1.591	Ukraine	0.154	Albania	0.239
89	Spain	1.389	Bulgaria	0.116	Malawi	0.220	Cyprus	1.571	Jamaica	0.149	Timor-Leste	0.237
90	Turkey	1.365	Guatemala	0.115	COD	0.219	Portugal	1.557	Morocco	0.145	Liberia	0.237
91	Israel	1.363	Grenada	0.109	Nigeria	0.216	BHS	1.548	ATG	0.142	Mauritius	0.233
92	Sweden	1.351	Sri Lanka	0.107	Vanuatu	0.215	Chile	1.536	Jordan	0.136	Egypt, Arab Rep.	0.232
93	Norway	1.318	Gabon	0.103	BRN	0.213	GNQ	1.513	Armenia	0.132	Saudi Arabia	0.227
94	Yemen, Rep.	1.299	VCT	0.096	Indonesia	0.209	St. Lucia	1.510	BIH	0.131	Vietnam	0.227
95	BHS	1.264	Jordan	0.093	PNG	0.208	Luxembourg	1.508	Albania	0.130	Paraguay	0.224
96	Indonesia	1.251	Kazakhstan	0.089	Angola	0.201	Barbados	1.461	Seychelles	0.130	Malaysia	0.217
97	Libya	1.228	Cote d'Ivoire	0.089	Ghana	0.200	Morocco	1.446	St. Lucia	0.127	Djibouti	0.212
98	Zimbabwe	1.224	Maldives	0.088	Fiji	0.197	Croatia	1.437	KNA	0.124	Thailand	0.212
99	Pakistan	1.219	Senegal	0.087	Ecuador	0.197	Italy	1.432	Algeria	0.123	Morocco	0.210
100	Japan	1.203	Cameroon	0.086	Libya	0.193	Brazil	1.430	Georgia	0.119	Gambia, The	0.207
101	Greece	1.180	MKD	0.085	India	0.191	Australia	1.429	Tunisia	0.117	Burkina Faso	0.206
102	Australia	1.137	Fiji	0.084	Tanzania	0.186	KNA	1.410	Ghana	0.116	SLB	0.204
103	SYR	1.135	Dominica	0.082	Cuba	0.180	Suriname	1.379	MKD	0.114	Honduras	0.203
104	France	1.111	Uzbekistan	0.082	Botswana	0.179	Finland	1.374	Kenya	0.114	Pakistan	0.202
105	Mexico	1.102	Paraguay	0.080	South Africa	0.176	Argentina	1.374	Grenada	0.113	Senegal	0.202
106	Oman	1.072	Honduras	0.079	Tonga	0.168	France	1.368	Kosovo	0.112	CAF	0.197

	1992 (world = 1)						2022 (world = 1)					
	e_s		e_o		iei		e_s		e_o		iei	
	Country		Country		Country		Country		Country		Country	
107	Finland	1.069	Georgia	0.074	Kenya	0.165	Montenegro	1.361	Cote d'Ivoire	0.109	Madagascar	0.195
108	India	1.061	Swaziland	0.073	Sudan	0.160	Iceland	1.323	Moldova	0.107	Grenada	0.193
109	ATG	1.037	Comoros	0.070	ATG	0.160	Spain	1.315	GNQ	0.107	St. Lucia	0.192
110	Malaysia	1.030	Botswana	0.067	Saudi Arabia	0.157	Germany	1.307	Uzbekistan	0.106	Fiji	0.187
111	Cyprus	1.026	MHL	0.065	Hungary	0.155	Slovenia	1.285	Angola	0.101	Iraq	0.185
112	Barbados	1.026	FSM	0.064	ARE	0.155	Jordan	1.270	Honduras	0.101	Azerbaijan	0.184
113	Cuba	0.989	Ghana	0.064	Oman	0.154	Mexico	1.270	Montenegro	0.101	Zambia	0.184
114	Germany	0.968	Zimbabwe	0.063	Pakistan	0.146	Panama	1.261	Paraguay	0.101	Bulgaria	0.182
115	New Zealand	0.958	Haiti	0.060	Lebanon	0.145	Greece	1.255	Haiti	0.100	Togo	0.177
116	Malta	0.915	Rwanda	0.059	SLB	0.137	Slovakia	1.229	Guyana	0.097	Swaziland	0.175
117	United Kingdom	0.903	Vietnam	0.056	Belize	0.131	Mongolia	1.223	VCT	0.095	KNA	0.175
118	Algeria	0.889	Yemen, Rep.	0.056	Panama	0.123	MKD	1.217	Ethiopia	0.091	Jordan	0.173
119	Panama	0.883	Kenya	0.055	VEN	0.115	Pakistan	1.191	Nepal	0.089	GNB	0.169
120	TWN	0.872	PNG	0.055	Seychelles	0.113	Indonesia	1.183	Gabon	0.089	Sudan	0.165
121	Lebanon	0.869	Tonga	0.055	Algeria	0.112	Tunisia	1.142	Nauru	0.086	VCT	0.165
122	Seychelles	0.831	Angola	0.055	Bhutan	0.111	Maldives	1.119	Uganda	0.081	Cabo Verde	0.164
123	Egypt, Arab Rep.	0.831	Gambia, The	0.054	Poland	0.110	Mauritius	1.100	Cambodia	0.080	Burundi	0.162
124	BRN	0.811	Namibia	0.053	Bolivia	0.109	Egypt, Arab Rep.	1.054	Libya	0.077	GNQ	0.161
125	Jordan	0.787	Cabo Verde	0.053	Vietnam	0.104	Moldova	1.047	Tanzania	0.076	Russia	0.161
126	Canada	0.780	Belize	0.053	Egypt, Arab Rep.	0.098	Tajikistan	1.045	Fiji	0.075	Botswana	0.159
127	Belgium	0.717	Congo, Rep.	0.052	Zambia	0.083	Hungary	1.024	Rwanda	0.075	Comoros	0.158
128	Netherlands	0.676	Bolivia	0.049	Czech Republic	0.082	Georgia	1.018	Cameroon	0.074	Benin	0.156
129	Korea, Rep.	0.664	Togo	0.049	Nicaragua	0.079	Jamaica	1.016	Senegal	0.074	Nicaragua	0.153
130	Luxembourg	0.664	Guinea	0.049	Zimbabwe	0.078	Lao PDR	0.997	PNG	0.073	Jamaica	0.151
131	Suriname	0.644	Armenia	0.048	Jamaica	0.076	Turkey	0.988	Bolivia	0.073	Serbia	0.149
132	United States	0.639	Ethiopia	0.048	Sierra Leone	0.075	United States	0.973	Myanmar	0.073	Belize	0.147
133	Djibouti	0.633	Turkmenistan	0.047	China	0.074	Japan	0.964	Botswana	0.072	STP	0.146

	1992 (world = 1)						2022 (world = 1)					
	e_s		e_o		iei		e_s		e_o		iei	
	Country		Country		Country		Country		Country		Country	
134	South Africa	0.629	Burkina Faso	0.045	Jordan	0.073	Netherlands	0.963	Swaziland	0.071	Cambodia	0.143
135	Jamaica	0.611	KGZ	0.045	Yemen, Rep.	0.072	Armenia	0.957	Cabo Verde	0.070	MKD	0.139
136	VEN	0.598	Nepal	0.044	Bahrain	0.071	Nauru	0.956	Nicaragua	0.069	Montenegro	0.137
137	MKD	0.584	Tajikistan	0.044	Samoa	0.069	Azerbaijan	0.939	Dominica	0.067	Bolivia	0.137
138	Hungary	0.564	Nicaragua	0.042	Iran	0.067	Canada	0.938	Benin	0.065	Mali	0.135
139	Saudi Arabia	0.558	Lesotho	0.042	TTO	0.067	ATG	0.932	MHL	0.062	Namibia	0.133
140	Iran	0.480	Burundi	0.040	Russia	0.064	Poland	0.929	Guinea	0.062	Tunisia	0.133
141	Tajikistan	0.459	Benin	0.039	Mauritania	0.061	KGZ	0.926	Belize	0.060	ATG	0.132
142	Albania	0.439	Djibouti	0.039	Slovakia	0.060	Czech Republic	0.867	Lao PDR	0.059	South Africa	0.130
143	China	0.433	Madagascar	0.038	GNQ	0.055	Vietnam	0.861	Zambia	0.056	Myanmar	0.130
144	Poland	0.388	COD	0.038	GNB	0.054	India	0.850	Djibouti	0.055	Sierra Leone	0.128
145	KGZ	0.377	Sudan	0.038	MKD	0.050	Belgium	0.847	Sudan	0.054	Armenia	0.126
146	Georgia	0.367	Malawi	0.037	Qatar	0.045	Iraq	0.847	Timor-Leste	0.054	Georgia	0.121
147	Turkmenistan	0.364	Uganda	0.037	Romania	0.041	Bulgaria	0.821	Congo, Rep.	0.054	Vanuatu	0.119
148	Mongolia	0.341	Zambia	0.036	Myanmar	0.039	Seychelles	0.815	Zimbabwe	0.053	Oman	0.118
149	Singapore	0.329	Samoa	0.035	Belarus	0.033	Kosovo	0.814	Comoros	0.051	Dominica	0.116
150	Czech Republic	0.307	Vanuatu	0.035	Ukraine	0.033	Algeria	0.811	Malawi	0.051	Bahrain	0.115
151	ARE	0.302	Mauritania	0.035	Bulgaria	0.030	Serbia	0.807	Togo	0.050	Moldova	0.112
152	Slovakia	0.301	Tanzania	0.034	Guyana	0.028	Thailand	0.737	Burkina Faso	0.050	Ukraine	0.110
153	TTO	0.295	Niger	0.033	Georgia	0.027	Ukraine	0.714	KGZ	0.049	FSM	0.109
154	Romania	0.285	Tuvalu	0.032	Djibouti	0.025	BIH	0.690	FSM	0.049	Lesotho	0.107
155	Bulgaria	0.262	Albania	0.032	Tajikistan	0.020	Libya	0.671	Namibia	0.049	Seychelles	0.106
156	Russia	0.257	Mali	0.029	Uzbekistan	0.019	Malaysia	0.666	Samoa	0.048	Belarus	0.101
157	Armenia	0.243	SLB	0.029	Turkmenistan	0.017	Belarus	0.646	Mongolia	0.048	Mauritania	0.101
158	Belarus	0.242	Kiribati	0.028	KGZ	0.017	South Africa	0.600	COD	0.048	BRN	0.100
159	Uzbekistan	0.237	Mozambique	0.028	Suriname	0.016	China	0.579	Tajikistan	0.047	Algeria	0.099
160	Bahrain	0.186	CAF	0.027	Albania	0.014	TWN	0.578	STP	0.046	Zimbabwe	0.091

	1992 (world = 1)						2022 (world = 1)					
	e_s		e_o		iei		e_s		e_o		iei	
	Country		Country		Country		Country		Country		Country	
161	Ukraine	0.166	Lao PDR	0.027	Kazakhstan	0.014	Kazakhstan	0.578	Tuvalu	0.045	Kosovo	0.091
162	Qatar	0.157	Suriname	0.025	Armenia	0.012	Saudi Arabia	0.552	Suriname	0.042	Kazakhstan	0.090
163	Kazakhstan	0.156	Sierra Leone	0.025	Mongolia	0.008	Malta	0.541	Gambia, The	0.041	BIH	0.090
164	Iraq	0.058	Chad	0.024	Iraq	0.001	Oman	0.526	Mali	0.036	Samoa	0.090
165	Azerbaijan	0.029	Mongolia	0.023	Azerbaijan	0.000	Korea, Rep.	0.519	Vanuatu	0.036	Nauru	0.083
166	Eritrea	N/A	Bhutan	0.022	Afghanistan	N/A	Russia	0.516	Lesotho	0.036	Mozambique	0.074
167	Andorra	N/A	Eritrea	0.021	Andorra	N/A	Uzbekistan	0.513	Mauritania	0.036	TTO	0.063
168	Liechtenstein	N/A	GNB	0.020	BIH	N/A	Kuwait	0.426	Mozambique	0.035	Mongolia	0.059
169	Monaco	N/A	Myanmar	0.020	Cambodia	N/A	ARE	0.416	SLB	0.035	Lao PDR	0.058
170	FSM	N/A	Guyana	0.020	Croatia	N/A	BRN	0.392	Madagascar	0.035	Suriname	0.058
171	MHL	N/A	GNQ	0.017	Eritrea	N/A	Qatar	0.338	Liberia	0.031	Uzbekistan	0.055
172	Kiribati	N/A	Azerbaijan	0.016	Estonia	N/A	Iran	0.278	Kiribati	0.030	Libya	0.052
173	Tuvalu	N/A	Iraq	0.011	Kiribati	N/A	Singapore	0.269	Sierra Leone	0.030	Iran	0.051
174	Afghanistan	N/A	Afghanistan	N/A	PRK	N/A	TTO	0.229	Chad	0.029	Tajikistan	0.049
175	BIH	N/A	BIH	N/A	Kosovo	N/A	Bahrain	0.203	Burundi	0.029	KGZ	0.046
176	Cambodia	N/A	Estonia	N/A	Kuwait	N/A	Kiribati	0.030	Niger	0.029	Kiribati	0.001
177	Croatia	N/A	Croatia	N/A	Latvia	N/A	Andorra	N/A	GNB	0.028	Afghanistan	N/A
178	Estonia	N/A	Cambodia	N/A	Liberia	N/A	MHL	N/A	Somalia	0.026	Andorra	N/A
179	PRK	N/A	Kuwait	N/A	Liechtenstein	N/A	Tuvalu	N/A	CAF	0.015	Bhutan	N/A
180	Kosovo	N/A	Liberia	N/A	Lithuania	N/A	Afghanistan	N/A	Afghanistan	N/A	Cuba	N/A
181	Kuwait	N/A	Lithuania	N/A	MHL	N/A	Bhutan	N/A	Palau	N/A	Eritrea	N/A
182	Latvia	N/A	Latvia	N/A	FSM	N/A	Cuba	N/A	PRK	N/A	PRK	N/A
183	Liberia	N/A	Moldova	N/A	Moldova	N/A	Eritrea	N/A	San Marino	N/A	Lebanon	N/A
184	Lithuania	N/A	Montenegro	N/A	Monaco	N/A	Lebanon	N/A	South Sudan	N/A	Liechtenstein	N/A
185	Moldova	N/A	Nauru	N/A	Montenegro	N/A	Liechtenstein	N/A	Monaco	N/A	MHL	N/A
186	Montenegro	N/A	Palau	N/A	Nauru	N/A	Monaco	N/A	Liechtenstein	N/A	Monaco	N/A
187	Nauru	N/A	PRK	N/A	Palau	N/A	Palau	N/A	SYR	N/A	Palau	N/A

	1992 (world = 1)						2022 (world = 1)					
	e_s		e_o		iei		e_s		e_o		iei	
	Country		**Country**		**Country**		**Country**		**Country**		**Country**	
188	Palau	N/A	San Marino	N/A	San Marino	N/A	PRK	N/A	VEN	N/A	San Marino	N/A
189	San Marino	N/A	Somalia	N/A	STP	N/A	San Marino	N/A	Cuba	N/A	South Sudan	N/A
190	STP	N/A	Serbia	N/A	Serbia	N/A	South Sudan	N/A	Lebanon	N/A	SYR	N/A
191	Serbia	N/A	South Sudan	N/A	Slovenia	N/A	SYR	N/A	Yemen, Rep.	N/A	Tonga	N/A
192	Slovenia	N/A	STP	N/A	Somalia	N/A	Turkmenistan	N/A	Tonga	N/A	Turkmenistan	N/A
193	Somalia	N/A	Slovenia	N/A	South Sudan	N/A	Tonga	N/A	Turkmenistan	N/A	Tuvalu	N/A
194	South Sudan	N/A	Timor-Leste	N/A	Timor-Leste	N/A	VEN	N/A	Bhutan	N/A	VEN	N/A
195	Timor-Leste	N/A	Kosovo	N/A	Tuvalu	N/A	Yemen, Rep.	N/A	Eritrea	N/A	Yemen, Rep.	N/A

4.3. Selected countries by level of civilization

We base the typology of levels of civilization on three criteria, which are two sub-measures – the efficiency of transformation of physical power into sociological power (sociological efficiency of physical power); the index of organization of society in time and space; and one synthetic index, the integrated efficiency index. In doing so, we assume only two states of these measures: high (H) and low (L). This produces a total of 8 combinations, but only four of them are viable: H-H-H; L-H-H; L-L-L; and H-L-L. More classification possibilities would be provided by adopting three states (e.g., high, medium, low), but the problem of the boundaries of the "medium" level arises, so at this stage we stop with the bipartite approach.

The H-H-H civilization comprises highly developed countries with a high efficiency of transformation of physical power into sociological power and a harmonized economy-demography-space structure. This is a very high level of civilization. L-H-H civilization includes highly developed countries, but due to the structure of the economy and other factors, they have a relatively low level of transformation efficiency, with a high level of social organization, resulting in a high end result. This is a high level of civilization. L-L-L civilization includes developing countries that have low transformation efficiency and a low level of social organization. This is a low level of civilization. H-L-L civilization includes low-developed countries (high transformation efficiency is due not to a high level of development, but to a low level of energy consumption). They represent a very low level of civilization. Levels of civilization with corresponding examples of countries are shown in Table 27.

Table 24 Levels of civilization with examples of countries

Levels Civilization	Efficiency Coefficients			EXAMPLES
	Partial		Integrated	
	e_r	e_o	iei	
I (Very High)	H	H	H	Switzerland, Ireland, UK, Japan, Germany, Denmark, Israel, USA, Italy.
II (High)	L	H	H	Spain, Austria, Norway, Belgium, Taiwan, Sweden, South Korea
III (Low)	L	L	L	Pakistan, Tunisia, Bolivia, Namibia, Armenia, Azerbaijan, Georgia, Belarus
IV (Very low)	H	L	L	Niger, Libya, Turkmenistan, Kyrgyzstan, Tajikistan, Iran, Mongolia, Sudan

It is also important to remember that efficiency indicators do not depend solely on the level of socioeconomic development. Several additional factors remain. Among them, the size of the country occupies a special place, and this is both positive and negative. The smaller the country, the greater the randomness of efficiency indicators, due to geographical location, climate, terrain, resource endowment, economic specialization, etc. Population density is also important. Countries that are large in area but sparsely populated (Canada, Australia, Russia, Saudi Arabia) will achieve slightly lower rates of organization, as this is a measure of control over time and space. Add to this the fact that some countries' high efficiency rates are rooted not so much in good organization as in having expensive raw materials. It follows that, for the purposes of detailed analysis, virtually every country should be analyzed separately. Recall also that the classification of countries was based on the extreme values of efficiency indicators (High - Low). The middle layer was omitted.

SUMMARY OF PART IV

People act. When acting, they process two types of energy – physical energy and sociological energy. Energy is processed over time, so we can operate with the concept of power. The purpose of Part IV was to present the results of measuring the civilizational power of countries in 2001 and 2022, and to classify countries according to levels of civilization. We adopted a very simple definition, according to which civilization power is the sum of physical power and sociological power (PHP + SOP). It is the power of human action. Physical power is the amount of physical energy consumed in a country in a unit of time (in our work,in a year). Sociological power is the amount of sociological energy processed in a unit of time (in our work, in a year). Sociological energy is a quantity that characterizes the state of a social system as its ability to do work. We calculated sociological power on the basis of a special formula. Based on the above results, it was possible to show the changes in the structure of the sociological power of the studied countries. From a cybernetic point of view, physical power flows are information flows, while sociological power flows are energy flows (executive).

Taking civilizational power as a criterion, we can distinguish three groups of countries. The first includes states that have a similar position according to physical power and sociological power, that is, that have a structure similar to the world average. The second group of states are those that stand clearly lower in terms of sociological power than physical power. The third group is the states that stand clearly higher in terms of sociological power, that is, that have a high efficiency of converting physical power into sociological power.

As a result, we present two main lists of countries: (1) by main measures, i.e., civilizational power and its components and (2) by efficiency measures. The main measures include physical power, sociological power and their sum which is civilizational power, the power of human action. Physical power plays the role of inputs, while sociological power plays the role of effects. For us, we were most interested in effects and efficiency, that is, the ratio of effects to inputs.

To assess the levels of civilization, we used three measures of efficiency: the efficiency of the transformation of physical energy into sociological energy and a measure of the organization of society (social efficiency), derived from sociological power. The second indicator is more complex in nature. It can be interpreted as an indicator of the organization of society in time and space. We assumed two states for the performance measures – high (H) and low (L). This yielded four levels of civilization, conventionally named: I (very high); II (high); III (low); (IV) very low.

The H-H-H civilization includes highly developed countries with a high efficiency of transformation of physical power into sociological power and a harmonized economic-demographic-spatial structure. This is the highest level of civilization. L-H-H civilization includes countries that are highly developed, but due to the structure of the economy and other factors have a relatively low level of transformation efficiency, with a high level of social organization, resulting in a high end result. This is a high level of civilization. L-L-L civilization includes developing countries with low transformation efficiency rates and low levels of social organization. This is a low level of civilization. H-L-L civilization includes low-developed countries (high transformation efficiency is due not to a high level of development, but to a low level of energy consumption). This is an example of a very low level of civilization.

CONCLUSION

In the work we have taken up issues that are challenging and debatable. We are primarily concerned with capturing the power of civilization. The situation in this area is a real jungle. The number of definitions of civilization and culture goes into the hundreds; we have adopted one simple operational definition. It should also be emphasized that the community engaged in quantifying the power of states is relatively few, even on a global scale. However, we note the growing popularity of power metric research, so there is an opportunity for broader research in this field, which could in turn draw a larger possible audience. Our report is aimed more at advanced readers.

A certain challenge in this type of research is the varying reliability of statistical data. Due to the nature of the work, we have kept comments related to this to a minimum. We present results for almost all countries of the world, so we treat our calculations rather as a starting point for further analytical work focusing on specific countries (regions, alliances, organizations) or specific issues.

A frequent objection to the model used in the report is the omission of so-called qualitative indicators, such as the political system, organizational efficiency, intellectual capital, innovation, morale of the military and population, quality of diplomacy, geographical location, social discipline, etc. Well, building a model that encompasses these and similar factors is virtually impossible. Even if it were possible, such a model would be quite non-transparent and, therefore, unreliable. Additionally, finding another factor that could be added to the model is always possible. After all, models are called models for this reason, because they contain only the most important, constitutive elements, making them transparent and carrying key information. Striving to include a great number of factors does not give any guarantee that the results will be better, but it will certainly make it more difficult to control them.

The literature strongly emphasizes that the power of states is relative. This is not the whole truth. If we compare two or three countries or more among themselves on the basis of absolute quantities, then we get the power of these countries relative to each other. Such power is undoubtedly relative in nature. At a time when there was no data regarding the world, there was no other way. The situation is different when we have data on the quantities needed in the model for the whole world. It is a fixed quantity, as it is always 1 (100%, etc.). The power of countries calculated on world shares is still relative (as it is relative to the world), but in connection with a fixed reference point, it thus acquires an absolute character. This is well illustrated by a simple example. Suppose that the power of two countries calculated on world shares is falling, but one of them is falling more slowly. Calculating their relative power (after assigning one of them to 100) will show that the power of the country falling more slowly – is rising! This can be misleading, which is why world data should be used whenever possible, even when you are only interested in the relative power of a particular group of countries.

The report presented here can be helpful in both the theoretical and practical layers. The theoretical layer is primarily concerned with modern praxeology, which distinguishes three subsystems in the system of human action – cooperation, struggle and competition – guided by a different logic of action, a different understanding of inputs and outputs and a different calculus of efficiency. This approach greatly improves the transparency of the decision-making situations of the three main actors: politicians, the military and entrepreneurs. The introduction of a new category – civilizational power – makes it possible to expand research and creates new prospects for the development of powerometrics. In the practical layer, it is primarily a matter of presenting a broad, quantitative account of the structure of the international system in terms of power relations (powers). Fitting into the current of strategic studies, it can help in the design and implementation of national security strategy, including economic and military strategy.

Quantified results allow for multi-variant forecasting, but this issue is omitted from the report. Such forecasts can be developed in two ways. The first possibility is to use existing forecasts in our model, referring to the components of the model. This is what we have done in previous reports, in which we made a multi-variant forecast of economic power, that is, we used existing forecasts from prestigious institutions regarding GDP and population. Projections of military and geopolitical power are also possible, but for understandable reasons they are much less reliable.

Secondly, the report's findings could also be helpful in estimating geopolitical risks. To this end, expanding the analysis of power relations to include an analysis of the interests and nature of the international environment would be useful (including in terms of concentration, polarity, levels of escalation, etc.) as well as including an analysis of the nature of the international environment.

TERMINOLOGY

TYPES OF POWER	Abbreviation
Civilizational power	CIP
Physical power	PHP
Sociological power	SOP
Economic power	ECP
Civil power	CIV
Military power	MIP
Geopolitical power	GEP
Measures of efficiency	
Effectiveness of transformation of physical power into sociological power	e_s
Society organization indicator	e_o
Integrated efficiency indicator	iei
Derived measures - indicators of militarization	
Economic militarization index	m_e
Demographic militarization index	m_d
GDP militarization index	m_{GDP}

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