

BRICS Journal of Economics

International Editorial Board

Editor-in-Chief

Prof. **Marina Sheresheva**, Lomonosov Moscow State University — LMSU (Russia)
https://www.researchgate.net/profile/Marina_Sheresheva2

Deputy Editor-in-Chief

Vladimir Faminsky, Lomonosov Moscow State University — LMSU (Russia)

International Editorial Board

Prof. **Ilan Alon**, University of Agder (Norway)
https://www.researchgate.net/profile/Ilan_Alon

Prof. **Alexander Auzan**, Lomonosov Moscow State University — LMSU (Russia)

Prof. **Svetlana Avdasheva**, National Research University —
Higher School of Economics (Russia)
https://www.researchgate.net/profile/Svetlana_Avdasheva2

Prof. **Paulo Furquim de Azevedo**, Insper Institute for Education and Research (Brasil)
https://www.researchgate.net/profile/Paulo_Azevedo

Prof. **Sergey Bobylev**, Lomonosov Moscow State University — LMSU (Russia)
https://www.researchgate.net/profile/Sergey_Bobylev

Prof. **Aleh Cherp**, Central European University (Hungary), Lund University (Sweden)
https://www.researchgate.net/profile/Aleh_Cherp

Prof. **Leonid Grigoryev**, National Research University —
Higher School of Economics (Russia)
https://www.researchgate.net/profile/Leonid_Grigoryev2

- Prof. **Irina Kalabikhina**, Lomonosov Moscow State University — LMSU (Russia)
https://www.researchgate.net/profile/Irina_Kalabikhina
- Ass. Prof. **Philipp Kartaev**, Lomonosov Moscow State University — LMSU (Russia)
https://www.researchgate.net/profile/Philipp_Kartaev
- Prof. **Yannis Katsoulakos**, Athens University of Economics and Business (Greece)
https://www.researchgate.net/profile/Yannis_Katsoulacos
- Ass. Prof. **Alexander Kurdin**, Lomonosov Moscow State University — LMSU (Russia)
https://www.researchgate.net/profile/Alexander_Kurdin
- Prof. **Andrey Panibratov**, St. Petersburg State University (Russia)
https://www.researchgate.net/profile/Andrei_Panibratov
- Prof. **Andrey Shastitko**, Lomonosov Moscow State University — LMSU; RANEPa (Russia)
https://www.researchgate.net/profile/Andrey_Shastitko
- Prof. **Jagdish Sheth**, Emory University (USA)
https://www.researchgate.net/profile/Jagdish_Sheth
- Prof. **Galina Shirokova**, St. Petersburg State University (Russia)
https://www.researchgate.net/profile/Galina_Shirokova
- Ass. Prof. **Alina Steblyanskaya**, Harbin Engineering University (China)
https://www.researchgate.net/profile/Alina_Steblyanskaya
- Prof. **Thomas Thurner**, Higher School of Economics (Russia); Cape Peninsula University of Technology (Republic of South Africa)
https://www.researchgate.net/profile/Thomas_Thurner3
- Prof. **Manuela Tvaronaviciene**, Vilnius Gediminas Technical University (Lithuania)
https://www.researchgate.net/profile/Manuela_Tvaronaviciene
- Prof. **Shlomo Weber**, New Economic School (Russia); Southern Methodist University (USA)
https://www.researchgate.net/profile/Shlomo_Weber
- Prof. **Wang Zhen**, China University of Petroleum — Beijing (China)
<https://www.scopus.com/authid/detail.uri?authorId=15823063000>

Contents

Sergey Bobylev, Leonid Grigoryev

- In search of the contours of the post-COVID
Sustainable Development Goals: The case of BRICS4

Viktor Tatuzov

- Contemporary global economic crisis:
Some conclusions for Russia and BRICS
(taking into account Kondratieff long waves)25

Jacques Richard

- Towards a new ecological and human type of national accounting
for developing economies (the CARE/TDL model) (*the ending*)41

Sergey Nikonorov, Konstantin Papenov, Denis Sergeyev

- Chinese experience in implementing renewable energy sources
as a possible scenario for the Krasnoyarsk Territory59

Olga Chudinovskikh, Oxana Kharaeva

- Migration policy towards skilled labor in the Russian Federation80

In search of the contours of the post-COVID Sustainable Development Goals: The case of BRICS¹

Sergey Bobylev*,

Faculty of Economics, Lomonosov Moscow State University

Leonid Grigoryev,

Faculty of World Economy and International Affairs,

National Research University — Higher School of Economics

Reference to this paper should be made as follows: **Bobylev S., & Grigoryev L.** (2020).

In search of the contours of the post-COVID Sustainable Development Goals: The case of BRICS.

BRICS Journal of Economics, 2(1), 4–24. <https://doi.org/10.38050/2712-7508-2020-7>

Abstract

The global COVID-19 pandemic and an unexpected recession of a dangerous magnitude have provided strong reasons to look at the Sustainable Development Goals (SDGs) from three points of view: the SDGs as a victim of the recession 2020; the SDGs as an opportunity for better coordination on the way out of recession; and the SDGs as an object of modernization for better adaptation to the realities on “the global ground”. The BRICS countries are, naturally, the primary group of interest for developing and implementing the SDGs on the global scale as a way of catching up. “Pandemic protocol” and additional indicators are proposed as an urgent update to several SDGs.

Keywords: BRICS, health care, inequality, low carbon, pandemic, recession, SDG.

JEL: JEL: F01, F44, F63, F64, O15.

1. Introduction: Dramatic changes in the global framework

The international community is now in the “acute” stage of reconsidering its problems and risks, capabilities and coordination in the face of COVID-19 and the Global Recession of 2020. In this context, we are witnessing broad discussions of the world’s post pandemic future. The main focus is on several areas. The most important task is to

¹ The publication was prepared with the financial support of the Russian Foundation of Basic Research, project No 20-010-00981.

* E-mails of the corresponding authors: snbobylev@yandex.ru, lgrigor1@yandex.ru

restore efficient coordination between major global powers, international organizations, and NGOs in order to overcome the pandemic and provide assistance to all suffering people in developed, and especially in developing countries. An essential point in this respect is cooperation of health care authorities that should produce, test, and recognize all relevant medicines (vaccines, etc.) and then use them around the globe to eliminate hidden sources of infection.

We should also underline the outstanding task of restoring economic activity within countries and the much more difficult task of restoring international travel, human contacts, and intellectual and art activities: connections between universities and scientific schools, concert halls and museums, stadiums, sport clubs and federations. A dramatic crisis was caused by restrictions in the health sector, which the IMF called the Great Lockdown. The breakdown of international economic activity in the fields of recreation, transportation, and services has put at risk hundreds of millions of people (Grigoryev et al., 2020). The objective of overcoming the pandemic will need a lot of trust and cooperation between countries and health authorities, and a certain degree of success in combatting COVID-19. And the earlier the global opening of the lockdown takes place, the faster the global economy will recover from the recession. As of August 2020, the pandemic has moved wider around the continents. There are reports by the WHO that predict a possible second coronavirus wave in the fall of 2020 or winter of 2021. Meanwhile, the recession prognosis dropped to minus 4.9% of GDP and minus 11.9% of global trade in 2020 with prospects of recovery surpassing the 2019 level only in 2022 (IMF, 2020).

Another key aspect of reducing global losses is financial stability — restoring the ability of affected industries, banks, and SME to revive their activities. Trillions of dollars have already been invested by leading countries and IFO. It is not an easy task, and mostly not a set of isolated decisions. A large-scale recreation industry (for example, the Mediterranean tourist world) cannot reopen with normal revenues without simultaneously opening airports, transport connections, suppliers, health care, etc. Medical and economic crises of March–June 2020 dealt a heavy blow to globalization. But without the latter, the world economy will not overcome the current low-level equilibrium. Here's how UN Secretary-General Antonio Gutierrez defined the position of the organization on April 27:

“While this crisis is imperiling progress towards the Sustainable Development Goals, it also makes their achievement all the more urgent and necessary. Moving forward, it is essential that recent gains are protected as much as possible and a truly transformative recovery from COVID-19 is pursued, one that reduces risk to future crises and bring much closer the inclusive and sustainable development required to meet the goals of the 2030 Agenda and the Paris Agreement on Climate Change” (UN. Economic and Social Council, 2020b).

We support the SDGs of the UN in general, but we also believe that some goals and indicators of the Agenda 2030 are timely subjects for discussion. As mentioned above, we see “achievements” in the progress of the SDGs as very modest along many lines of the big picture. From our point of view, the SDGs as a process of achieving Agenda 2030, a set of goals and a system of indicators need certain attention to keep them effective (“self-sustainable”) in the long run. By July 2020, we have already learnt new basic limitations

on the perspectives of global prosperity. The pandemic is slowly exhausting itself in Russia, and some European Union countries have suppressed the outbreak. China still seems to be struggling with the recurring danger of a mutating virus in Beijing. BRICS countries in Asia (India), Latin America (Brazil), and Africa (South Africa) are currently experiencing an increase in the number of infected citizens. There is no clarity about the outcome of the pandemic in the fall of 2020 and the restoration of normal life and economic activity. Essentially, we are observing discrepancies in precautionary measures in European countries coming out of the quarantine; meanwhile the USA, Brazil, and some Asian countries are demonstrating a sad perspective of a prolonged anti-virus battle.

The IMF forecast of June 2020 has concluded that the global recession—2020 was the deepest decline of peacetime economic activity since the Great Depression of the early 1930s (Table 1). This year we expect a 4.9% decline in global GDP, world trade is shrinking by 11.9%, and a recovery above the 2019 level is not expected until 2021. Two years of growth may be considered lost for global development (IMF, 2020). The under-developed countries will suffer the most. However, the poor in the middle-income or advanced economies are also at risk of a prolonged decrease in consumption and a possible step back in social conditions.

The global double crisis of 2020 has made clear that in order to survive the mankind needed coordination, governance and development. The first understanding of this simple idea came from the Club of Rome half a century ago. Recently it affected the climate policy that requires coordination of the energy sector. The SDGs are a manifestation of a long-term survival attempt based on some progressive views, the available scientific background and the actual consensus on Global Governance in 2015. The latter no longer works as it is itself a source of problems. We would also like to point out that without more development, institution-building, equality among countries and social equality within countries, the international community may not be able to reach the objectives of the Agenda 2030 or a longer-term and crucial set of goals. The BRICS countries are important as driving forces, and even more so as beneficiaries of the global progress. It is important to have their vision and interests incorporated in the SDG process.

In this situation, the role of the SDGs could potentially become even more important as a general frame program for global long-term prosperity. There is no other comprehensive program for the mankind to survive and avoid the fate of the ancient tribes of Easter Island. And we should work within the SDGs framework to restore global cooperation for prosperity. We feel it is time to appeal to political elites to reestablish Global Governance (Grigoryev & Pavljushina, 2020). The reignition of the global economy without cooperation in suppressing the pandemic and reviving travel and trade will be difficult, long and the costs will be huge. Now at stake is how long the recession and recovery will last, which will lead to even greater delays in achieving all the SDGs.

We believe that economic growth is not bringing more equality by itself (Grigoryev & Pavljushina, 2019). In this respect we support the intention of the UNDP Report of 2019: “Key message 5: We can redress inequalities if we act now, before imbalances in economic power are politically entrenched” (UNDP, 2019, p. 14). However, we do not believe that the imbalances are not yet politically entrenched. Anyway, the economic development after the pandemic and recession should also be more socially equal than before.

As far as the summer of 2020 is concerned, we are to recognize several realities. We should address the set of problems which has been known for a long time. The first problem is the relatively weak enforcement capacity of the SDGs. In many important cases (goals), results (targets or indicators) cannot be achieved without long-term intensive cooperation, joint financing, and clear prioritizing. So far, the history of COVID-19 shows very limited cooperation with a lot of rivalries, negative consequences of domestic political agendas, or various development agendas. Voluntary targets for each country are natural solutions from a political point of view, while in many fields much depends on a few key countries (in scale or capacity), which makes their responsibility considerably higher. The BRICS countries have three billion people, different pathways of the COVID-19 pandemic, an immense responsibility for their citizens, and a global ability to overcome COVID-19 and the recession (Table 1).

Table 1. The BRICS countries: GDP growth and COVID intensity

	GDP growth rates (%)		COVID cases, as of July 25 th , 2020	
	2019	2020 (forecast)	(thousand)	(per 100 th.)
Brazil	1.1	−9.1	2396	1127
Russia	1.3	−6.6	813	557
India	4.2	−4.5	1394	101
China	6.1	1.0	86	5.8
South Africa	0.2	−8.0	434	713
:				
USA	2.3	−8.0	4315	1303
UK	1.4	−10.2	314	440
France	1.5	−12.5	180	276
Germany	0.6	−7.8	206	247
Italy	0.3	−12.8	245	406
Spain	2.0	−12.8	320	683
World	2.9	−4.9	16 245	215

Source: World Economic Outlook Update (IMF, 2020). <https://coronavirus-monitor.ru>

The second problem of the SDGs is a wide diversity between countries in terms of development levels that implies a specific set of tools for steps forward from their different achieved stages. During the 2015–2019 upturn, there were slow changes (with some setbacks). Now, in the dramatic time of recession, the international community should come to an understanding how the achieved level of the socio-economic system affects the reduction of economic activity, adaptation to infection and changes, ways of recovery and further development in the new environment.

And we see the third problem which sooner or later must come to light and be addressed in the context of the SDGs — compatibility of achieving various goals. The problem can be transformed into a question: How different development goals can be addressed simultaneously in the presence of imperfect institutions and budgetary constraints?

2. Development after signing the Paris Agreement: Diversity between the BRICS countries

It's time to look back at 2016–2019 — a short period of the implementation of the SDGs. Was there really a success story before COVID-19? Apparently, the world has descended into even more instability in 2020 for two dramatic reasons: the pandemic and oil prices shock. Countries' chances of reaching their national voluntary targets continue to diminish. Achieving the SDGs as a program by 2030 seems more and more problematic.

The BRICS countries take an active part in supporting the implementation of the concept of sustainable development as a consensual paradigm of human development in the 21st century (Bobylev, 2017). It is illustrated by the fact that the largest UN summits on sustainable development took place in the megacities of the BRICS countries: Rio de Janeiro (United Nations Conference on Environment & Development, 1992 and 2012) and Johannesburg (2002). The list of the UN concept documents on sustainable development that determine the future of humanity in the 21st century and have been adopted by all countries includes the following documents:

- “The Future We Want” (Rio de Janeiro, 2012), which defines the prospects of humanity in the 21st century based on the concept of sustainable development (UN. General Assembly, 2012);
- “Transforming Our World” (New York, 2015), which defines the Sustainable Development Goals for 2016–2030 (UN. General Assembly, 2015);
- The Paris Agreement on climate change (2015) that sets the priorities of the international community in the field of stabilizing the climate system and reducing losses caused by climate change (UN, 2015).

The world recession and COVID-19 place a new emphasis on the concept of sustainable development. The current situation requires a certain reconsideration of the SDG system, its goals and indicators, as well as a particular transformation of the system as a whole. By the end of 2019, the collapse of Global Governance, increased sanctions and escalation of trade conflicts almost squeezed the joint activities of people all around the world. Levels of capital accumulation, as well as of fixed investment, were lower than before the Great Recession of 2008–2009 (Grigoryev & Makarova, 2019). While the European Union was focused on climate and greenhouse gas problems, the issue of energy poverty in developing countries was underestimated.

In the context of the crisis, the 2030 Agenda (2015) has become not quite adequate to the current situation in the world, especially with regard to healthy lives (SDG 3), hunger (SDG 2), inequality (SDG 10), energy (SDG 7) and climate change prevention (SDG 13), institutions and global governance (SDGs 16 and 17). Due to the limited scope of the article, we analyze only a few approaches to the transformation of the SDGs: correction of the SDGs related to long-term trends of switching to low-carbon development (due to climate change), which would ensure a prompt resolution of the health problem; and an adequate account of human life value in the context of the new COVID-19 reality. In addition to the correction of the SDGs, we suggest changing the methodology of including specific indicators in the SDG system: introducing new indicators that

are important for ensuring sustainability and are currently missing, and also incorporating “connecting indicators” for already existing SDGs.

The new reality reveals that without changing the overall course of sustainable development, the mankind may face disastrous consequences, so it is high time to correct the goals of such a course and the corresponding system of indicators. It is particularly important to take into consideration the specifics of the development, adaptation and implementation of the SDGs in the BRICS countries. There are three main areas of implementation and adjustment of the SDGs in the BRICS countries that can be highlighted according to the 2030 Agenda and that were proposed by the European Commission for the high-level political forum on sustainable development (UN, 2017):

- Adaptation of the Sustainable Development Goals to national and local conditions;
- Sub-regional cooperation to achieve the SDGs;
- Data collecting and control/supervising.

Traditionally, the SDGs are considered to be a balanced system/structure of social, economic and ecological goals, objectives, and indicators. The creation of the SDGs themselves was primarily due to the evident unsustainability of global development. Despite apparent success in solving some of the global and national problems in the 2000s, most of them have persisted and even escalated. By 2019, the poverty rate remained high. The gap between the rich and the poor is becoming wider in numerous countries; ecological problems are aggravating, particularly the ones related to climate, access to clean water and other issues (Grigoryev & Pavljushina, 2018, 2019).

Nowadays, the SDGs are taught in schools in many countries all over the world. Many conferences are devoted to their discussion, and the vast majority of governments and parliaments make notable efforts to adapt these goals to their countries’ national characteristics. In our opinion, some countries (including BRICS) often do not thoroughly develop the SDGs and treat them superficially. The goals and their socio-economic components are seen as some parts of a puzzle that can be put together in a rather arbitrary way without taking into account their complementarity or interdependency. Specifically, the way social, economic and environmental SDGs are combined appears to be somewhat uncoordinated. However, emerging realities require that the pieces of the puzzle are put together in better order. In line with the commitments made by countries under the 2030 Agenda for Sustainable Development adopted in 2015, all of these states should develop their strategies of implementing common commitments and highlight the main vectors for achieving the most important “connecting” indicators. All countries are expected to account for their work by 2020, showing the progress made since 2015 and the speed with which they are moving towards their goals that are to be achieved in 2030. The BRICS countries have submitted voluntary national reviews of the implementation of the 2030 Agenda for sustainable development. The reviews were completely different; the countries elaborated sustainable development problems to different degrees. The objective differences between the countries determined the focus of their national goals.

Some countries presented two reviews: first, an introductory one, then a quite fundamental one. Countries like India (2017 and 2020), China (2016 and 2021), Brazil

(2017) and South Africa (2019) presented their own documents. Russia submitted an extensive voluntary national review in June 2020 (UN, 2020), and on July 21, 2020, the President of the Russian Federation signed a Decree on the national development goals of Russia for the period up to 2030². It should be noted that the comprehensiveness of the goals, the intensity of their realization, as well as the progress in achieving them, have significantly varied in the past years.

From the scientific point of view, the SDGs are the legacy of the Millennium Development Goals (MDGs) adopted in 2000 — and that fact is often overlooked (UN. General Assembly, 2000). The MDGs covered the period 2000–2015, and the SDGs, which are due to be implemented from 2016 to 2030, have just pursued the concept of the MDGs in an extended version. The methodical basis of the MDGs was reproduced in the SDGs in a broader version: a three-level configuration “goals — targets — indicators”; several indicators may relate to a particular objective; most of the indicators should be quantifiable; key indicators should be achieved before the exact deadlines — 2015 in the case of the MDGs, and 2030 in the case of the SDGs. Methodically, the MDGs and the SDGs are rather similar; however, the SDG ideology is way more extensive. The MDGs were mostly focused on social issues: six out of the eight MDGs were social, and they are now virtually represented in the SDGs as well, though in a slightly different interpretation. In addition, the MDGs contained one environmental goal (“Ensuring environmental sustainability”) that was converted into several goals in the framework of the SDGs; and there was another MDG of an institutional nature (“Global partnership for development”) that in the SDG system was transformed into two goals (“Sustainable communities”, and “Global partnership for the goals”). The number of the SDGs increased (compared to the MDGs) due to a broader range of economic goals. Consequently, the scope of the 2030 Agenda for 2016–2030 became considerably broader: the SDG framework has twice as many goals as the MDG one, the number of its targets is ten times more than the number of the MDG targets (UNDP, 2010; Analytical Center., 2016)³.

In contrast to the MDGs that were mainly focused on developing countries, the SDGs are designed for all countries with individual variations and national peculiarities (UN. General Assembly, 2015). That is why the SDGs represent an important step towards creating a future in an interdependent world. Nowadays, the BRICS countries (as well as the vast majority of the countries all over the world) lack a complete set of statistical indicators for the SDG framework. Moreover, disaggregation by income level, gender, age, race or ethnicity, migration status, physical abilities or geographical location, or any

² <http://kremlin.ru/events/president/news/63728>

³ The subject of adapting the MDGs to national and local characteristics of Russia was analyzed in detail in the National Human Development Report for the Russian Federation presented by the UN Development Programme in 2005, 2007, and 2010, which was compiled with the participation of one of the authors — S. Bobylev (UNDP, 2010). The SDGs adaptation to Russian conditions and peculiarities was first presented in “The National Human Development Report for the Russian Federation. The UN Sustainable Development Goals in Russia” edited by S. Bobylev and L. Grigoryev and published in 2016 by Analytical Center for the Government of the Russian Federation (Analytical Center., 2016).

other characteristic proposed by the UN in accordance with the key principles of official statistics poses a number of practical challenges.

3. Different stages of development: Problems and advantages for the BRICS countries

Let us focus now on the differences and immediate objectives of the development of the BRICS countries. We usually discuss what is similar in our approach to world affairs in international politics, especially the international financial architecture, trade and investments, et cetera. The BRICS countries represent a huge variety of countries that are “catching-up” with more developed economies. In an era of rapid technological changes, we need to adjust our development strategies to new realities. If they are successful, developing and middle-income countries will have a feasible strategy for achieving success in development. There is an extensive literature on the differences between the BRICS countries and their common interests in “catching-up” and establishing somewhat more adequate Global Governance (Grigoryev & Morozkina, 2012; 2013).

In this article we do not have space to discuss different stages of the long-term development of the BRICS countries. The five countries, plus many countries of the same levels of income and development, are at different stages of industrial development on their way to post-industrial societies. Looking forward, we recognize common interests in the global affairs and a wide range of possible fields for cooperation. To some extent, we have had opportunities to stress “similarity in inequality” in the BRICS issues. Our countries have inherited urban — rural disparities, social inequality, educational and other substantial environmental issues from the past (Table 2).

Table 2. Key indicators of the SDGs for BRICS countries, as indicated

	Life expectancy at birth, 2018	Inequality (share of income for 10th decyl, %, 2016	Human Development Index (rank), 2018	GDP (per capita, ppp, th. int. dollars), 2016	Ambient PM2.5 air pollution (mean annual exposure, micrograms per cubic meter), 2016	Carbon dioxide emissions (per capita, metric tons), 2014	Net CO2 emissions export (% of a country's emissions)	Adjusted Net Savings (% of GNI), 2018	SDG Index (rank)
Brazil	75.7	40.7	0.761 (79)	14.1	11	2.5	−2.9	5.3	53
Russia	72.4	29.8	0.824 (49)	25.0	17	12.5	21.6	8.4	57
India	69.4	32.2	0.647 (129)	6.2	74	1.6	6.1	18.5	117
China	76.7	29.8	0.758 (85)	14.3	58	7.6	14.1	19.9	48
South Africa	63.9	51.3	0.705 (113)	12.3	30	8.8	24.3	1.0	110

Source: (Makarov & Sokolova, 2017), (Sachs et al., 2020), (UN, 2019), (World Bank, 2019).

Economic growth is dependent on domestic institutions and external environment. The OECD countries passed through these stages half a century ago. There is no “simple” theory of transition from “middle income traps” to a stable democratic society with a GDP over 30 thousand dollars per capita. Using “the best available institutions” and policies, BRICS may seek the Sustainable Development Goals while “catching-up” with the growth progress. It would take better coordination of trade, investments, education and R&D efforts and policies. Human capital is growing (Table 3).

Table 3. Personal Education in the BRICS countries, 2016

	Individuals using the Internet (%)		Tertiary gross enrolment ratio (%)	
	2008	2016	2008	2016
Brazil	34	61	35.6	50.6
China	23	53	20.7	48.4
India	4	30	15.1	26.9
Russia	27	73	75.0	81.8
South Africa	8	54	-	19.8

Source: WDI, World Bank.

We do not intend to make clear-cut definitions of the stages of development for each BRICS country. But we can make brief remarks about the specifics of each country’s situation. In South Africa, demand for education is a key starting point for developing productivity and middle class, while it takes time and investments to grow out of a deeply divided industrial society with the highest recorded social disparity rates.

China’s system of mass production and export has lifted its huge population out of poverty in 40 years of central planning transforming into market-oriented decision making, competition, and a consumer society based on an industrial society per se. Inequality is an important feature of this society (Jain-Chandra et al., 2018), and the progress to the post-industrial society takes time and institutional changes.

The structure of the Indian economy is very specific and based on services and agriculture, with a large flow of finance from Indian migrant workers abroad. This would be an industrial stage (with a huge shortage of infrastructure and energy) in a not very strong service sector. The segment of trade, repair, hotels and restaurants remains the largest contributor to the services sector.

The Brazilian economy is still struggling to recover from the crises of 2009 and 2015. The previous success gave an important push to development, but it did not provide strong competition capabilities. High levels of inequality prevent the economy from developing into a more stable society, while democracy has survived a chain of recent socio-economic (and corruption) shocks.

The Russian economy is still struggling with the specific transition problems of the 1990s, probably, more than with the problems of the Soviet past. Materials and hi-tech, as well as strong human capital, are unique, while weak institutions leave these capabilities significantly underutilized.

The BRICS countries need a good global environment with predictable governance, improved domestic institutions, and a strong focus on inequality. The SDGs are different for all countries, but many problems and interests are common (Kurdin, Shastitko, 2020). The success of the BRICS countries in achieving the SDGs is a crucial precondition for global success, stability and progress.

4. The SDGs and low-carbon development

The world economy, as well as the economy of any nation, is facing growing environmental risks and threats, including those related to climate change. This fact was recognized by the world's leading scientists, political and business elite at the prestigious World Economic Forum (WEF) in Davos in January 2020. The annual WEF reports highlight five types of global risks: economic, environmental, geopolitical, social, and technological (WEF, 2020). The 2007 WEF report identified, three of the five high priority risks as economic (oil prices shock, China's hard landing, blow-up in asset prices), one as technological (infrastructure breakdown), and one as social (chronic diseases). All the risks in the 2020 report were related to environmental issues: extreme weather, climate action failure, natural disasters, biodiversity loss, human-induced environmental disasters (WEF, 2020).

The fight against climate change declared in the UN Paris Agreement 2015, and the intention of many countries, including China and Russia, to switch to low-carbon development and low-carbon economy are inadequately reflected in the SDGs. At present, SDG 13 "Take urgent action to combat climate change and its impacts" seems to be confusing due to the lack of essential indicators that would ensure a solution of the problem and monitoring of climate change. In general, one of the most important indicators — the indicator of greenhouse gas emissions — is used only twice: in SDG 13 — indicator 13.2.2 ("Total greenhouse gas emissions per year"), and in SDG 9 ("Infrastructure, industrialization and innovation") — indicator 9.4.1 ("CO₂ emission per unit of value added").

For the 13+ SDGs, we suggest new and additional "connecting key indicators"⁴:

- CO₂ emissions by economic sectors (million tons). For BRICS, this indicator is essential due to the rapid development of the energy sector;
- CO₂ emissions per capita (tons). For the BRICS countries with large population, this indicator plays an important role;
- Comparison of changes in CO₂ emissions for all the countries in both "production" and "consumption" sectors (%) (Makarov & Sokolova, 2017);

⁴ We suggest using the term "connecting key indicators" as an instrument to display the interconnection between different sustainable goals which are supposed to be changed in a certain conjunction.

- Forest consumption of greenhouse gases (million tons). The BRICS countries have one of the largest forest areas in the world accounting for 40% of the world's forests. Such areas have a significant influence on climate control. This connecting indicator may be used within the framework of SDG 15 ("Life on land");
- Consumption/emissions of greenhouse gases by the agricultural sector (million tons). The BRICS countries have large areas of agricultural land, and their management has a great impact on climate. This indicator can be of a connecting character and can be used within the framework of SDG 2 ("End hunger, achieve food security and improved nutrition and promote sustainable agriculture");
- Energy intensity (ratio of primary energy consumption to GDP). It has a connecting character, and is now used in SDG 7 ("Energy"), (7.3.1 indicator). This indicator reflects important social (health, etc.) and environmental (climate, etc.) problems. In general, it may be of a connecting character for such SDGs as SDG 3 ("Health"), SDG 7 ("Sustainable energy"), SDG 8 ("Economic growth and work"), SDG 11 ("Sustainable cities"), SDG 12 ("Consumption and production models"), and SDG 13 ("Climate");
- Carbon footprint (million tons of CO₂ and as a balance between production and consumption emissions (%)) (see Table 2). It is an important climate indicator that reflects the impact of certain countries on the climate system via their own emissions and imports of products containing CO₂. Despite producing significant greenhouse gas emissions, the BRICS countries export a considerable part of their carbon-intensive production to developed countries. Namely, both exporters and importers are responsible for CO₂ emission, with the developed OECD-member countries standing out among the importers: for the five BRICS countries, the net exports of emissions account for 13.5% of the total emissions, for the OECD countries this number is negative — 13% (OECD, 2020). The carbon footprint indicator can be thorough and can be used in SDG 12 ("Responsible consumption and production");
- CO₂ emissions per unit of value added. This indicator has already been mentioned as SDG 9.4.1. It is important for technological development towards high-tech industries. It would be worthwhile to transform that indicator into a connecting one and include it in the framework of SDG 13+;
- Adjusted Net Savings Index. This indicator is calculated by the World Bank and published annually in the World Development Indicators database (World Bank, 2019). This indicator reflects essential aspects of sustainable development: education expenditure, natural resources depletion (including energy depletion), damage from CO₂ and PM_{2,5} to environment and health. Adjusted Net Savings Index can be a connecting indicator and can be used in SDG 3, SDG 4, SDG 7, SDG 8, SDG 9, SDG 11, SDG 12, SDG 13, SDG 15.

Transition to low-carbon development and incorporation of environmental-economic and climatic targets in the SDGs should involve modification and integration of the new and thorough key indicators and cover at least SDG 3, SDG 4, SDG 7, SDG 8, SDG 9, SDG 11, SDG 12, SDG 13, and SDG 15.

5. Global combined crises of 2020 and human development

We are very much concerned about global peace and stability. Global Governance is in disarray, and collective efforts are not what we are actually observing now. Nevertheless, we should recognize the shortage of resources to combat the COVID-19 pandemic and to stabilize countries affected by the recession, both developed and developing. The period 2020–2021 will present a difficult task of ensuring the survival of millions of people suffering from poverty or infection, based on long-term solutions in a coordinated approach. Restoration of growth will take time and resources that otherwise could be used for implementing the SDGs.

The global agenda has been drastically changed from 2015 to 2020: from long-term coordinated prosperity till 2030 with average GDP growth of approximately 3% and efforts to achieve the 17 SDGs to a more intense focus on climate change prevention. The latter is obviously in the center of the EU policy promoted by IEA, and it was supported by the special agreement in Paris in 2015. The impact of the recession and the COVID-19 pandemic on the implementation of the SDGs is not uniform. We consider the SDG Agreement as a coordinating tool for solving the problems of humanity. Today we see the necessity of some sort of a concordat between urgent problems and the general norms of the SDGs. It should be emphasized that the above-mentioned interrelated nature of some “connecting” SDGs contributes to the creation of synergy in realizing particular, separately taken SDGs (Bobylev & Solovyeva, 2017).

The new world order requires a transformation of the SDG structure taking into account new theoretical accents. First of all, this transformation should focus on human development. The concept of human development was elaborated by the UN institutions more than 40 years ago, then it became officially recognized, and since 1990, the organization publishes an annual Human Development Report. The Nobel laureate Amartya Sen made a major contribution to the human development theory (Sen, 1990). In addition, we would like to highlight the works by K. Griffin and T. McKinley (Griffin & McKinley, 1994) in this field. However, this concept mainly remains a declaration that lacks support from decision-makers, scientific studies, economics and society. We believe that this fact is largely due to absolutization of economic growth that is justified by the theory of human capital, which is largely based on a person’s ability to perform labor, a combination of knowledge and experience (Schultz, 1960). Both global political and economic mainstreams adhere to the human capital theory, though some of its aspects contradict those of the human development theory. This contradiction is clearly seen, at least when analyzing the activity of elderly (65+ years) people, infants, housewives etc. who do not produce income or profit that is one of the main characteristics of any capital (including natural).

The COVID-19 pandemic consequences may lead to new approaches towards implementing and evaluating economic policies aimed at achieving the SDGs. Nowadays, humanity faces an unprecedented situation when almost all nations have sacrificed economic growth for the sake of saving human lives. That means that human lives have become an absolute priority. Consequently, development must be measured

differently, in terms of the value of human lives. How does the fight against COVID-19 differ from realization of different economic scenarios that take into account, for example, environmental issues? The WHO data shows that in China, a resident of a “clean” area lives several years longer than a resident of a megalopolis. This difference exists due to coal burning and transport pollution. That is why traditional coal-based energy scenarios can be dangerous for many countries, not only from the climate change perspective, but from the perspective of premature death and morbidity as well. According to health workers, the most dangerous pollutants are suspended particles less than 2.5 microns in diameter (PM2.5) that are abundantly produced by coal-related industries and activities (mining, incineration, transportation, etc.). From a medical point of view, in terms of annual mortality rate, coal is a greater threat to humans than COVID-19. The fact is that morbidity and mortality caused by the effect of coal on human health are protracted, while those caused by COVID-19 are supposed to be localized within one to two years. Therefore, development scenarios must take into account the risks of additional deaths in many respects, inter alia, due to environmental pollution. These estimates are difficult to carry out; nonetheless, modern science is able to do so using the concept of risk. The number of deaths caused by PM2.5 pollution might be even higher for such BRICS countries as China, India, Russia, and South Africa than the number of deaths caused by COVID-19, although, of course, the calculation is based on a rational and complex long-term accounting system (see Table 2).

Given a full assessment of the global value system, the SDGs should be viewed in terms of the value of human life, rather than in terms of economic growth. In this regard, we consider the MDGs to be simpler and more understandable in the context of human development theory than the SDGs. In the view of high probability of a second COVID-19 wave or new epidemics, it is necessary to strengthen the concept of the value of human life in the SDGs. Several options are possible, taking into account the potential correction of a number of the SDGs. There are at least two variants of the SDGs modification: first, transforming SDG 3 (“Health”) and including health-related indicators from other SDGs in it; second, creating an additional SDG in the light of the concept of the value of human life and the risk of epidemics and new diseases.

The first option implies transforming and changing SDG 3. This is easy as it does not require new lengthy negotiations or compromises between developed and developing countries in relation to forming an additional SDG. However, from the point of view of sustainable development as the main paradigm of human development in the 21st century (that is, of course, not limited to 2030), a clear declaration of the value of human life as an independent goal would be more constructive. In order to formulate such a goal, it is necessary to take into account not only the health factor (SDG 3) but also many other socio-economic realities that cover, for example, the acute problem of inequality (SDG 10).

Currently, the objective of combating epidemics is included in SDG 3 — 3.3 target: “By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases” (UNDP, 2015). It is worth mentioning that in the MDGs, the fight against epidemics

was allocated to a special Goal 6 “Combat HIV/AIDS, malaria and other diseases”. The current denomination of SDG 3 — “Ensure healthy lives and promote well-being for all at all ages” — seems too limited for the new realities. Based on the MDG 6, the title of SDG 3 could be transformed into the following: “Ensure a healthy lives and reduce the risk of epidemics and other diseases”. The transformed SDG 3 can be defined as SDG 3+, as it has already been done when adapting the MDGs to the national level.

SDG 3+ and other related goals should be complemented by indicators that reflect the state of health and value of human life. These indicators can be either new or connective, taken from other SDGs. This is a fundamental point since the classical SDGs contain a non-overlapping system of indicators, which, in our view, impoverishes the potential for achieving the Goals. As mentioned above, we suggest using a system of connecting key indicators, in which each indicator could be considered as a part of several SDGs and used to monitor a number of goals.

We suggest using the following indicators as the new ones:

- Life expectancy/longevity (years). This is a key indicator for measuring human development. It is unclear why this indicator is not included in the final list of the UN SDGs, although it is used within the SDG framework in certain countries and associations.
- Health (medical) expenditure (as a percentage of GDP or as a percentage of government spending). Nowadays, there is a widely used similar indicator of education expenditure as a percentage of GDP. COVID-19 revealed the weakness of all countries, including the developed ones, in fighting epidemics, which is an objective signal of the present need to increase health spending.
- Hospital capacity (per 10,000 people). The appalling picture of people lying on hospital floors or ill patients waiting in queues outside hospitals has shown the current huge deficit of hospital facilities. The capacity of hospitals should be significantly increased in order to increase the number of patients provided with hospital care.
- Human development index (HDI). This integral index is crucial for assessing sustainable development (including health and education) from a social point of view. The HDI may be of a thorough character and may be used within social SDG 4 (“Education”) and SDG 8 (“Promote sustainable economic growth, employment and work”). This indicator in the BRICS countries is presented in Table 2.

SDG 3+ may also include new indicators as well as thorough indicators that are already included in other SDGs. For example, SDG 3 already contains health indicators that reflect environmental aspects of sustainability: “mortality rate attributed to household and ambient air pollution” (indicator 3.9.1) and “mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene” (indicator 3.9.2). As mentioned above, suspended particles measuring less than 2.5 microns in diameter (PM2.5) contained in the air play a crucial role in mortality and morbidity rates. PM2.5 air pollution is rather dangerous in the BRICS countries (see Table 2). PM2.5 emissions are especially high in India and China resulting in a significant number of diseases and deaths in these countries.

At present, this indicator is part of SDG 11 (“Sustainable cities”): “Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)” (11.6.2 indicator). It would be reasonable to make this indicator a thorough one and include it in SDG 3+. In addition, it should be included in at least two other SDGs: SDG 7 (Energy) and SDG 13 (Climate) due to extensive production and burning of high-carbon and high-emission coal in the world.

Contamination of water resources (SDG 6) causes a lot of diseases and deaths worldwide. According to the UN, the number of people affected by this problem has reached 2,2 billion (UN, 2020b). Two indicators included in this SDG should also become thorough and be used in the SDG 3+ framework: 6.1.1 indicator (“Proportion of population using safely managed drinking water services”); 6.2.1 indicator (“Proportion of population using (a) safely managed sanitation services, and (b) a hand-washing facility with soap and water”). In the COVID-19 context, the latter indicator is crucial for fighting the epidemic, though nowadays 3 billion people in the world lack hand-washing facilities with soap and water (UN, 2020b).

Currently, SDG 3 contains an indicator that should be made a connecting one and also included in SDG 17 (“Global partnership”): “Total net official development assistance to medical research and basic health sectors” (3.6.2 indicator). However, in the current definition, the indicator seems to be too limited. We propose to modify this indicator within the framework of SDG 3+ and SDG 17 as follows: “Total net official development assistance for fighting epidemics and other diseases, medical research and basic health sectors”.

Global development represents complex socio-economic factors and characteristics, some of which are constantly changing, and some are stalling. Among the widely discussed features of modern societies, one would notice inequalities of various natures. Reducing this is the target of SDG 10. In the 21st century, inequality between countries is decreasing quite slowly (if at all), especially excluding the factor of China and India. Stylized facts argue for global coordination of investments into physical infrastructure and human capital to ensure self-sustainability for growth. Social inequality is growing at the top of the scale (10th decil, 100th percent, etc.). Redistribution of income (consumption) in favor of the lower strata has improved Gini coefficients, but not the “social distance” between the rich and the poor, or even to the lower middle strata. In the case of a double blow — a pandemic and a severe recession, — this creates a risk of social instability and actually delays success in achieving the SDGs.

The problem of inequality between countries was discussed in various aspects (Grigoryev & Pavljushina, 2018). Here we can offer some indicators for monitoring success in reducing inequality between countries (Grigoryev & Pavljushina, 2018), such as: (10a) — reducing dispersion between the 20 developed countries and other countries, calculated in 10-year increments.

The growing social inequality in the world has been in the focus of discussions in recent years (Grigoryev & Pavljushina, 2019, 2020). The current crisis makes it especially visible and addressed on a very high international level (Guterres, 2020). We are suggesting an approach with some quantitative parameters for considerations: (10b) — the growing

share of income (consumption) going to the 1st quintile for the same groups of countries, calculated in 5-year increments; (10c) — the decreasing share of income going to the 5th quintile, calculated in 5-year increments (from levels above 45%).

The number of suicides and homicides must be classified as an unfavorable indicator related to social inequality (SDG 10): in particular, homicides are associated with poverty and countries with low and middle income per capita, while suicides — with upper- and upper-middle-income countries and strata (Grigoryev & Popovets, 2019).

We would like to highlight the new integral Human Development Index (HDI) suggested as an indicator for achieving the SDGs. The HDI formation dates back to 1990. This index is published now on a regular basis in Human Development Reports at the global and national levels (including Russia). In terms of ideology, this index was elaborated in order to counter the GDP indicator which is too focused on a country's economic performance and ignores other important economic and social characteristics. From the point of view of sustainability, the HDI primarily reflects the social component: health (life longevity) and education level. The third HDI sub-index reflects the achieved level of economic development — GDP/GNI per capita. The environmental component is latent in the HDI as it is part of the life expectancy index (used to evaluate harm to health and longevity caused by environmental pollution). Based on the existing studies and the WHO data, the damage caused by environmental pollution in the BRICS countries amounts to several years of lost life for the vast majority of citizens, especially those who live in polluted cities.

Nowadays, there are a lot of HDI modifications that include gender, inequality, more detailed aspects of education, etc. (UN, 2019). One of the important advantages of the HDI is that it pays more attention to assessing social aspects compared to economic ones. For example, countries with high GDP levels but low life expectancy are ranked lower than countries with high life expectancy. In the HDI ranking, Russia is listed among countries with a very high level of human development and ranks 49th, while Brazil (79th), China (85th), South Africa (113th) are in the list of countries with high human development, and India (129th) is among those with a medium level of human development (see Table 2). However, in our opinion, the HDI generally cannot reflect the sustainability of development in an adequate way since it cannot address multidimensional challenges of sustainability, in particular, environmental ones.

Another connecting SDG Index that is possible to use was designed by well-known economists J. D. Sachs, G. Schmidt-Traub et al. (Sachs et al., 2020). This index was presented at the UN Political Forums in 2016 and 2017. The SDG Index covers all 17 SDGs, it is statistically significant and most of the countries in the world provide statistical databases for its calculation. China occupies the highest position among the BRICS countries — 48th place, Brazil and Russia are close by (53rd and 57th places, respectively), and India and South Africa are in the lower middle of the ranking — 117th and 110th places (see Table 2). The limitations of the SDG Index are the contradictory nature of the choice of some of its indicators and their quantitative assessment. All in all, the index represents merely a country's position in the ranking and its dynamics without paying attention to the interaction of mechanisms that should provide for achieving the final goals.

Thus if such parameters as the value of human life and health are to be taken into account, then the existing indicators should be modified and new, connecting indicators should be included in the system, at least, this concerns SDGs 3, 4, 6, 8, 11, 17.

6. Conclusion. “Pandemic Protocol”

Modification of the SDGs might be an option for the international community in the long-run. And the difficult year 2020 is the right time to start discussing this issue. However, we are not currently calling for an overhaul of the SDGs. The time has come for urgent anti-pandemic and anti-recession measures, but it would be the wrong time for such a complex multilateral negotiation process. As the second-best approach, we suggest creating some kind of an addition to the SDGs in the form of a Protocol clarifying urgent necessities and priorities during a pandemic and recession. Such an approach can provide a guidance for all countries on coordinating stabilization of the health system and initiating recovery in the frame of long-term SDG solutions.

SDG 1. Take measures to ensure the supply of the population of LDCs in the face of a recession or disconnection from traditional sources of income, or deprivation of economic activity due to anti-COVID-19 restrictions or a recession: tourism, transport, services, agriculture, fishing.

SDG 2. There are prospects for potential coordination of efforts of the BRICS countries in the fields of agricultural policy development, and balancing export-import food regulations owing to the critical role of most of these countries agricultural productions, exports and imports on the global level.

SDG 3. The COVID-19 pandemic has demonstrated the vulnerability of the mankind as a whole, including developing countries and pockets of poverty in developed countries. All countries should focus on providing health care to low-income strata through state systems of mixed medical insurance. Additional attention should be paid to building international cooperation and sharing information and research results for testing, curing or preventing coronavirus infections now and in the future.

The COVID-19 problem has cast doubt on the health-related definition of SDG 3. It should be modified taking into account epidemiological problems. At present, the goal of fighting epidemics is included in target 3.3 “By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases”.

SDG 4. It aims to provide quality education and promote lifelong education opportunities for all. It would be reasonable for the BRICS countries to create joint educational programs in the field of sustainable development and improve knowledge in the field of the SDGs implementation. Besides, all countries should raise public awareness of the dangers of coronavirus diseases and preparedness of health systems to combat pandemics globally, including the poor social strata.

SDG 6. It is aimed at ensuring public access to safe and affordable drinking water and rational use of freshwater ecosystems. In the BRICS countries, there is a need to improve access to quality sanitation and hygiene services, especially in rural areas.

SDG 7. Provide access to affordable, reliable, sustainable and modern energy for all. The common goal is to assure a stable supply of affordable energy for economic growth, development and catching up in less developed countries. Fighting energy poverty should be addressed as an integral part of development with a target of climate change prevention in terms of technology transfer, financing and human life. Energy transition should be conducted in a way that is compatible with the prevention of climate change on a global scale.

SDG 8. Economic growth should be restored from the low level of recession as soon as possible using the vast resources of advanced economies to combat COVID-19 on the global level. Global instability also requires a review of the traditional financial accounting system including the dictate of GDP, which does not adequately reflect social and environmental issues (Richard, 2020).

SDG 9. Create flexible infrastructure, promote inclusive and sustainable industrialization and innovation. Physical and human infrastructure and innovation capability should be built as a common project of mankind.

SDG 10. Inequality between countries is reducing quite slowly, and social inequality plays an outstanding role in the pandemic and recession of 2020. These problems should be addressed as a target for the immediate future with indicators suggested above.

SDG 11. The mission of ensuring the safety, resilience and environmental sustainability of cities is acute for the BRICS countries in the context of fast urbanization which is accompanied by environmental problems. High levels of pollution in cities lead to high mortality and morbidity levels of their inhabitants (Porfiriyev & Bobylev, 2018).

SDG 12. Ensuring transition to sustainable and rational consumption and production models implies increasing efficiency of the use of natural resources. The BRICS countries can develop joint plans in this field within the framework of the 10-year UN programmes on sustainable consumption and production (10YFP).

The recession has led to travel bans and contact restrictions. It gives an example of reduced personal consumption for the rich strata and includes recreation, services and transportation. We call for long-term measures to preserve some lifestyle changes. We also suggest paying considerably more attention to recording emissions by consumption and green consumption, as well as technological progress and implementation of the green approach to production.

SDG 13. In order to “take urgent actions to combat climate change and its impacts”, the BRICS countries should elaborate coordinated approaches to shaping the positions of the BRICS member states on climate change issues, including regulation and compensation of greenhouse gas emissions from forest and other ecosystems, within the UN organization and other dialogue platforms.

SDG 14. This goal is aimed at conservation and sustainable use of oceans, seas and marine resources for sustainable development. The BRICS countries that have huge coastlines, significant protected areas in the marine environment and high levels of fishing (or overfishing) can effectively coordinate efforts to implement SDG 14.

SDG 15. In order to “protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss”, the BRICS countries should promote achievement

of this goal and emphasize their role as global environmental donors in international agreements and commitments in the field of climate change prevention, water scarcity mitigation, ecosystems and biodiversity conservation.

Meanwhile, *SDG 16* (“Sustainable societies”) was recognized as an important broad institutional goal. In 2020, the BRICS countries and the whole world are starting to look at them from another, virtually new point of view. The example of *SDG 16* (“Peace, justice and effective institutions”) shows this tendency quite well. The pandemic has shown the imperfection of domestic and international institutions. All in all, here are a huge number of new questions concerning institutional support for sustainable development. It is obvious that the world is moving towards greater instability in 2020, and realization of the SDGs by 2030 has become even more challenging. The SDGs should be a balanced system of social, economic and environmental targets, objectives, and indicators.

In the context of the current world recession and growing budget deficits in countries all over the world, *SDG 17* should cover a range of new and acute problems. The problem of deceleration of the implementation of the SDGs is becoming evident in many countries because there are simply no financial resources left for accomplishing a number of goals. What is more, it is difficult to draw any conclusions concerning the problems of developing countries in general. It is obvious that in the short run, the political burden will shift towards solving short-term social and economic problems at the expense of long-term sustainability issues. Apparently, the international community should prevent the SDGs from being relegated to a secondary place.

The Secretary-General of the United Nations mentioned that the response to the COVID-19 problem should amount to at least 10% of global GDP (UN. Economic and Social Council, 2020). In fact, his words referred to the budgetary funds of developed countries and international financial organizations. It is also important to preserve the level of bilateral development assistance. However, in 2020, the problem of declining foreign direct investments and private financial flows, estimated at several percentage points of GDP, should also be taken into account, and for a number of recipient countries this problem will itself become an external shock. Rebuilding the global economy after the epidemic and recession will be a challenging process that will require new global coordination of the SDG system and effective use of the limited resources of the international community. Certain modifications to the SDGs could help coordinate common efforts around the world and, in particular, in the BRICS countries. Finally, we must reiterate that this pandemic and recession are far too dangerous for the mankind. The international community, the UN, the Bretton-Woods, academia and NGOs, and responsible actors should reestablish global coordination and governance for reaching the SDGs. The BRICS countries can provide institutional support to achieve this important objective.

References

- Bobylev, S. (2017). Ustojchivoe razvitie: Paradigma dlya budushchego. *Mirovaya ekonomika i mezhdunarodnye otnosheniya*, 61(3), 107–113 (Sustainable development: A paradigm for the future. *World Economy and International Relations*, 61(3), 107–113).

- Bobylev, S., & Solovyeva, S. (2017). Sustainable development goals for the future of Russia. *Studies on Russian Economic Development*, 28(3), 259–265.
- Doklad o chelovecheskom razvitií v Rossijskoj Federacii: Celi ustojchivogo razvitiya OON i Rossiya. (2016). Pod red. S. N. Bobyleva & L. M. Grigoryeva (S. Bobylev & L. Grigoryev (Eds.)), *Human development report in the Russian Federation: UN sustainable development goals and Russia*. Analytical Center for the Government of the Russian Federation). <https://ac.gov.ru/archive/files/publication/a/11138.pdf>
- Griffin, K., & McKinley, T. (1994). *Implementing a Human Development Strategy*. MacMillan.
- Grigoryev, L. (2016). Russia in the system of global economic relations. *Strategic Analysis*, 40(6), 498–512.
- Grigoryev, L., & Morozkina, A. (2012). BRICS instruments: Specifics of objectives. In H. H. S. Viswanathan & N. Unnikrishnan (Eds.), *Search of stability, security and growth BRICS and a new world order*. ORF, pp. 125–134.
- Grigoryev, L., & Morozkina, A. (2013). Different economies, similar problem. *Russia in Global Affairs*, 2, 26–39. <https://eng.globalaffairs.ru/articles/different-economies-similar-problems/>
- Grigoryev, L., & Popovets, L. (2019). Sociology of individual tragedies. Homicides and suicides: Cross-country cluster analysis. *Russian Journal of Economics*, 5(3), 251–276.
- Grigoryev, L. (2020a). Sustainable development goals — BRICS countries' specifics. *International Affairs: A Russian Journal of World Politics, Diplomacy and International Relations*, 60–65.
- Grigoryev, L. (2020b). Global social drama of pandemic and recession. *Population and Economics*, 4(2), 18–25. <https://populationandconomics.pensoft.net/article/53325/>
- Grigoryev, L., & Makarova, E. (2019). Norma nakopleniya i ekonomicheskij rost: Sdvigi posle Velikoj recessii. *Voprosy Ekonomiki*, 12, 24–46 (Capital accumulation and economic growth after the Great Recession. *Issues of Economics*, 12, 24–46).
- Grigoryev, L., & Pabst, A. (2020). Introduction — international cooperation in times of post-Cold War (dis)order. In L. Grigoryev & A. Pabst (Eds.), *Global governance in transformation — Challenges for international cooperation*. Springer, pp. 1–12.
- Grigoryev, L., & Pavljushina, V. (2018). Mezhranovoe neravenstvo: Dinamika i problema stadij razvitiya. *Voprosy Ekonomiki*, 7, 5–29 (International inequality: Dynamic and the problem of stages of development. *Issues of Economics*, 7, 5–29).
- Grigoryev, L., & Pavljushina, V. (2019). Relative social inequality in the world: Rigidity against the economic growth, 1992–2016. *Russian Journal of Economics*, 5(1), 46–66. <https://rujec.org/article/35485/>
- Grigoryev, L., & Pavljushina, V. (2020). Global recession and income inequality: Factors of disruption for elites in the twenty-first century. In L. Grigoryev & A. Pabst (Eds.), *Global governance in transformation: Challenges for international cooperation*. Springer, pp. 275–297.
- Grigoryev, L., Makarov, I., Sokolova, A., Pavlyushina, V., & Stepanov, I. (2020). Climate change and inequality: How to solve these problems jointly? *International Organizations Research Journal*, 15(1), 7–30.
- Grigoryev, L., Pavlyushina, V., & Muzychenko, E. (2020). Padenie v mirovuyu recessiyu 2020... *Voprosy Ekonomiki*, 5, 5–24 (The fall into 2020 recession... *Issues of Economics*, 5, 5–24).
- Guterres, A. (2020). Opening remarks at Nelson Mandela lecture: “Tackling the inequality pandemic: A new social contract for a new era”, July 20. <https://www.un.org/africarenewal/web-features/“tackling-inequality-pandemic-new-social-contract-new-era”>
- IMF. (2020). *World economic outlook update, June 2020*. <https://www.imf.org/en/Publications/WEO>
- Jain-Chandra, S., Khor, N., Mano, R., Schauer, J., Wingender, P., & Zhuang, J. (2018). *Inequality in China — Trends, drivers and policy remedies*. Working Paper No. 18/127. <https://www.imf.org/en/Publications/WP/Issues/2018/06/05/Inequality-in-China-Trends-Drivers-and-Policy-Remedies-45878>
- Kurdir, A., & Shastitko, A. (2020) The new industrial policy: A chance for the BRICS countries. *BRICS journal of economics*, 1(1), 60–80.

- Makarov, I., & Sokolova, A. (2014). Ocenka uglerodoyemkosti vneshney trgovli Rossii. *Ekonomicheskij Zhurnal VSHE*, 18, 477–507 (Assessment of carbon intensity of foreign trade in Russia. *Higher School of Economics Economic Journal*, 18, 477–507). https://elib.hse.ru/e-resources/HSE_economic_journal/articles/18_03_06.pdf
- Makarov, I., & Sokolova, A. (2017). Carbon emissions embodied in Russia's trade: Implications for climate policy. *Review of European and Russian Affairs*, 11(2), 1–21.
- Makarov, I., Chen, H., & Paltsev, S. (2020). Impacts of climate change policies worldwide on the Russian economy. *Climate Policy*. 19 June.
- OECD. (2020). *Carbon dioxide emissions embodied in international trade*. <https://www.oecd.org/sti/ind/carbondioxideemissionsembodiedininternationaltrade.htm>
- Porfiriyev, B., & Bobylev, S. (2018). Cities and megalopolises: The problem of definitions and sustainable development indicators. *Studies on Russian Economic Development*, 29(2), 116–123.
- Richard, J. (2020). Towards a new ecological and human type of national accounting for developing economies (The CARE/TDL model). *BRICS Journal of Economics*, 1(1), 43–59. https://www.brics-econ.org/current/2020.Volume.1.Number.1/JournalArticle.20200417204956_3290/
- Sachs, J., Schmidt-Traub, G., Kroll, C., Lafortune, G., Fuller, G., & Woelm, F. (2020). The sustainable development goals and COVID–19. *Sustainable Development Report 2020*. Cambridge University Press.
- Schultz, T. W. (1960). Capital formation by education. *Journal of Political Economy*, 68(6), 571–583.
- Sen, A. (1990). Development as capability expansion. In K. Griffin & T. McKinley (Eds.), *Human development and the international development strategy for the 1990s*. MacMillan, pp. 41–58.
- UN. (1992). *Agenda 21*. United Nations conference on environment & development. <https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf>
- UN. (2015). *Paris Agreement on climate change*. <https://www.un.org/sustainabledevelopment/climate-action/>
- UN. (2017). *Input from the Economic Commission for Europe to the high-level political forum on sustainable development*. <https://digitallibrary.un.org/record/1290269>
- UN. (2020). *Voluntary National reviews database*. <https://sustainabledevelopment.un.org/vnrs/>
- UN. Economic and Social Council. (2020). *Progress towards the sustainable development goals*. Report of the Secretary–General (E/2020/XXX). https://sustainabledevelopment.un.org/content/documents/26158Final_SG_SDG_Progress_Report_14052020.pdf
- UN. General Assembly. (2000). *United Nations Millennium Declaration*.
- UN. General Assembly. (2012). *The future we want* (A/RES/66/288). https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_66_288.pdf
- UN. General Assembly. (2015). *Transforming our world: The 2030 agenda for sustainable development* (A/RES/70/1). https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_70_1_E.pdf
- UNDP. (2010). *National Human Development Report 2010 in the Russian Federation*. Millennium Development Goals in Russia: Looking into the Future. http://hdr.undp.org/sites/default/files/russia_nhdr_2010_en.pdf
- UNDP. (2019). *Human Development Report 2019. Beyond income, beyond averages, beyond today: Inequalities in human development in the 21st century*. <http://hdr.undp.org/en/2019-report>
- WEF. (2020). *The Global Risks Report 2020* (15th ed). http://www3.weforum.org/docs/WEF_Global_Risk_Report_2020.pdf
- World Bank. (2019). *World Development Indicators*. <http://wdi.worldbank.org/tables>

Contemporary global economic crisis: Some conclusions for Russia and BRICS

(taking into account Kondratieff long waves)

Viktor Tatuzov*,

Primakov National Research Institute of World Economy and International Relations,
Russian Academy of Sciences (Russia)

Reference to this paper should be made as follows: **Tatuzov, V.** (2020). Contemporary global economic crisis: Some conclusions for Russia and BRICS (taking into account Kondratieff long waves). *BRICS Journal of Economics*, 2(1), 25–40. <https://doi.org/10.38050/2712-7508-2020-8>

Abstract

The article is devoted to the origins of contemporary economic crises (2008–2020). The author suggests a relatively novel approach to the study and forecasting of the economic life of the BRICS countries and other regions within the framework of the modern Kondratieff long waves hypothesis.

The author recalls that in the mid-twenties, after analyzing the results of a sufficiently deep crisis in 1920–1921, Kondratieff drew a conclusion that even more destructive perturbations in the world economy were approaching (having thus predicted the Great Depression of 1930s). In particular, Kondratieff wrote about the downswing phase of a long wave – a long turbulent period of economic instability (a period of deep economic crises).

According to some Russian economists, today's preservation of the downswing phase was correctly predicted in the framework of modern modifications of Kondratieff's theory. Based on the hypothesis of long waves, the author predicted the global economic crisis of 2008–2010 in 2006, and in the summer of 2014, he predicted many turbulent years for Russia (in particular, economic crises). The author warned of a possible aggravation of the global situation in early 2019, and such aggravation happened in 2020.

Taking into account Kondratieff long waves, some new risks for the BRICS countries are analyzed in this article. In particular, the author argues that by the end of 2020, Russia's real GDP may considerably shrink. In 2020, Russia seems to be able to take into account and use the previous experience of other BRICS countries which largely succeeded in mitigating external shocks in 2009 (for example, the experience of China and India).

Keywords: BRICS countries, economic cycles and crises, Kondratieff long waves.

JEL: A11, E32, F01.

* E-mail for correspondence: vytatut@mail.ru

Introduction

Today the global coronavirus pandemic leads to a decrease in the external demand for Russian oil and natural gas. In 2020, a risk of Russian economy's high dependence on external environment became more obvious (as it was in 2009). In 2009, Russia felt the crisis later than developed countries. However, its development was deeper. In 2009, the fall in Russia's GDP was among the most tangible declines as compared to developed countries and other BRICS countries. Recessionary tendencies in Russia were exacerbated by a build-up of unresolved modernization problems and lack of improvement in quality growth.

Is it possible that the situation in 2020 is approximately the same? Is the Russian economy repeating what happened to it in 2009?

March and April 2020 recorded a decline in business activity in Russia. The deterioration of conditions for the development of the Russian economy is primarily associated with the following main factors:

- a) decreased demand for Russian exports;
- b) lower world prices for oil and natural gas;
- c) activity in Russia due to coronavirus pandemia.

According to the Bank of Russia's forecast (as of May 2020), in the 2nd quarter of 2020, annual GDP growth rates will become negative. In its forecast calculations, the Bank of Russia assumes that the annual economic growth rate will remain negative in the second half of 2020, and by the end of 2020, Russia's real GDP may decline by 4–6% (YOY) (Monetary Policy Report, 2020, p. 6).

The government of Russia started to ease the restrictions on economic activity and travel of individuals in June 2020, and this will pave the way for economic recovery. However, taking into account the experience of the previous deep recession (2009), we can conclude that there still persist the main risks associated with the following factors: a downturn in global prices for oil and gas and other Russian export commodities; high exchange rate volatility; narrowing domestic demand; deterioration in the banking sector; growing unemployment, and social and economic instability.

The author suggests a non-customary approach to studying and forecasting the economic life of Russia and the BRICS countries in the context of the current crisis within the framework of Kondratieff long waves. The author warned about the global economic destabilization in 2006 (Lohmachev & Tatuzov, 2006) and the deep global crisis of 2008–2009. He also wrote about the global economic instability in the early 2019 (Tatuzov, 2018, 2019), and such a crisis happened in 2020. Based on the theory of Kondratieff long waves, in the summer of 2014, the author correctly predicted many difficult years for the Russian economy (Ershov et al., 2014).

The main objectives of the article are:

- a) to make a brief description of some important modern approaches to long waves;
- b) to propose a scientific analysis of the nature of the observed economic crisis (2008–2020) in many countries, including the BRICS countries (taking into account Kondratieff waves and the author's long-term experience in the Russian business and banking sphere);

- c) to develop some potential tools for BRICS to jointly solve many urgent economic problems;
 - d) to illustrate the necessity of transferring to a new economic paradigm (in Russia).
- The article puts forward some ideas as hypotheses, so the text can be debatable.

1. The history of long-wave theory

1.1. Kondratieff long waves

In the 19th century, the economic science discovered a 7–12 year cycle which was named after Juglar (Juglar, 1862). In the 20th century, some other cyclic waves were discovered in the dynamics of economic indicators. In 1923, Kitchin published an article about a 40-month cycle resulting from a study of USA and UK statistics from 1890 to 1922 (Kitchin, 1923). In the 1930–1940s, Kuznets discovered 16–25 year fluctuations in the construction industry (Kuznets swing) (Kuznets, 1930, 1931, 1966).

Also in the 1940s, Shumpeter noted the existence of long cycles connected to innovations (Shumpeter, 1934, 1939, 1949). This term was supposed to explain reasons for economic changes. An impetus for economic development in the longer term arose in connection with such large-scale innovations as the creation of the steam engine, railway construction, the invention of the internal combustion engine, etc.

However, initially the theory of long waves was created and developed by Nikolai Kondratieff (Kondratieff, 1984, 1989). Many issues, as well as the whole subject of long waves, remain debatable today. But the hypothesis of long waves can be used successfully as a general empirical reference point. (We can propose here only a very brief and simplified form of Kondratieff theory.)

In 1925, Kondratieff wrote that the modern economic theory knew only cycles lasting 7–11 years, but in real life, along with these cycles, there seemed to be other cycles of economic dynamics lasting about 48–55 years (Table 1). Kondratieff named them the “big cycles of conjuncture” (long waves of economic dynamics) and attributed them to the development of capital accumulation. The beginning of the recovery coincides with the moment when the formation and accumulation of capital reach such a level at which it becomes possible to make profitable investments of capital with the purpose of creating basic productive forces and radical re-equipment. According to Kondratieff, the rate of capital accumulation weakens, particularly in connection with the aggravation of the social struggle and external conflicts. The strengthening of these factors causes turns in the dynamics of economic development and its slowdown.

Table 1. Long waves in Kondratieff’s works (covering events before 1920)

	Upward wave	Downward wave
Cycle 1	<i>from the end of 1780s – beginning of 1790s to 1810–1817</i>	<i>from 1810–1817 to 1844–1851</i>
Cycle 2	<i>from 1844–1851 to 1870–1875</i>	<i>from 1870–1875 to 1890–1896</i>
Cycle 3	<i>from 1890–1896 to 1914–1920</i>	<i>from 1914–1920</i>

Source: (Kondratieff, 1989, p. 197).

So, Kondratieff discovered the existence of *long upward waves* and *long downward waves*. According to Kondratieff, an *upward wave* is a long period of relatively stable economic growth, and a *downward wave* is a *long unfavorable period of economic instability and relatively deep economic crises*. According to Kondratieff, *downward waves* are characterized by *increased level of depth* in comparison with ordinary cyclic crises. (These ordinary crises during *downward wave* of a “long cycle” become stronger.)

1.2. Some new classifications of long waves

In the mid-twenties, after analyzing the results of a sufficiently deep crisis of 1920–1921, Kondratieff concluded the beginning of a *downward wave* (approximately in 1920–1921) and the approach of even more destructive perturbations in the world economy (thus predicting the Great Depression of 1930s). Can we assume the similar situation in 2008–2010, or say that the start of a *downward wave* (approximately in 2008–2010) leads to even more destructive perturbations in the world economy in 2020? (Table 2).

Table 2. New long waves (development of events after 1920s, according to some works of contemporary economists)

	Upward wave	Downward wave
Cycle 3	<i>from 1890–1896 to 1914–1920</i>	<i>from 1914–1928/29 to 1939–1950</i>
Cycle 4	<i>from 1939–1950 to 1968–1974</i>	<i>from 1968–1974 to 1984–1991</i>
Cycle 5	<i>from 1984–1991 to 2008–2010</i>	<i>from 2008–2010</i>

Source: (Grinin et al., 2012, p. 26).

The modern classification proposed about 10 years ago (!) by the contemporary economic science (Korotayev & Tsirel, 2010; Grinin et al., 2012) has a *clear verification due to the further turbulent development of global events in 2010s and in 2020*. So, we can assume the existence of Kondratieff Long Cycle 6 – in particular, the existence of a *downward wave* starting approximately from 2008 – as a general abstract trend in the development of the contemporary world economy.

Academician Akaev, Rector of LMSU Sadovnichij, and other Russian economists, who have considerably developed Kondratieff’s ideas, proposed factorial analysis of the BRICS dynamics in the landscape of the world trends taking into account long waves (Sadovnichij et al., 2014, Sadovnichij et al., 2014). In the last decades, a new theory of long-term technological development was created in the works of academician Glazyev, who also developed Kondratieff’s ideas. It described this process as successive replacement of large complexes of technologically linked productions (i.e. technological patterns) (Glazyev, 1993, 2016).

The life cycle of a technological pattern covers about one century, and the period of its domination in economic development lasts from 40 to 60 years (this period is being gradually reduced as scientific and technological progress accelerates, and as the duration of research-and-production cycles shortens). To date, in the world technological

development (since the industrial revolution in England), supporters of this approach single out life cycles for five technological patterns which consistently replaced each other (Table 3).

Table 3. Technological patterns

Pattern No.	1	2	3	4	5
Key factor	Textile machines	Steam engine, machine tools	Electric motor, steel	Internal combustion engine, petrochemistry	Microelectronic components
Domination period	1770–1830	1830–1880	1880–1930	1930–1970	<i>From 1970 to 2010</i>

Source: (Glazyev, 1993, 2016).

The growth of conflicts between the leading countries due to the crisis of the 1930s resulted in the disaster of World War II, and the arms race after the crisis of the 1970–1980s led to the collapse of the former USSR. According to Glazyev, growth of government expenses acts as an important stimulus for the transition to a new long wave based on a new technological pattern, and today a reproductive system of the new, sixth technological pattern is being formed. (It is necessary to consider, in particular, the development of nanotechnologies as a reference point of the sixth technological pattern.)

The contemporary global economic crisis is also accompanied by an aggravation of trade, military, and political tensions. Although the latter are restrained from sliding into major military conflicts, the risk of transition to a new technological pattern through militarization, which is characteristic of developed countries, brings on serious threats to the world and must be taken into account by the BRICS countries.

1.3. Is a downward wave continuing?

It is possible to generalize and illustrate in a simplified way the theory of Kondratieff and his followers by means of *crisis points* (“long cycle”). There is a stable tendency that is clearly visible: each new deep crisis occurs *approximately 35–45 years after the end of the previous crisis*. In a very simplified form, crisis points of a long wave (according to the modern followers of Kondratieff’s theory) are: 1847–1948, 1889–1893, 1929–1933, 1974–1975, and maybe 2008–2020.

According to some supporters of Kondratieff’s theory, *the current world economic crisis is a process of replacing the dominant technological pattern*. The surge and fall in energy products prices, the global financial turmoil in 2008–2020, deglobalization, Brexit, and the global coronavirus pandemic in 2020 are probably signs of the final phase of the life cycle of the previously dominant way of production and life (in general). *The necessity of a structural reorganization of the world economy and lifestyle in general in many countries (on the basis of the new pattern) is becoming evident due to COVID-19 and the deep global economic crisis in 2020.*

In this connection, some parallels can be drawn. In particular, the contemporary economic crisis can be compared with the crisis of 1929–1933 and the crisis of 1974–1975. So, in 2008–2010 and in 2020, the global economy may be confronted with the same common threats that pushed the world into the Great Depression of the 1930s and into the deep economic crisis of 1974–1975. With deep crises we cannot rule out potential double shocks, as was the case, for example, in 1920–1921 and in 1929–1933; in 1969–1971 and then in 1974–1975, etc. The crisis of 1974–1975 was followed by another decline in 1980–1982. The economic crisis of 2008–2010 is followed by the deep economic crisis in 2020.

The works of Kondratieff and his followers give a clear answer: the world crisis that began in 2007–2008 was the starting point of *the long adverse period of economic instability and relatively deep economic crises (downward wave)*. However, *is the global economic crises of 2020 the end point of this long adverse period of economic instability, or just a new phase of the downward wave that will continue?* This issue, as well as the whole subject of long waves, remains debatable. The long waves hypothesis can also be used successfully, but only as a general empirical reference point. (This is so because the long wave theory has not been accepted by many economists, and we do not yet fully know the true causes of the long waves.)

2. Transfer to the new world economic paradigm during the contemporary global crisis

2.1. General global trends (V, W, L – approaches)

According to some leading economists and politicians, such as Krugman and Medvedev (Krugman, 2008, 2012; Medvedev, 2018), there has actually been no important economic recovery after the 2008 global economic crisis. The specific features of the 2000s and 2010s, compared to previous decades, are, among other things, relatively low global inflation (despite high oil prices) and serious problems faced by major currencies. The 2008–2010 crisis was preceded by problems related to long-term dollar depreciation; and today euro, in its turn, sometimes is also facing significant problems.

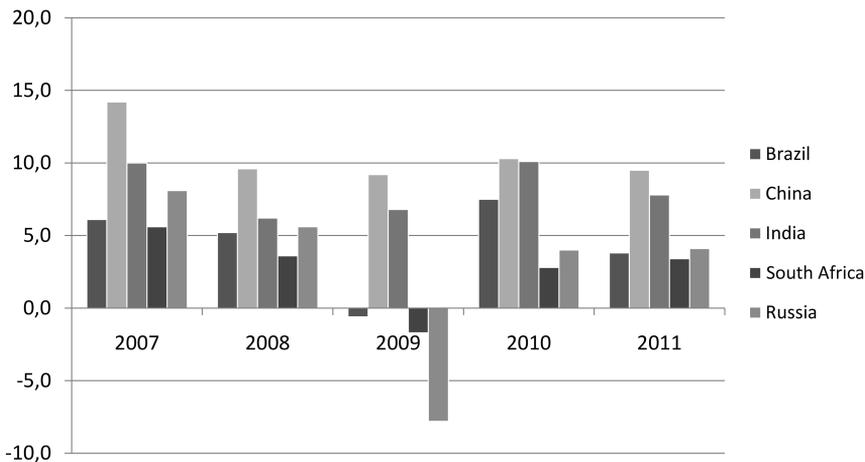
In 2008–2010, anti-crisis management was complicated by high openness and liberalization. Thus, in-house transfers of multinational enterprises (MNE) and free capital flows between countries hinder implementation of measures to get out of the crisis. The intensive artificial stimulation of the ultra-optimal liberalization by developed countries made it difficult for less developed states to implement their sovereign economic policy. Peripheral economies increased their dependence on raw material export incomes, inflow of foreign financial resources and technologies, and their economic structure was formed accordingly.

After analyzing the results of the rather deep crisis of 1920–1921, in mid-1920s, Kondratieff came to a conclusion that even more destructive global economic upheavals

were coming, and thus predicted the Great Depression and the possibility of double shocks. *Can we interpret all that happens in the global economy in 2020 as a certain second wave of the previous global crisis (2008–2010)?* (We'd like to remind that in 2010s, there were discussions about what form the post-crisis recovery of the global economy would take: V – a decline followed by substantial recovery; W – a second wave scenario, or L – a downturn followed by a multiyear depression.)

Although a number of reputable economists and politicians prefer the L-scenario as a global approach (Krugman and Medvedev), one should not ignore the second wave (W) theory as a theoretical analysis instrument for the contemporary global economic crisis. This theory (as well as the L-scenario) allows us to doubt the overly-optimistic post-crisis recovery forecasts, while the W-scenario in this situation may also be realistic. It is evident that the world economy *is experiencing two deep recessions – in 2009 and in 2020 (W, in a simplified version, i.e. the second wave scenario).*

We also remember that in 2009, the economic recession in Russia's GDP was the most deep in relation to the BRICS countries (in some BRICS countries, there was no economic recession in 2009). In 2020, Russia seems to be able to take into account and use the previous experience of other BRICS countries which succeeded in mitigating external shocks in 2009 to an important degree (for example, China and India where the state plays a significant role in the economy). (Figure 1).



Source: (IMF Real GDP Growth database, 2020).

Figure 1. Real GDP growth rates for BRICS countries in 2007–2011 (%)

However, if we take the work of Kondratieff and his followers as the starting point, it is clear that the global crisis that started in 2007–2008 was not the end point of deep instability, but a new adverse phase that has a continuation (for example, in 2020). Given the experience of previous global economic upheavals, can there be deferred negative effects and new crisis waves after 2020? *Qui vivra verra!*¹

¹ Time will tell! (*Fr.*)

2.2. The necessity of transferring to the new economic paradigm (in Russia and other countries)

Some experts believe that the global economic crises of 2008–2010 and 2020 does not fit into the concept of a normal economic cycle (7 to 12 years long, as a rule). Taking into account the theory of Kondratieff long waves, the rapid spread of COVID-19 in 2020 could probably be connected with high global economic and political instability and conflicts in many previous years (among other well-known factors).

The whole issue of long waves still remains open, while the ability to predict within this concept is not insignificant. So, we need to have a dogma-free analysis of all potential hypotheses and scenarios. Only with this approach, the evolution of the above-mentioned concepts, including that of the world-famous Russian economist Kondratieff, might allow us to set up more accurate forecast benchmarks and build long-term strategies in a more efficient way.

The current global crisis (2008–2020) has shown shortcomings of the existing institutions, both at the micro-level and in the macro-aspect (from the state and global perspectives). We should also consider the possibility of new changes in economic policy (as some post-crisis events in the past have shown). (Table 4). For example, after the global crises, there was a transfer to Keynesianism, that is, to the increasing role of national states in the 1930s, to monetarism (weakening of the role of the state) – in the second half of the 1970s, etc. In addition, during the crises in 1929–1933 and 1974–1975, similar to the current one, the recovery from the depressive economy was accompanied by a surge in military expenses, with a significant part of it being invested in the development of new technological capacities.

Table 4. Transfer to the new world economic paradigm during deep crises

Years	Economic Approaches
1929–1933	Keynesian mechanisms, growing role of the state
1974–1975	Monetarism, liberal economy
2008–2020 (?)	Neo-Keynesian approaches (?), increase of state regulation (?), protectionism (?), deglobalization (?), crash of regional integration (such as, for example, Brexit) (?)

Source: author's hypothesis.

The global economy is now quite different from what it was in the 1970s, and even more so from what it was during the Great Depression. New factors are emerging which contribute to the growth of destructive potential. In the new global environment, the transmission of crisis effects and contagion effects are multiplied.

In the first decade of the 21st century, the growing role of external factors in the economy and international synchronization of cyclic development were to some extent associated with the disintegration of the USSR and CMEA. According to many economists, in the past, the internationalization processes were hampered because the Soviet economy was extremely closed, and the CMEA was a “collective autarchy”. It also applies to China

which in the past sought a closed economy, but in a few decades, it is taking steps to become more involved in global processes.

The course of international cyclical development before the global economic crisis of 2008–2010 has an essential salient feature – its synchronization on an international scale. As a result, the time lag between entry and exit from various cycle phases (including depression) is reduced, and trends in the dynamics of different countries become similar and almost parallel in some segments. First internationalization and then globalization led to a high level of economic interdependence of various countries (before the global economic crisis of 2008–2010). In this sense, there is a difference from a number of crises in developing countries (as well as in Russia) in the 1990s which have not rendered such a destructive effect on a global scale.

Is the world economy in 2020 repeating what happened to it in 2008–2010? The particularities of the 2000s (as compared to the previous decade) are reflected in low world inflation (despite high oil prices) and a strong downward trend in the dollar. In the second decade of the 21st century, global inflation was relatively low, the euro and the dollar were unstable, but there were also relatively new processes of deglobalization (James, 2017). For example, the role of FDI in the global economy has considerably declined. Thus, the share of global FDI in world GDP fell from 5.4% in 2007 to 1.4% in 2018 (during 2010s, the share of global FDI in global GDP approximately fell by half – from 2.8% in 2010 to 1.4% in 2018; World Bank FDI database, 2020).

However, despite the deglobalization and the relatively low level of economic interdependence of various countries, in 2020 (as in 2008–2010), there is a high level of synchronization on an international scale of cyclical development of the economy in many countries (in particular, due to the similar for many countries restrictions on economic activity and travel imposed by the World Health Organization).

It is interesting that the period of increased instability began with the onset of the global financial and economic crisis of 2008–2010, and in 2020, the situation deteriorated sharply. We emphasize that the problem lies not only in the coronavirus but also in the instability of the economic growth observed in recent years in many countries (including Russia), which was noted by international organizations before the start of the COVID-19 epidemic (World Economic Outlook, 2019, pp. 1–2, 39–41).

2.3. Some new risks for the BRICS countries

Financial difficulties make it more possible for many countries (for example, the BRICS countries) to use protectionist measures. International rules of the game require world participants to give their assurances that protectionism is unacceptable. However, these approaches may differ on the country level. Given the intensifying regulation and growing instability, the issue of direct or indirect forms of protectionism will constantly be in the focus of attention of national regulators.

As a result, in many countries today we may expect a return to active government participation in the economy. BRICS must take into account that the significance of both international and supranational regulation at the level of governments and central banks,

integration groups, and other international organizations is likely to increase. The level of emerging global risks suggests that BRICS, as an association of five major emerging national economies and an important international organization, should use the entire range of all potential tools, both vertically and horizontally, which will allow to neutralize new risks and increase the chances of post-crisis growth.

The international economic organizations (IMF, World Bank, WTO, and others) may address the issue of fighting protectionism, with a special emphasis on protectionism as an inadmissible form of trade policy. Obviously, it is desirable for the BRICS countries that the possibility of applying an independent trade policy (i.e. protectionism) should not be excessively limited. (It also concerns the lack of consistency in the implementation of regulatory actions in the Russian economy.)

There is also another important global threat. Excessive international liquidity in the world today may lead to an increase in risks associated with the US dollar and the Euro. In general, it has shown important systemic fluctuations in recent years. Thus, any new possible worsening of the economic situation in the US and the European Union, as well as possible new dollar and euro injections, make the future of the US dollar and the Euro more complex. In some situations (for example, in the case of a pessimistic scenario), one cannot exclude the case when developed countries will use all possible tools to shift the center of gravity of the crisis from developed countries to other countries (i.e. the BRICS countries) with subsequent global tensions.

Today, some fundamental factors have come into play – the BRICS countries must take into account the risks of developing negative economic trends abroad. Overall, the main threats to economies of the BRICS countries are still represented by external risks. For example, a slump in the European economy and a slowdown in the economic growth in developed countries (particularly, in case of the pessimistic scenario) may result in lower commodity prices and other negative consequences for the Russian economy.

Over the year, the Russian economic structure deteriorated, with the economy becoming more dependent on external demand. Even though in June 2020, the government of Russia will start to ease the restrictions on economic activity and travel, it is still too early to talk about any stable positive changes. In Russia and in many other BRICS countries, there is still a risk that several indicators may show unfavorable trends.

For example, global recessionary processes and the rapid spread of COVID-19 have adversely affected the Russian economy. According to many forecasts, in 2020 we will have a considerable deterioration of some indicators in the Russian economy compared to the previous year:

- decrease in real GDP
- decrease in industrial production (especially in the manufacturing sector)
- federal budget deficit
- decrease in investments
- reduction of real disposable household income
- growth of inflation
- high volatility of the ruble exchange rate
- rising unemployment.

In particular, given the growing fluctuations of the ruble exchange rate, it is possible that inflationary trends may occur in Russia in the short, medium and longer periods. All types of inflation have substantial economic and social effects; and these effects are usually adverse:

1. Devaluation of savings is detrimental to recipients of fixed incomes (pensions, wages, salaries, and interest on bank deposits).
2. There is a decrease in the actual value of time deposits, insurance policies, fixed-rate annual rents, etc. Inflation also redistributes income between borrowers and lenders in favor of the borrower.
3. In general, economic relations are distorted, and many risks in long-term lending and investing processes become higher. For example, liquid funds can flow into short-term speculative transactions, including transactions aimed at preserving the purchasing power of monetary resources.
4. Inflationary expectations could lead to a constant rise in prices, which, in the absence of appropriate mechanisms and tools of control, may result in constant rising inflation and social tensions.

The government's optimal pricing policy will contribute to both slowing down the inflation rate and building an efficient market economy with the maximum possible use of the price mechanism to make the national economy more competitive. However, with the monopolistic ("imperfect") structure of some Russian markets that has taken shape in the past decades and has remained unchanged to this day, the pricing practice often leads to excessive enrichment of certain companies and individuals at the expense of the population and the entire economy, rather than to improved production efficiency.

In this situation, it is necessary to enhance the role of the anti-inflationary policy which, among other things, should provide for a more efficient utilization of budgetary funds; take measures to increase supply of some goods and services; stabilize the ruble exchange rate; take measures to reduce costs and modernize enterprises; make organizational improvements, enhance infrastructure, stimulate investment activities and competition.

If well balanced, comprehensive anti-inflationary measures taken by the government can produce positive results. In this regard, it is worth repeating that the most important measures listed below also deserve attention:

- reduce tariffs of natural monopolies
- control public spending
- stimulate production (including agriculture) and formulate stable rules for import regulation
- support investing activities and competition
- other.

3. Russia: A desirable departure from the old economic approaches

It seems necessary to review some of the previously mentioned principles underlying macroeconomic policy (with a view to combat inflation), specifically:

- optimal degree of the openness of the Russian economy in general
- acceptable level of its dependence on imported foods
- support of some branches of domestic manufacturers.

Anti-crisis measures and budget deficit in Russia may lead to high inflation and also to a noticeable rise in the volume of domestic and foreign debt of the Russian government both in the short and medium term, and may foster the diversification of debt tools. Broader use of debt policy tools can contribute to the creation of more flexible mechanisms for solving important issues in different areas (budgetary, monetary, social, etc.). At the same time, such policy needs to be well balanced and has to be monitored on an ongoing basis. It's necessary to form and maintain demand for government debt instruments. (The placement of new securities should not cause a "crowding out" effect when financial resources are diverted from other segments of the economy.) As a result, government debt service expenses (both in absolute and relative terms) may grow. The deterioration of foreign economic environment and unfavorable internal economic factors may cause a tangible increase in the domestic and foreign debt service ratio. In the future, this may create an additional burden on the Russian Federation budget.

The old approaches promote *conservation of the export-raw material orientation of the Russian economy*, since an exporter of raw materials by selling currency earnings and receiving the ruble basically forms demand for other economic sectors which are increasingly starting to serve the interests of this sector. *We set a departure from the export-raw material orientation of the economy as an important systemic objective.*

Thus, we may now expect a return to a more active state participation in the economy, both in Russia and abroad, with a broad range of mechanisms used (including some protectionist measures). The importance of international and supranational regulation may also grow. Assuming the role of the European economies and the Euro in Russia's foreign economic relations, the crisis trends in developed economies (primarily, in Europe), if further aggravated, may substantially hold back Russia's development in the near future. In such circumstances, a model that relies on internal growth mechanisms is of a paramount importance. But it is too early to speak about a total departure from the old approaches with external factors predominating as growth drivers.

In the long run, transition to innovative development assumes creation of a "new economy" — a knowledge-intensive economy that must gradually become one of the leading national economy sectors. In the long run, growth rates of the manufacturing industries can potentially exceed the extraction industry growth rates.

However, if certain negative phenomena are observed, particularly in the sphere of investments, the modernized traditional economy sectors (including hydrocarbons, commodity, agriculture, and transport) surely will not have negligible significance. In any case, the regulatory authorities in Russia need to take a number of important steps to improve the situation. Among other things, the investment sector needs such measures as:

- stronger anti-corruption efforts
- fewer administrative barriers
- promotion of tax allowances
- streamlined migration policy

- improvements of the legal and judicial systems
- systemic efforts in enhancing the investment image of Russia.

Due to the high degree of openness of the Russian economy, its development today largely depends on the dynamics of world demand for Russian export goods and foreign investments. Given the current negative trends, in the future the industry needs efficient support to enhance its competitiveness in both the domestic and foreign markets.

We need to bear in mind that in the context of an “open” export-oriented Russian economy based on intensive exports of oil and natural gas, the growth was unstable. For example, the Russian monetary and currency systems were not sufficiently protected against the impact of oil and gas price fluctuations, capital outflow, “currency wars”, “debt crisis”, and other destabilizing external factors. At the same time, approaches to the free-float exchange rate regime increased the volatility of the rouble. To minimize adverse effects and neutralize external shocks, we will need to reckon potential impact of the above factors on economic growth rates, inflation, gold and foreign exchange reserves, and other factors in the coming future. Taking into account the risks of deep economic crises, the inflow of speculative foreign resources should be treated more carefully and consider the duration of stay, origins, sphere of investing (taking into account economic priorities), terms and conditions of repatriation, etc.

However, the new forecasts (as of May 2020) adopted by the Bank of Russia that imply relatively high annual growth rates of the Russian economy in 2021–2022 (1.5–5.0%) and financial stability support to a sensible extent at the expense of internal sources, are noteworthy (Monetary Policy Report, 2020, pp. 6, 14). The trend towards increasing importance of internal economic factors, taken as an implication in Russian official forecasts, may indicate an attempt to move away from the economic model which existed in Russia before the crisis. The actual deep economic crisis in Russia raises hopes for the beginning of a gradual transition to a new model of development (more complex and relatively reoriented from developed countries to the BRICS countries).

Conclusions

Kondratieff long waves were successfully used by the author in the business and banking sphere. Thus, taking into account Kondratieff waves, the observed economic crisis (2008–2020) in many countries is primarily associated with fundamental structural factors and systemic errors.

The current global crisis (2008–2020) has revealed the drawbacks of existing institutions, both at the micro and macro levels (from the government and global standpoints). In 2009, crisis management became even more complex in a highly transparent and liberalized world. For example, intra-company transfers within transnational corporations and free capital flows between countries complicate the implementation of recovery measures. However, in 2010s, we saw a wave of protectionism and deglobalization, and the crisis of the European Union (Brexit, a very weak European reaction to the COVID-19 pandemic in 2020, etc.). But the integration process within BRICS has another nature, and so it must be accelerated.

The COVID-19 epidemic and the economic crisis of 2020 have once again demonstrated the importance of future basic scientific research. In particular, it is necessary to continue the study of Kondratieff long waves, taking into account the hypothetical downward wave (a long turbulent period of instability and crises), the effects of the COVID-19 epidemic, and other possible new negative factors. The rapid spread of COVID-19 can probably be seen not as a fundamental cause, but only as a trigger for the global economic crisis in 2020.

We remember that after the global crisis of 1930s, countries started switching to Keynesian approaches in economic policy, i.e. a higher role of the national government. Taking into account Kondratieff waves, the second half of the 1970s can also be described as an important crisis point of long wave, and there was also a transition, but it was a transition to monetarism that assumed a weaker role of the government.

In addition, given the current crisis point of long wave, in the medium and long term, we would like to see in many countries (including the BRICS countries) considerable new changes in macroeconomic approaches, as is the case after particularly deep crises that mark the change in the currently prevailing technological pattern. Such changes may be towards Neo-Keynesian approaches, i.e. stronger regulatory approaches. In some cases, the significance of both international and supranational regulation is likely to increase. Thus, the high level of emerging global risks suggests that BRICS, as an important international organization of the five major developing national economies, should use the entire range of all potential tools to jointly solve many urgent economic problems.

The current global crisis (2008–2020) has revealed new phenomena in the global economy and suggests essential global transformations. In particular, in 2009 and 2020, the global GDP showed a negative growth for the first time since World War II. First internationalization and then globalization have led to close economic interdependencies between different countries (before the global economic crisis of 2008–2020). Despite further deglobalization, contemporary crises have acquired high potential for destructive economic impact. The collapse of the Soviet Union might also have played its role (with a 15–20-year lag), since the previously self-contained Soviet economy and the “collective autarchy” of COMECON had put a drag on internationalization processes. The same applies to China, which previously had always wanted to be a self-contained economy, but a few decades ago started moving towards a higher exposure to global processes.

Russia seems to be able to use the experience of the BRICS countries, which largely succeeded in mitigating external shocks in 2009 (for example, China and India, where the state plays a significant role in economy, took measures to strengthen their internal sources of growth and expand domestic demand – in particular, China). In the context of turbulence inherent in such times, the private sector was unwilling to make long-term investments in the development of radical and quite risky technologies. In China and India, the governments assumed a significant portion of costs required for transition to a new technological pattern, particularly those related to exploration, investment in infrastructure, and personnel training.

In general, decisions taken by the Russian regulators should be based on a more balanced, verified, and risk-free approach towards integration into the Western economy. The reliance on external financial inflows from exports of raw materials and associated risks of contagion from external crises/shocks should in many cases be replaced by mechanisms of economic development based on domestic sources. In a more systemic way, creating domestic sources of growth (based on household and domestic private sector demand) is necessary and should play a major role.

The contemporary economic crisis in Russia gives rise to hopes for the beginning of a gradual transition to a new model of development (more innovative and reoriented from the Western countries to the BRICS countries). Regulators and businesses in Russia and other BRICS countries should be open to using new tools and mechanisms that respond to new challenges. The high probability of a protracted nature of the crisis and its further deepening should be taken into account. It is necessary to consider the use of a wide range of measures and approaches that will make it possible to reverse the current situation.

References

- Ershov, M., Tanasova, A., & Tatusov, V. (2014). Ekonomika RF, begushchaya po volnam. *Analiticheskii bankovskii zhurnal*, 14, 33–35 (The Russian economy: She who runs the waves. *The Analytical Banking Magazine*, 14, 33–35). https://fief.ru/img/files/Ersov_M.V._Akonomika_RF_begusa_po_volnam.pdf
- Glazyev, S. (1993). *Teoriya dolgosrochnogo tekhniko-ekonomicheskogo razvitiya (The theory of the Long-term Economic Development)*. VlaDar.
- Glazyev, S. (2016). *Poslednyaya mirovaya voyna. SSHA nachinayut i proigryvayut (The last World War. USA is starting and losing)*. Knizhnyi Mir.
- Grinin, L., Tessaleno, D., & Korotayev, A. (Eds.). (2012). *Kondratieff waves. Dimensions and prospects at the dawn of the 21st Century. Yearbook*, Uchitel.
- James, H. (2017). *Deglobalization as a global challenge*. Centre for International Governance Innovation. CIGI Paper No. 135, June 28. https://www.cigionline.org/sites/default/files/documents/Paper%20no.135WEB_1.pdf
- Juglar, C. (1862). *Des Crises commerciales et leur retour periodique en France, en Angleterre, et aux Etats-Unis*. Guillaumin.
- IMF Real GDP Growth database. (2020). https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC
- Kitchin, J. (1923). Cycles and trends in economic factors. *The Review of Economics and Statistics*, 1, 10–16.
- Kondratieff, N. (1989). *Problemi ekonomicheskoi dinamiki (Issues of economic dynamics)*. Economica.
- Kondratieff, N. (1984). *The long wave cycle*. Richardson & Snyder.
- Korotayev, A., & Tsirel, S. (2010). A spectral analysis of world GDP dynamics: Kondratieff waves, Kuznets swings, Juglar and Kitchin cycles in global economic development, and the 2008–2009 economic crisis. *Structure and Dynamics*, 1, 3–57.
- Krugman, P. (2008). *The return of depression economics and the crisis of 2008*. W. W. Norton.
- Krugman, P. (2012). *End this depression now!* W. W. Norton & Company.
- Kuznets, S. (1930). *Secular movements in production and prices*. Houghton-Mifflin.
- Kuznets, S. (1961). *Capital in the American economy: Its formation and financing*. Princeton University Press.

- Kuznets, S. (1966). *Modern economic growth: Rate, structure, and spread*. Yale University Press.
- Lohmachev, B., & Tatuzov, V. (2006). Vneshnie riski i ekonomika Rossii. *Analiticheskii bankovskii zhurnal*, 12, 33–35 (External threats facing the Russian economy. *The Analytical Banking Magazine*, 12, 33–35). https://fief.ru/img/files/ABJ_dek_2006.pdf
- Medvedev, D. (2018). Rossiya–2024: Strategiya social'no-ekonomicheskogo razvitiya. *Voprosy Ekonomiki*, 10, 5–28 (Russia–2024: The strategy of social and economic development. *Issues of Economics*, 10, 5–28). <https://doi.org/10.32609/0042-8736-2018-10-5-28>
- Monetary Policy Report. (2020). CBR, No. 2. https://www.cbr.ru/Collection/Collection/File/27863/2020_02_ddcp_e.pdf
- Sadovnichij, V., Akaev, A., Korotayev, A., & Malkov, S. (2014). *Kompleksnoe modelirovanie i prognozirovanie razvitiya stran BRICS v kontekste mirovoi dinamiki (Complex modeling and forecasting of the development of the BRICS countries in the context of the world dynamics)*. Nauka.
- Sadovnichij, V., Yakovets, Y., & Akaev, A. (Eds.). (2014). Perspektivy i strategicheskie priority voshkhozheniya BRIKS. MISK — INES — NCI BRICS (Prospects and strategic priorities for BRICS ascension. International Sorokin–Kondratieff Institute — Institute of Economic Strategies — National Committee on BRICS Research). http://nkibrics.ru/ckeditor_assets/attachments/548e7dc36272693788000000/sokraschennaya_versiya_doklada.pdf?1418624451
- Schumpeter, J. A. (1934). *The theory of economic development*. Harvard University Press.
- Schumpeter, J. A. (1939). *Business cycles. A theoretical, historical and statistical analysis of the capitalist process*. McGraw-Hill Book Company.
- Schumpeter, J. A. (1949). *The theory of economic development. An inquiry into profits, capital, credit, interest, and the business cycle*. Harvard University Press.
- Tatuzov, V. (2018). Finansovaya sfera RF: Nekotore negativnie vnechnie factori. *Sbornik trudov volnogo ekonomicheskogo obchestva*, 5, 446–455 (Russian financial sector: Some negative external factors. *Scientific works of the free economic society of Russia*, 5, 446–455). http://veorus.ru/upload/iblock/c9e/veo_213.pdf
- Tatuzov, V. (2019). Ne priblizhaetsja li mirovaja jekonomika v izvestnom smysle k povtoreniu sobytij desjatiletnej davnosti. *Vol'naya Ekonomika*, 1, 1 (Is the world economy repeating what happened to it ten years ago. *Free Economy*, 1, 1). <http://freeconomy.ru/mneniya/ne-priblizhaetsya-li-mirovaya-ekonomika-v-izvestnom-smysle-k-povtoreniu-sobytij-desjatiletnej-davnosti.html>.
- World Bank FDI database. (2020). <https://data.worldbank.org/indicator/BX.KLT.DINV.WD.GD.ZS>.
- World Economic Outlook. (2019). IMF, pp. 1–2, 39–41 (October). <https://www.imf.org/en/Publications/WEO/Issues/2019/10/01/world-economic-outlook-october-2019>

Towards a new ecological and human type of national accounting for developing economies (the CARE/TDL model)¹

Jacques Richard*,

University of Paris Dauphine (France)

Reference to this paper should be made as follows: **Richard, J.** (2020). Towards a new ecological and human type of national accounting for developing economies (the CARE/TDL model). *BRICS Journal of Economics*, 2 (1), 41–58. <https://doi.org/10.38050/2712-7508-2020-9>

Abstract

The goal of this article is to propose a radical reform of the today's financial accounting system of businesses accompanied by a corresponding reform of the system of national accounts. It transforms them into genuine ecological and human systems of accounts that can systematically conserve the three main types of capitals which are necessary for the functioning of any economic system. This is a radical means of overcoming the dramatic ecological and human crisis in which the humanity is buried today. This can be done by applying traditional weapons of capital conservation, invented at the end of the Middle Ages by big capitalists for the protection of their financial investments, to human and natural capital. We notably use the famous double entry accounting depicted by Werner Sombart and Max Weber like certain martial arts use the force of the adversary against him. As a result, we come to a complete redefinition of the main concepts of the economics, especially the concepts of capital, profit and market, and to the possibility of a new type of firm management that allows us to get out of the capitalist system.

Keywords: green national accounting, environmental accounting, human accounting, green finance, ecological accounting against IFRS.

JEL: M00, M41, Q56.

3. The necessary changes in the basic concepts of national accounting

We are going to demonstrate that the basic concepts of added value and GDP (Gross Domestic Product) will be completely transformed by the new national accounting system derived from the CARE/TDL model. We use a simplified example to explain the effects

¹ The final part of the article, see the first part in No. 1.

* E-mail for correspondence: jacques.richard17@laposte.net

of applying the CARE/TDL method both at the micro (businesses) and macro (nations) levels.

We suppose that economy of a certain nation is comprised of only one enormous enterprise X which has just been founded by merging several other businesses. Thus, at the beginning of the observed period, its balance sheet (BS) appears as follows according to the traditional capitalist presentation (NB: units of currency are not given, only the reasoning matters):

Initial BS, Firm X

Assets	Liabilities
Machines, tools, and other assets (MTO) 2000	Financial capital 2000

As is common, workforce and nature do not appear in such a BS, although the workers² are already hired for three years³ at the beginning of the period with a possibility of a renewal. We admit now that for the year to come this company will have three types of activities requiring three types of workforce with different wages: 1) Extraction: 200; 2) Fabrication and sale: 300; 3) Maintenance (of the MTO): 200. The total cost of production and sale is then 700. We admit that the entire production is sold during this period for 1200 to the nation's consumers (including both salaried people and capitalists) and that they consume all of it during the same year.

Let us now present the traditional capitalist balance sheet and P&L statement for this first year before distribution of profits but after wages were paid.

Final BS, Firm X

Assets	Liabilities
MTO (2000 – 200 + 200) 2000	Financial capital 2000
Cash 500	Profit 500

P&L, Firm X

Expenses	Revenues
Wages (total) 700	Sales 1200
Depreciation expenses of MTO 200	Production of MTO 200
Profit 500	

Figures above are the classic ones. The only item that warrants an explanation is the “production of MTO” which represents what the workers in charge of the renewal of machines and tools did. This is indeed an internal production valued at its labour

² The category of “workers” is to be understood in a very large sense as encompassing every person that works in a nation, including financial capitalists that, beyond their contribution in the form of financial capitals, also devote their time to some work inside a firm.

³ This short length of time is chosen for simplicity of treatment.

cost that makes revenues go up and enables the maintenance of the financial capital, for instance, of machines and tools⁴.

Now, what is the traditional presentation of national accounts in the case of this “firm/nation”? We know that the traditional accounting instrument of national accounts is a kind of P&L focused on the concept of added value popularised under the name of domestic product (DP). Two types of domestic products are generally calculated: the Gross Domestic Product (GDP), and the Net Domestic product (NDP). The first one is calculated before the deduction of the depreciation of the long-term investments, the second one – after this deduction. Since the GDP is incorrect from a theoretical point of view, we focus on the NDP here. It can be calculated in two different ways: the deductive process and the additive process. For the deductive process, we deduce the depreciation expenses from the production during the period. In the case of X, the net added value of the period is equal to 1400 (global production) minus 200 (depreciation expenses), which brings us to a total of 1200. For the additive process, we have to add all the items corresponding to the distribution of the net added value, which is 700 (wages) + 500 (Profit) that equals 1200. In either case, the NDP of the period is equal to 1200. As a conclusion, we put emphasis on the fact that the figures we used are all directly taken from the capitalist model of accounting for businesses without any major correction.

Now we take the case of the CARE/TDL model. We examine two different situations. In the first one, we assume that this capitalist firm is (nevertheless) perfect, as far as the preservation of both NC and HC is concerned, and uses the CARE/TDL model⁵. More realistically, in the second case it does not respect the preservation of these capitals.

A. The first case (perfect sustainability). To simplify, the capitalist firm/nation pays its workers enough to preserve the labor force and respects all the criteria of resilience in using the natural capital. On this basis we show, first, the initial BS, then the final BS and the P&L.

Initial BS Firm X

Assets		Liabilities	
MTO	2000	Financial capital	2000
Work force (CU)	2100	Human capital	2100

In this balance sheet, the company owes its employees a debt of 2100 for a period of three years (it means 700 a year). This debt is registered at the time of their recruitment as the human capital on the liabilities side. The counterpart of this capital-debt is the cost of use (CU) of this human capital for the same period (and not the workforce or, even worse, the worker him/herself, like at the time of slavery). The natural capital does not appear because this firm, on account of its good ecological management, does not need to plan a budget for resilience. One year later, the situation is as follows:

⁴ We are aware that valuation of the cost of products that are not sold, such as maintenance of the machines and tools, can create problems, but these are secondary questions. We operate here according to the famous principle of prudence which has been dominating the scene in capitalist business accounting for centuries.

⁵ In a sense, this firm is no longer a capitalist one.

Final BS, Firm X

Assets		Liabilities	
MTO (2000 – 200 + 200)	2000	Financial capital	2000
Work force (CU) (2100 – 700 + 700)	2100	Human capital	2100
Cash	500	Common profit	500

The “fate” of the human capital is totally in line with that of the financial capital. This human capital was conserved thanks to the “reinvestment” of a normal pay (700) taken from new resources (cash) associated with the sales. This allowed the new cost of using employees to be equal to their capital to be maintained (2100). This situation can be compared to that of the financial capital: the mechanisms of conservation are strictly identical. This equality can also be noticed at the level of the P&L statement.

P&L Firm X (CARE/TDL)

Expenses		Revenues	
Depreciation expenses of the HC	700	Sales	1200
Depreciation expenses of the FC	200	Production of MTO	200
Common Profit	500		

If the revenues are unchanged in form and content, expenses are a whole different story. We are no longer concerned with wages but with “depreciation expenses of the human capital”. Here again, the symmetry with the financial capital’s treatment is totally respected: in both cases it is a matter of depreciation of capital to be maintained. The workforce has been treated as a capital to be maintained for itself and no longer as a simple means and a burden on the financial capital. This equality of fate for both FC and HC is also at stake in the matters of profit. Since two capitals are necessary for the company’s activities and identified as having equal “rights”, one has no choice but to admit that they both contribute to the profit registered for the period. Consequently, the profit is no longer that of the financial capital but “common profit”. These two main changes in the treatment of expenses and profits will have enormous consequences for the concepts used in national accounting if we apply the principles of the CARE/TDL method to this kind of accounts.

Let us first take the case of expenses. Earlier, according to the deductive approach, we figured out the NDP by deducting the depreciations of the financial capital from the whole of revenues (or product). This is normal since we have to take the use of the financial capital during the period into account. What is not normal is that this rational treatment is not applied to the human capital! If we consider there is no net product until we have deducted the expenses for the financial capital’s conservation, logic dictates that we accept the necessity to do the same for the human capital’s depreciations. In other words, it means at least two main lines of depreciations are to be deducted from the GDP to get the NDP – the depreciation of the FC, and the depreciation of the HC. It is only after we made these two types of deductions that we can speak of a net product according to the CARE/TDL method. In that case, the normal “wages” (700) paid

to the workforce for their preservation, and thus only for the preservation of their capital, should not be considered a revenue but only a compensation for the use of this human capital. It is the same thing for a capitalist: the compensation for the use of his financial capital (the depreciation expenses) cannot be considered an element of his net product, i.e. his financial profit. All this reasoning implies that in our case the NDP calculated according to the deductive approach is absolutely not equal to 1200 but only to 500 ($1400 - 200 - 700$). The traditional calculation of the NDP's obvious mistake is also repeated in the additive mode of calculation which generally boils down to summing up the profits and the wages (in the simple case where there are no interests and no taxes). The error here is to assimilate wages and profits. This assimilation is completely biased (fraught with a bias). In traditional accounting, while profit is a surplus after systematic conservation of the financial capital, wages are a contractual (market) allocation that for the great majority of human beings is barely enough to support their lives, let alone the part of population who are starving. In the CARE/TDL approach, we do not talk about a surplus for the HC as long as it has not been paid for its preservation. Thus, as a conclusion, in our case the normal "wages" of 700 are only a compensation for maintaining the human capital, not a part of an "added value". Only the (new) profit of 500 can be considered an element of the NDP once every new "capitalist" has preserved their capital⁶. This leads us to the following comment on this new concept of profit.

In a pure financial capitalist view, which is also the view of the traditional theory and practice of national accounts, the profit is the excess above the financial capital which remains at the disposal of financial capitalists. This is not the case in the CARE/TDL method. In this method, the profit is defined as the *common* surplus after the conservation of the three main capitals that are the NC, the HC, and the FC. It can be seen as the "true economic profit" since this new kind of economics really cares for all three capitals equally. In a way, we can talk here about a kind of "tri-capitalist view" (Richard, 2012). This article's goal is not to study the conditions under which this common profit has to be certified by new (independent) auditors and distributed among the new "capital-holders" as defined by the CARE/TDL approach (for that, see Richard (2015b) and Richard and Rambaud (2018)). Here we only use this concept of a common "true economic profit" to redefine the concept of the NDP. To conclude, the new P&L statement (or set of P&L statements) that will be the basis for the calculation of the new concept of a sustainable NDP appears as follows:

1) Calculation of the NDP (deductive method)

Expenses	Revenues (products)		
Depreciation expenses of the HC	700	Sales	1200
Depreciation expenses of the FC	200	Production of MTO	200
NDP (net added value)	500		

⁶ Financial capitalists will also maintain their human capital if they agree to work, which should be the case in a normal society.

2) Distribution of the NDP (net added value)

Distribution to the HC	X	NDP (net added value)	500
Distribution to the NC	Y		
Retained added value	Z		

Here we have a situation in which companies and other entities that make up the nation already respect the criteria laid for a sustainable management according to the CARE/TDL method. In fact, this refers to an optimal situation, so we need to work on a more realistic and complex case.

B. The case where businesses and national entities do not respect the 12 principles of the CARE/TDL model. Let us modify our case and change some data. We will take two kinds of problems into account. The first one has to do with the natural capital: we now admit that X's management style is not compatible with genuine ecological sustainability, and that transformation of this management implies a series of new costs at all levels of the firm. More precisely, we suppose that a new sustainable management requires a rise of 420 of all initial costs in the initial BS with hiring new employees and materials, both *specialised in ecology*. This amount constitutes the NC in the new initial BS for a period of three years. But we will also introduce another complication. We suppose now that, unlike in the previous case, the level of wages of the "old" employees is below the normal rate, which does not allow both real conservation and "normal" life, and that to reach this level, a general rise of 10% is necessary. Therefore, the human capital should be increased from 2100 to 2310 (for three years). We can now give a new version of the initial BS.

Initial BS, Firm X (CARE/TDL)

Assets		Liabilities	
MTO	2000	Financial capital	2000
Work force (CU)	2310	Human capital	2310
Specialised assets (CU)	420	Natural capital	420

The rest of the reasoning is in accordance with the previous developments. We give now the final BS and the corresponding P&L statement at the end of the first period. We suppose here that the firm has *not* taken the measures necessary to cope with the human and environmental situations, a mistake that will appear in its CARE/TDL balance sheet.

Final BS, Firm X (CARE/TDL)

Assets		Liabilities	
Machines and tools (2000 – 200 + 200)	2000	Financial capital	2000
Work force (CU) (2310 – 770)	1540	Human capital	2310
Specialised assets (CU) (420 – 140)	280	Natural capital	420
Cash	1200	Common profit	290

In that case, two important events appear in the accounts. First, profit is reduced to take the real ecological and human situation of the firm into account. Second, the simple perusal of the balance sheet allows the reader to understand that the firm has not respected its obligation to preserve natural and human capitals: it has not invested money to preserve it despite having sufficient cash. Thus, it becomes easy to precisely calculate the *level of indebtedness* of the firm to the human capital and the natural capital by comparing the unpaid amount to the total of the debt registered on the liabilities' side.

Indebtedness to the human capital	$770/2310 = 33,3\%$
Indebtedness to the natural capital	$140/420 = 33,3\%$

It is only the presence of the human and ecological balance sheet that makes this type of calculation possible. We will later show the importance of a true and complete set of accounting documents that includes a national balance sheet when we will discuss and criticize some national accountants' attempts at evaluating state environmental burdens without the help of balance sheets. Let us now give the corresponding P&L statement to complete the scene.

P&L, Firm X (CARE/TDL)

Expenses	Revenues	
Depreciation expenses of the HC	770	Sales 1200
Depreciation expenses of the NC	140	
Depreciation expenses of the FC	200	Production of MTO 200
Common Profit	290	

Compared to the past situation, the common profit of the NDP has now decreased from 500 to 290. This result will also appear in our CARE/TDL national income statement:

Calculation of the NDP (deductive method)

Expenses	Revenues (products)	
Depreciation expenses of the HC	770	Sales 1200
Depreciation expenses of the NC	140	Production of MTO 200
Depreciation expenses of the FC	200	
NDP (net added value)	290	

Let us now compare our accounting model with the (classic) pure capitalist model. Below we see figures for the latter according to the deductive model:

Calculation of the NDP (deductive method)

Expenses	Revenues (products)	
Depreciation expenses of the FC	200	Sales 1200
NDP (net added value)	1200	Production of MTO 200

As is shown, despite all the changes introduced by the problems relative to the national firm's situation, the "official" NDP remains the same. Discrepancy between the apparent added value (or NDP), i.e. 1200, and the real added value (290) reaches 910. In the previous case (with all conditions of sustainability respected), this discrepancy was only 700 (1200 – 500). The marginal rise of 210 can be explained by the complete absence of consideration for the natural and human capitals' real situations. It means that the damages they sustained in regard to maintenance standards were not taken into account. Consequently, the sum of the effects of this absence of ecological and human considerations and the false conception of added value explain the global environmental gap (when compared to the macro CARE/TDL model). This kind of traditional national accounting is a pure representation of the capitalist accounting ideology – ideology based solely on conservation of financial capital and on its corresponding concept of profit. In conclusion, we want to emphasize how valuable correct balance sheets are for calculating important environmental information. Some environmental economists, like Ekins et al. (2018; see below), propose that we compare the sum of the environmental costs to be paid to guarantee the functions' resilience with the traditional NDP's total in order to indicate the "intensity of environmental monetary unsustainability"⁷. In our example, this ratio would look as follows:

$$\frac{\text{Total environmental expenses to pay for three years}}{NDP} = \frac{420}{1200} = 35\%$$

Actually, this ratio is supposed to give an idea of the pressure of the environmental debt on the revenues dedicated to the funding of environmental expenditures. There are two reasons why this is not a valid indication. The first one is that it compares three-year-long expenses with one-year-long revenues. The second one is that it implicitly considers that all revenues, including the revenues from the preservation of the human capital, are available for financing the environmental expenses. Even in traditional capital finance, this is not the case. Generally, only profits are considered when performing this type of calculation. If we take these two points into account, the correct ratio should be:

$$\frac{\text{Total environmental expenses to pay for three years}}{NDP} = \frac{420}{1200} = 35\%$$

This kind of indicator measures the possibility of paying the environmental debt while the first one measured the degree of indebtedness. In both cases, it appears that only the CARE/TDL model may provide adequate figures.

Here we complete the presentation of the bases of the CARE/TDL method for the reconstruction of business and national accounts. Further, we are going to compare

⁷ "The ratio between the sum of M-ESGAP across the environmental and resource indicators (G-ESGAP) and GDP may indicate the 'intensity of environmental monetary unsustainability'" (Rees & Wackernagel, 1999).

this conception with some major works on environmental (and/or, more rarely, social) national accounting systems that try to remedy the defaults of the classic capitalist one.

4. Some distant and recent attempts to rebuild the capitalist national accounting system, their evaluation and comparison with the micro-macro CARE/TDL model

4.1. Presentation of the issue: A wide range of environmental accounting systems

In the old days, there were many attempts to restructure national accounts in an ecological and/or human way (see, notably, Richard, 2012). After initial steps in the works by Kapp (1950), Ciriacy-Wantrupt (1952) and Georgescu-Roegen (1971), these new types of national accounts began to emerge massively in the 1970s. They are characterised by very different features. There is a huge gap between those based on non-monetary units and those that rely on the use of monetary valuations. In the first category we can find those based on eco-points (for example, Müller-Wenck, 1972), on units of solar energy (such as the works of Odum (1971), and Pillet (1998)), and those based on units of land surface, such as the ecological footprint developed by Rees and Wackernagel (1999). These attempts at developing non-monetary systems of national accounts deserve respect and interest, especially since they are generally conceived within the frame of a strong conception of sustainability in reference to ecological limits (Richard, 2012, 64–67). But, unlike the CARE/TDL method, they have no ambition to replace today's dominating systems of accounting based on monetary valuations, such as the IFRS and the national GDP or NDP. This is the reason why our comparison focuses on environmental and human monetary systems of accounting, more specifically, on those that should be used as national accounts. This last category can be divided into SNA which will rely on a weak sustainability approach, and those that, on the contrary, will rely on a strong one.

Among the first ones we find mainly the Sustainable Measure of Economic Welfare (SMEW) initiated by Nordhaus and Tobin (1972), the Index of Sustainable Economic Welfare (ISEW) by Daly and Cobb (1989), the Genuine Progress Indicator (GPI) by Cobb and Cobb (1994), the System for Environmental-Economic Accounting (SEEA, 2003) promoted by a range of international organizations (notably, the UNO, the EU, the OECD, the IMF and the WB), and the Genuine Saving model as first conceived by the World Bank in their book "Where is the Wealth of Nations" (2006). All these types of accounting share the same fault: they allow compensations between the three types of capitals, as shown by Meda (1999, notably, pages 338 and following), Richard (2012, notably ch. 6–7), Gadrey & Jany-Catrice (2012) and, more recently, Ekins et al. (2018). That is why we do not pay attention to these models, although they unfortunately represent what can be considered modern mainstream approach. For us, they cannot

be proper models to deal with today's environmental and human crisis (for more details see Richard, 2012, and Ekins et al., 2018)⁸. Instead we compare the CARE/TDL model with the (rare) attempts aiming at strong sustainability in the frame of monetary accounts. It was the Dutch economist Hueting who made the first commendable proposal. In 1989, he suggested to abandon the neo-classical environmental accounting systems based on cost benefits analysis which aimed to get an ecological optimum through the internalisation of externalities. Instead he proposed to calculate the global cost of maintaining or restoring the nation's environmental functions taking into account environmental scientific-based limits that must be strictly respected⁹. The ultimate goal is to recalculate the true costs of all products and thus to enable the maintenance of the environmental functions necessary for life. These additional costs are deducted from the GDP as "costs of environmental functions" (see Hueting (1989); Hueting et al. (1992); and comment by Richard (2012, 77–81)). Almost at the same time, a similar proposal is made by the British economist Ekins (Ekins, 1992). As far as we know, to this day, these are the only works on the new types of monetary based accounts that seem to revolve around a strict, strong sustainability approach. P. Ekins recently proposed a new version of his former work with two other colleagues (Ekins et al., 2018), and this recent version is the basis for our comparison with the CARE/TDL model.

4.2. Analysis of the "single indicator of strong sustainability for development"

This article's philosophy (Ekins et al., 2018)¹⁰ shows strong similarities with our CARE/TDL model, which indicates that Ekins et al. are heading in the same direction. We are going to demonstrate that the CARE/TDL model goes further and can be considered as a complementary proposal to achieve Ekins and his co-authors' goals.

4.2.1. Common points

a) Firstly, the choice of a strong type of sustainability. From the very beginning the authors clearly express their preference for a strong sustainability approach as it is the case for the CARE/TDL model. Three main arguments explain their choice. The first one goes

⁸ As far as valuation is concerned, some of the models quoted in the previous paragraph, like the SMEW, the ISEW and the GPI, choose a kind of historical cost accounting. Others choose a kind of Fisherian approach: the SEEA and the Genuine Saving (Richard, 2012, 105–119). The choice of the historical cost approach for valuation could be considered as a possibility of improving the "old-fashioned" models such as the SMEW and its derivatives. One could consider that, thanks to their transformation in favor of a strong sustainability approach, they could get closer to a kind of ecological accounting. On the contrary, the choice of a Fisherian value on the part of the SEEA and the Genuine Saving automatically ruins every chance of their transitioning into ecological (and human) accounting. These two types of models, especially the Genuine Saving model, can be considered as pure antitheses of true ecological accounting (Richard, 2012, ch. 6).

⁹ This courageous approach will earn him the criticisms of the tenants of the economic (Fisherian) types of valuation (see the critics by Vanoli (2002, 440)).

¹⁰ This paper will be quoted throughout this subparagraph (unless otherwise specified).

as follows: “It is possible to shift to a weak sustainability position where that is shown to be appropriate”. The second one is: “The destruction of manufactured capital is very rarely irreversible... whereas irreversibility ... is common in the consumption of natural capital”. And in the third one, invoking Victor et al. (1998, p. 206), the authors identify some elements of natural capital that are essential for life (pp. 13–14). Thus, they underline: “Important environmental functions may be considered to be those that are not substitutable, those whose loss is irreversible and is likely to lead to “immoderate” losses (that is, those considerably greater than the costs of maintaining the functions), and those that are crucial for the maintenance of health, for the avoidance of substantial threats (such as climate stability), and for economic sustainability. The natural capital that performs such environmental functions may be called critical natural capital”¹¹ (p. 25).

This leads them to giving priority to maintaining natural capital among the four types of capitals that they identify (see below): “The four types of capital can be ranked in order of temporal priority, if not of present economic importance. Natural capital came first, providing the conditions for the evolution of humans and other life on earth” (p. 9).

b) Secondly, the necessity to have scientific targets (limits) for achieving strong sustainability. The authors want to compare environmental performance indicators with scientific environmental targets so as to get distance to (scientific) targets indicators (p. 21). “The difference between standards and environmental state or pressure indicator showing the current situation may be described as the ‘Environmental Sustainability Gap’ (ESGAP), in physical terms, between the current and a sustainable situation” (p. 44).

The reference point (i.e. the scientific target) has to be “indicative of an acceptable level of environmental functions”. This reasoning leads them to distinguish standards and limits (or scientific targets): “*An environmental limit* represents a point beyond which non-linear dynamics significantly change the functions and/or structure of an ecosystem... *Environmental standards* are intended to depict the stock and quality of natural capital required... *Environmental targets* usually deviate from the previous science-based reference points...” (p. 39–40).

On behalf of that necessity, they deplore that “most environmental indicators developed by European institutions¹² do not meet these criteria”. They also stress that “Distance-to-target indicators, such as the environmental dimension of the Sustainable Development Goals, the Environmental Performance Index or the Planetary Boundaries dashboard, also fail to meet at least one of the criteria above.” (p. 60). The authors point out that their brief review “reveals the continuing absence of a credible environmental sustainability indicator system at the national level, which could be used to inform policy makers” (p. 3). We share these hopes and conclusions as they also are basic elements of the CARE/TDL model appliance.

¹¹ Here they quote Ekins et al., (2003) where an interesting distinction between “functions for” and “functions of” is introduced: the “functions of” the environment is those which maintain the basic integrity of natural systems in general and ecosystems in particular. These functions may be essential for the continued operation of other functions and to maintain the biosphere from which they derive.

¹² Notably mentioned in the reports EEA (2016), and EEA (2017).

c) Thirdly, the choice of valuing the distance to strong (environmental) sustainability with costs. Ekins and his co-authors rejected the weak sustainability hypothesis. As was the case with Hueting, they make a conscious choice to abandon the evaluation of environmental costs on the basis of discounted damages (negative externalities) in favour of the measure of the costs necessary for maintaining the functioning of different natural capitals¹³.

They claim that “when the ESGAP does not represent an irreversible effect, it will be possible to estimate the monetary costs of meeting the sustainability standards (M-ESGAP)” (p. 33). They add that “because the M-ESGAPs for different functions are all expressed in the same unit, it would be convenient to aggregate them to compute an overall Gross ESGAP, or G-ESGAP, for the economy as a whole. This could then be used to indicate the economic ‘distance’ to environmental sustainability in relation to the present situation and practices. The G-ESGAP will decrease either as the environment improves (reducing the ‘physical’ sustainability gap), or as technologies of abatement, avoidance or restoration become cheaper” (p. 45). This conception of valuation on the basis of maintenance cost is at the heart of our CARE/TDL model.

4.2.2. Differences

Our five principal items are (in order of growing importance): (1) the object of the new system of information, (2) its goals, (3) its relation to a concept of capital, (4) its relation to the concept of profit, and (5) consideration (or not) of the matters of governance.

a) The object of the new indicator. This is the most obvious difference with the CARE/TDL model. Despite the fact that Ekins and his co-authors deal with four capitals, they only deal with the conservation of the natural capital, excluding the treatment of the human and social ones. But this can be considered a secondary difference since the methodology proposed by Ekins could be extended to other types of capital.

b) The goal of the new “single indicator”. The CARE/TDL model’s end goal is not only to give information on environmental problems, but also to offer a way of replacing the old

¹³ Considering how important it is, we *replicate* this reasoning in detail: “In economics a natural way in which to frame the idea of sustainability is in terms of a capital stock and the goods and services that flow from it. The value of a capital stock is that of the discounted present value of the flows from it over its lifetime, and the sustainability of the flows will depend on the whether the capital stock is maintained over time, with investment making good any depreciation”. Sustainable development came to be framed, by economists at least, as a non-declining, and perhaps increasing level of human welfare (see, for example, Pezzey (1992), p. 55ff), something that can easily be related to the conception of wealth creation set out. “However, given that there are different forms of capital, this immediately raises the question as to whether it is the capital stock as a whole that should be non-declining or whether the individual types of capital, or some parts of them, should be non-declining as well. This is the difference between weak and strong sustainability”. “The economic approach to this issue seeks to calculate the monetary value of the damage to the environmental functions caused by economic activity, measured in terms of the loss of human benefits to which the damage gives rise, to compare this with the benefits from the economic activity, and to equate the marginal loss due to the former with the marginal gain due to the latter in order to maximise the delivery of benefits overall. While this is a reasonable way of proceeding in principle, in practice it encounters a number of major problems... The results of the damage are very uncertain, but may be very large (even catastrophic). The results may be irreversible. The results will play out over the very long term... The alternative approach to be explored here is on strong environmental sustainability” (p. 8, 12, 24–25).

capitalist business and national accounting systems in all their concepts, dimensions, and documents. We will indeed change the economic system with new economic global indicators encompassing a “proper” treatment of all capitals.

In the case of the authors of the “single indicator”, the goal is “only” to reach a strict, strong sustainable development with a focus on environmental matters independently from global economic and accounting devices. Even in their most recent article (Ekins et al. 2018), they do not present an accounting system, not even reduced to a national accounting system. Strikingly, the word “accounting” never occurs, which is all the more astonishing as they compare their single indicator to true national accounting models such as the SMEW, the SEEA, and the Genuine Saving of the World Bank. And they clearly express why. They state that their indicator makes no pretence to replace the economic indicators. Obviously, they refuse or, at least for the while, do not intend to modify the mainstream national accounts. They do not explain this fundamental choice, although it creates a radical divide between “economic” and “environmental” indicators and implies that it is impossible to get rid of the concept of financial profit. On our part, we believe this choice was influenced by former “bad examples” like when the aforementioned SMEW, SEEA and GS tried to revise national accounts and turn them into kinds of national environmental accounting. They rightfully criticized the latter as a means of fostering a weak sustainable type of development. In their opinion, any addition of environmental costs and “economic costs and values” will lead to calculating a revised GDP or NDP that will allow a compensation of environmental losses with bigger financial profits – a typical case of a weak sustainability. This is why they prefer a single separated (not infected) environmental indicator. As it appears, this choice is based on the conviction that any mixing of “environmental” and “economic” data in an accounting system will automatically lead to weak sustainability. However, we've proved the opposite. Notably thanks to the three separated lines of capitals (and their uses) in the CARE/TDL balance sheet, it is perfectly possible to calculate a common new economic result that is obtained in the frame of a separate and systematic preservation of the three main types of capitals. The problem Ekins and his co-authors, as well as many other economists, encountered is fundamentally the lack of adequate conceptualisation of a new type of balance sheet that would include a concept of human and environmental capital as separate debts. This may be connected with the long-running tradition of national accountants who dealt only with flow indicators such as GDP and NDP, not with stock indicators such as balance sheets, and also ignored the peculiarities of traditional business accounts, notably their concept of capital as a debt, the last element being a quasi-general one as far as economists are concerned.

c) The concept of capital. Since Ekins and his co-authors are all economists, it is logical that they use a totally different approach to capital than we do, at least as far as definitions go. Indeed, they define capitals as assets to be used to get services and not as liabilities, as in the CARE/TDL model. They state: “Human well-being and wealth creation is underpinned by four types of capital assets: manufactured, human, social and natural. Each of the capital stocks produces a flow of services that is used to generate goods and services, but also ‘bads’ in the form of depreciation and pollution/wastes” (p. 7).

According to them, the manufactured (or human-made, or physical) capital “is what is traditionally considered as capital: produced assets that are used to produce other goods and services. Some examples are machines, tools, buildings, and infrastructure” (p. 8). But they want to extend this notion of capital because “it is clear that flows of benefits derive from many other sources than manufactured capital, so that the concept of capital has been extended in a number of directions” (p. 8). Thus, they add three other capitals: the human capital, the social capital, and the natural capital to get a “4-capitals model”¹⁴ (Ekins et al., 2018, p. 8). The human capital “generally refers to the health, well-being, and productive potential of individual people. Types of human capital include mental and physical health, education, motivation and work skills. These elements not only contribute to a happy, healthy society, but also improve the opportunities for economic development through a productive workforce” (p. 8). The natural capital “in addition to traditional natural resources, such as timber, water, and energy and mineral reserves... includes broader natural assets, such as biodiversity, endangered species, and the ecosystems which perform ecological services (e.g. air and water filtration) that absorb and neutralize human wastes. Natural capital can be defined as the components of nature that can be linked directly or indirectly to human welfare, and has been formally defined as ‘the elements of nature that directly and indirectly produce value or benefits to people, including ecosystems, species, freshwater, land, minerals, the air and oceans, as well as natural processes and functions’¹⁵” (p. 8). Although the goal clearly is to preserve the human and natural capitals, at least the critical ones, these capitals are treated as assets producing services. Hence, as they emphasise, “environmental sustainability is characterised by the maintenance of the capacity of natural capital to provide relevant goods and services” (p. 7). We have showed that with such a conception of a single-entry accounting and focusing on the services “provided” by the natural capital, it is clearly impossible to have a complete accounting system that allows full description of both ecological and human capital debts.

d) *The concept of profit.* In a remarkable way that contrasts with the mainstream neo-classic economy, Ekins and his co-authors assert that profit is a kind of *common profit* resulting from “the interactions between the different kinds of capital”, and that in such a case “it is effectively impossible to identify and separate out their individual productive capacity” (p. 9). We agree with this position. But, as opposed to the CARE/TDL model, they never propose a new definition of profit, although they clearly show that a stronger protection of environmental functions will cause both firms and nations’ costs to rise. As they state, the very motive of monetary valuation of the ESGAPs is not so much a transformation of the management of the firms and nations as chiefly a means for governments to have some idea of the global importance of the sums at stake, or that could be at stake, in the case of their intervention in the reduction of the ESGAPs at the national level.

¹⁴ Quoting Ekins (1992, pp. 147–151).

¹⁵ Quoting NCC (2014, p. 21).

5. Conclusion

We live in times of huge human and ecological crises (see Alvaredo et al., 2018; Bonneuil & Fressoz, 2013) in the context of the new Anthropocene era (Lewis & Maslin, 2015; Moore, 2017). These crises must be resolved by drastic economic and political measures. Only a few “ecological economists”, such as Hueting, Ekins and their co-authors, conceived systems of indicators within the frame of a strong sustainability approach abandoning the theory of internalisation of externalities promoted by the mainstream school of “environmental economists”. Up to now, though, they have not been in a position to formulate a complete integrated system of accounting that could compete with and replace today’s capitalist system of business and national accounts. We believe their valuable work could be extended upon and improved, notably for the use in developing countries if applied within the frame of the micro/macro CARE/TDL system. This could help put an end to the terrible pressure of capitalist financial accounting on the biosphere.

References

- Alvaredo, F., Chancel, L., Piketty, T., Saez, E., & Zucman, G. (2018). *World Inequality Report*. World Inequality Lab. <http://wir2018.wid.world/files/download/wir2018-full-report-english.pdf>.
- Becker, G. (1964). *Human capital: A theoretical and empirical analysis, with special reference to education*. Columbia University Press.
- Bicalho, T. (2006). *Les limites de l'ACV. Etude de la soutenabilité d'un biodiesel issu de l'huile de palme brésilienne*. Thèse pour le doctorat en Sciences de Gestion. Université Paris Dauphine.
- Braudel, F. (1979). *Civilisation matérielle, économie et capitalisme*. Armand Colin.
- Ciriacy-Wantrup, S. V. (1952). *Resource Conservation: Economics and Policies*. University of California Press, Berkeley.
- Cobb, C., & Cobb, J. (1994). *The Green National Product: A Proposed Index of Sustainable Economic Welfare*. University Press of America.
- Daly, H. E., & Cobb, J. (1989). *For the common good: Redirecting the economy towards community, the environment and a sustainable future*. Beacon Press.
- De Groot, R. S. (1992). *Functions of nature: Evaluation of nature in environmental planning, management and decision making*. Wolters-Noordhoff.
- De Roover, R. (1956). The development of accounting prior to Luca Pacioli according to the account-books of Medieval merchants. In A. C. Littleton & B. S. Yamey (Eds.), *Studies in the History of Accounting*. Sweet and Maxwell.
- Dietz, S., & Neumayer, E. (2007). Weak and strong sustainability in the SEEA: Concepts and measurement. *Ecological Economics*, 61, 617–626.
- EEA. (2016). *Environmental indicator report 2016*. In support to the monitoring of the 7th Environment Action Programme. European Environment Agency Report, No. 30/2016.
- EEA. (2017). *Environmental indicator report 2017*. In support to the monitoring of the Seventh Environment Action Programme. European Environment Agency Report, No. 21/2017.
- Ekins, P. (1992). A Four-Capital Model of Wealth Creation. In P. Ekins & M. Max-Neef (Eds.), *Real-Life Economics: Understanding Wealth-Creation*, 147–155.
- Ekins, P., Milligan, P., & Usubiaga, B. (2018). *A single indicator of strong sustainability for development: Theoretical basis and practical implementation*. Scoping Paper for Agence Française de Développement (AFD).

- Ekins, P., & Simon, S. (1998). Determining the sustainability gap: National accounting for environmental sustainability. In P. Vaze (Ed.), *UK environmental accounts: Theory, data and application*. Office for National Statistics, 147–167.
- Ekins, P., Simon, S., Deutsch, L., Folke, C., & de Groot, R. (2003). A framework for the practical application of the concepts of critical natural capital and strong sustainability. *Ecological Economics*, 44(23), 165–185.
- Favereau, O. (2014). *Entreprises: La grande déformation*. Editions parole et Silence / Collège des Bernardins.
- Favereau, O. (2016). *L'impact de la financiarisation de l'économie sur les entreprises et plus particulièrement sur les relations du travail*. Organisation Internationale du Travail.
- Fetter, F. A. (1937). Reformulation of the concepts of capital and income in economics and accounting. *The Accounting Review*, 12, 3–12.
- Fisher, I. (1906). *The Nature of capital and income*. The Macmillan Company. <https://archive.org/details/natureofcapitali00fishuoft/page/n8/mode/2up>
- Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Pittman-Ballinger.
- Gadrey, J., & Jany-Catrice F. (2012). *Les nouveaux indicateurs de richesse*. La Découverte.
- Georgescu-Roegen, N. (1971). *The entropy law and the economic process*. Harvard University Press.
- Griffon, M. & Weber, J. (1996). *La révolution doublement verte: Economie et institutions*. Séminaire international: Vers une évolution doublement verte, CIRAD, 8-9/11/1995.
- Groffman, P. M., Baron, J. B., & Blett, T. (2006). Ecological thresholds: The key to successful environmental management or an important concept with no practical application? *Ecosystems*, 9(1), 1–13.
- Hodgson, G. M. (2014). What is capital? Economists and sociologists have changed its meaning: Should it changed back? *Cambridge Journal of Economics*, 38(5), 1063–1086.
- Holling, C. S. (1973). Resilience and stability of ecological systems. *Annual Review of Ecology and Systematics*, 4, 1–23.
- Hueting, R. (1980). *New scarcity and economic growth. More welfare through less production?* North-Holland.
- Hueting, R. (1989). Correcting national income for environmental losses: Toward a practical solution. In Y. J. Ahmad et al. (Eds.), *Environmental Accounting for Sustainable Development*. Banque Mondiale, 32–39.
- Kapp, K. W. (1950). *The social costs of private enterprise*. Harvard University Press.
- Kapp, K. W. (2015). *Les coûts sociaux de l'entreprise privée*. Institut Veblen. Les Petits Matins.
- Kendrick, J. (1976). *The formation and stocks of total capital*. Columbia University Press.
- Kuznets, S. (1955). Economic growth and income inequality. *American Economic Review*, 45(1), 1–28.
- Ionescu, C. (2016). *Biodiversité et stratégie des organisations: Construire des outils pour gérer des relations multiples et inter-temporelles*. Thèse de Doctorat en sciences économiques. Grenoble. Alpes.
- Johnson, C. J. (2013). Identifying ecological thresholds for regulating human activity: Effective conservation or wishful thinking? *Biological Conservation*, 168, 57–65.
- Levrel, H. (2007). *Selecting indicators for the management of biodiversity*. Institut français de la biodiversité.
- Lewis, S. L., & Maslin, M. A. (2015). Defining the Anthropocene. *Nature*, 519(7542), 171–180.
- Meade, J., & Stone, R. (1941). The construction of tables of National income, expenditure, savings and investment. *The Economic Journal*, 51, 216–233.
- Meda, D. (1999). *Qu'est ce que la richesse?* Champs Flammarion.
- Moore, J. W. (2016). Introduction. Anthropocene or capitalocene? Nature, history, and the crisis of capitalism. In J. W. Moore (Ed.), *Anthropocene or capitalocene? Nature, history, and the crisis of capitalism*. PM Press.

- Müller-Wenck R. (1972). *Ökologische Buchhaltung. Eine Einführung*. St Gallen, Mimeo.
- Nations Unies. (2003). *Manuel de comptabilité économique et environnementale intégrée*. <http://unstats.un.org/unsd/environment/2003.htm>
- Nitzan, J., & Bichler, S. (2009). *Capital as Power. A Study of Order and Creorder*. Routledge.
- Nordhaus, W. D., & Tobin, J. (1973). Is growth obsolete? In M. Moss (Ed.), *The measurement of economic and social performance*. National Bureau of Economic Research / Columbia University, 509–532.
- Norton, B. G. (1991). *Towards unity among environmentalists*. Oxford University Press.
- OCDE. (2001). *Measuring capital: A manual on the measurement of capital stocks, consumption of fixed capital and capital services*. <https://www.oecd.org/sdd/na/1876369.pdf>
- Odum, E. P. (1971). *Fundamentals of ecology*. W. B. Saunders.
- Pacioli, L. (1494). *Summae arithmetica, geometria, proportioni et proportionalita*. Paganini.
- Passet, R. (2000). *L'illusion néo-libérale*. Fayard.
- Pearce, D. (1976). The limits of cost benefit analysis as a guide to environmental policy. *Kyklos*, 29, 97–112.
- Perroux, F. (1952). Les coûts de l'homme. *Economie appliquée*, 1, 151–168.
- Pillet, G. (1998). *E3: Energie, Ecologie, Economie*. Ed Georg.
- Piper, E. (1978). *Der Aufstand der Ciompi*. Wagenbach.
- Rambaud, A. (2015). *La valeur d'existence en comptabilité: Pourquoi et comment l'entreprise peut (p) rendre en compte des entités environnementales pour "elles-mêmes"*. Thèse de Doctorat en Sciences de Gestion. Université Paris-Dauphine.
- Rambaud, A. (2018). *Aux origines du capital: Le capital chez Luca Pacioli, entre comptabilité et économie, entre mondes ancien et Moderne*. Working Paper presented at AFC congress.
- Rambaud, A., & Richard, J. (2015a). Sustainability, finance and accounting: From the today's Fisherian-(Falsified) Hicksian perspective to a traditional accounting approach. In *Social and Sustainable Finance and Impact Investing Conference*, SAID Business School.
- Rambaud, A., & Richard, J. (2015b). The "Triple Depreciation Line" instead of the "Triple Bottom Line": Towards a genuine integrated reporting. *Critical Perspectives on Accounting*, 33, 92–116.
- Rambaud, A., & Richard, J. (2017). The "Triple Depreciation Line" accounting model and its application to the human capital. In S. Aljani & C. Karyotis (Eds.), *Finance and Economy for Society: Integrating Sustainability*, Emerald Group Publishing.
- Rees, W., & Wackernagel, M. (1999). Forum: monetary analysis: turning a blind eye on sustainability. *Ecological Economics*, 29, 47–52.
- Renouard, Y. (1968). *Les hommes d'affaires italiens du moyen âge*. A. Colin.
- Richard, J. (2008). *Pour une révolution comptable environnementale*. *Le Monde de l'économie*, 5 Fev, p. 6.
- Richard, J. (2012). *Comptabilité et Développement Durable*. Economica.
- Richard, J. (2015a). The dangerous dynamics of modern capitalism: From static to IFRS' futuristic accounting. *Critical Perspectives on Accounting*, 30, 9–34.
- Richard, J. (2015b). Refonder l'entreprise, la société anonyme et l'intérêt social par la comptabilité environnementale. In *Vers un nouveau cadre conceptuel pour la comptabilité internationale?* Centre Français de Droit Comparé. Ed Soc Législation comparée et Mazars, 19, 175–216.
- Richard, J. (2015c). *Préface à la réédition de l'ouvrage "les coûts sociaux de l'entreprise privée" de Karl William Kapp*. Institut Veblen. Les Petits Matins.
- Richard, J., Bensadon, D., & Rambaud, A. (2018). *Comptabilité Financière*. Comptabilité écologique contre IFRS. 11^{ème} édition. Dunod.
- Sombart, W. (1902). *Der Moderne Kapitalismus*. Duncker & Humblot.
- Stone, R. (1945). *The measurement of the national income and the construction of social accounts*. United Nations.

- Talberth, J., Cobb, C., & Slattery, N. (2006). *The Genuine Progress Indicator. A Tool for Sustainable Development*. Redefining Progress.
- Tedino, V. (2017). Environmental impact of economic growth in BRICS. University of Colorado at Boulder Department of Economics. <https://www.semanticscholar.org/paper/Environmental-Impactof-Economic-Growth-in-BRICS-edino/32f09d2d98fc7257d12ef073b906ca7531982971>
- UN. (1996). *Indicators of sustainable development: Framework and methodologies*. United Nations.
- UN. (2003). *System of Environmental and Economic Accounting (SEEA)*.
- UN. (2013). *System of Environmental and Economic Accounting (SEEA)*.
- Vanoli, A. (2002). *Une histoire de la comptabilité nationale*. Coll Repères. La Découverte.
- Victor, P., Hanna, E., & Kubursi, A.(1998). How strong is weak sustainability? In S. Faucheux, M. O'Connor, & J. van der Straaten (Eds.), *Sustainable development: Concepts, rationalities and strategies*. Economy & Environment, 13. Springer.
- Walker, G., Holling, C. S., Carpenter S. R., & Kinzig A. (2004). Resilience, adaptability and transformability in social-ecological systems. *Ecology and Society*, 9(2), 512.
- Weber, M. (1922). *Wirtschaft und Gesellschaft. Grundriß der verstehenden Soziologie*. Mohr.
- Wood, D. (2002). *Medieval economic thought*. Cambridge University Press.
- World Bank. (2000). *Genuine saving as a sustainability indicator*. Environmental Economics Series, Paper No. 77. World Bank.
- World Bank. (2006). *Where is the wealth of nations?* World Bank.
- World Bank. (2011). *The changing wealth of nations: Measuring sustainable development in the New Millennium*. World Bank.

Chinese experience in implementing renewable energy sources as a possible scenario for the Krasnoyarsk Territory

Sergey Nikonorov*,

Faculty of Economics, Lomonosov Moscow State University

Konstantin Papenov,

Faculty of Economics, Lomonosov Moscow State University

Denis Sergejev,

Faculty of Economics, Lomonosov Moscow State University

Reference to this paper should be made as follows: **Nikonorov, S., Papenov, K., & Sergejev, D.** (2020).

Chinese experience in implementing renewable energy sources as a possible scenario for the Krasnoyarsk Territory. *BRICS Journal of Economics*, 2 (1), 59–79.

<https://doi.org/10.38050/2712-7508-2020-10>

Abstract

Renewable energy is a rapidly developing area of the modern economy. As many experts forecast, global electricity consumption will double by 2050, while the share of renewable sources in energy generation will be 50%. For most states, the main incentives for the development of renewable energy are the ability to eliminate the consumption of fossil fuels and reduce the level of emissions of pollutants, while ensuring sustainable development of the country. At the same time, Russia, which has significant reserves of natural resources, is in no hurry to switch to the use of energy from renewable sources since it is believed that the country's subsoil can provide it with cheap energy resources for many generations to come. Therefore, introduction of renewable energy sources that are unable to compete with traditional energy without a developed energy infrastructure and established production is impractical. In our study we try to evaluate the efficiency of the introduction of renewable energy sources in the Krasnoyarsk Territory of Russia using the example of the Chinese experience.

Keywords: renewable sources of energy, sustainable development, emissions of pollutants, Chinese experience.

JEL: L94, Q42, R58.

* E-mail of the corresponding author: nico.73@mail.ru

Introduction

A few years ago, experts predicted that by 2030, renewable energy costs would equal the cost of electricity from traditional sources, but the cases of advanced countries show the future has come and renewables can compete with fossil fuels. However, it is still uncertain whether the introduction of renewable energy can be effective in Russia. The purpose of this work is to use the Chinese experience as an example for evaluating the efficiency of introducing renewable energy sources in the Krasnoyarsk Territory of Russia. The research and statistics of the International Renewable Energy Agency (IRENA) and the International Energy Agency (IEA), as well as analytical reviews of consulting companies, were mainly used as a theoretical and informational base for comparing the countries. Statistics for the Russian Federation was taken from the database of the Federal State Statistics Service and its department for the Krasnoyarsk Territory. As a methodological base, the authors used the study “Clean Energy Sources: Insights from Russia” devoted to assessing the potential and demand for electricity from renewable sources, and the study by the Ministry of Housing and Public Utilities of the Krasnoyarsk Territory on assessing the potential of renewable energy in the region. Many works of scientists devoted to specific types of renewable energy were also analysed, as well as materials from Forbes magazine were studied to identify barriers to the development of renewable energy in Russia.

1. Renewable energy development dynamics in the world and in China

Between 2010 and 2019, the installed capacity of renewables worldwide increased by 107.4% — from 1223.3 to 2536.9 GW¹. The growth is even more impressive compared to 2000, at the end of which the total installed capacity of renewables was only 753.3 GW (236.6%).

For the first time the increase in installed capacity of renewable energy exceeded that of traditional energy in 2012, accounting for more than 50% of the volume of the newly installed capacity. In subsequent years, with rare exceptions, renewable energy sources were steadily increasing their share among new power plants, and by 2019 this figure exceeded 70%. As a result, the share of renewable energy in the total installed capacity of the energy sector accounted to 34.7%.

More than half of all installed capacity, namely 51.7%, is accounted for by hydropower, but this renewable energy industry is developing much slower than the rest: during the period from 2010 to 2019, the capacity increased by only 28.6%, from 925.1 to 1189.4 GW, while that of solar energy, the leader in terms of development rate, increased by 1311.7% — from 41.5 to 586.4 GW.

The success of solar energy is ensured by rapid technological progress in the field of photovoltaic (PV) generators. Encouraged by the reduction in the cost of generating

¹ International Renewable Energy Agency. Renewable energy prospects: China. <https://www.irena.org/publications/2014/Nov/Renewable-Energy-Prospects-China>

energy, the installed capacity of PV modules increased more than 14 times — from 40.3 to 580.1 GW. As a result, solar energy has become one of the most important sources of renewable energy, taking third place after hydropower and wind energy in the rating of renewable energy by installed capacity.

The previously mentioned wind energy has also developed rapidly. Its growth for the period from 2010 to 2019 amounted to 244.3% — from 180.8 to 622.7 GW. The most significant contribution to the growth in the popularity of wind energy was made by onshore power plants — their capacity increased by 416.6 GW, or 234.3%. However, offshore wind farms are developing much faster — from 3 to 28 GW, or by 826.4%. Solar and wind energy accounted for 90% of the total renewable energy capacity installed in 2019. Due to their versatility, SPPs and wind farms can be placed almost everywhere where the wind blows and the sun shines, and technological progress and industrial development make them more and more effective every year.

The remaining types of renewables, although their installed capacity has increased many times over 2010–2019, have an insignificant share in the total renewable energy capacity — only 5.5%, or 138.3 GW. Of these, 123.8 GW is bioenergy, which is mainly used for energy supply to consumers without access to the central grid; 13.9 GW is geothermal energy, which can be used only in special places; and 0.5 GW is ocean energy, which is still not commercialized and represented by experimental power plants.

Thus, the most promising and universal RES are solar and wind energy. Hydropower is gradually losing its popularity and, even in absolute terms, the increase in its capacity is inferior to rapidly developing renewable energy sources. However, its weight in energy production is still significant and the potential is not exhausted.

The undisputed leader in the sphere of renewable energy is China — the installed capacity of power plants in its territory is 30% of the world level. China ranks first in terms of capacity of hydroelectric power plants, solar power plants, wind farms, and bioenergy power plants.

There are countries where the share of renewable energy sources in energy production is much higher than that indicated above. Thus, Norway receives 97.5% of its electricity from renewable sources, and in the energy structure of Brazil, 82.5% is obtained from renewable energy sources. However, almost all renewable energy in these countries is generated by hydroelectric power stations, since the energy potential of the rivers in these countries makes it possible to cover all their demand for electricity.

Since such countries did not encounter problems that other states introducing renewable energy have, their experience will not be considered in this work. Further research will focus on the experience of China since its practice of introducing renewable energy sources is much more indicative.

Over the past decades, China's economy has developed rapidly, and along with it, electricity consumption has grown. From 1990 to 2017, the country's energy consumption increased from 453.9 to 5537.2 TWh — more than 12 times². This has made China the largest energy consumer accounting for a quarter of the world's total energy consumption.

² IRENA. Data and statistics. <https://www.irena.org/Statistics>

However, with the growth of the economy, CO₂ emissions also increased. Over the period 1990–2017, carbon dioxide emissions in China increased 4.5 times — from 2089 to 9258 million tons, which is 30% of global CO₂ emissions. A significant part of greenhouse gas emissions is generated by coal-fired power, which produces 70% of all Chinese electricity.

But in the same period, there was an increase in the environmental efficiency of the Chinese economy. In 1990, the level of CO₂ emissions per unit of GDP was 2.3 kg, and in 2017 — only 0.9 kg³.

Such a significant reduction in greenhouse gas emissions was achieved, among other things, through the implementation of renewable energy sources. According to the data for 2016, the share of renewable energy in China's electricity is 25.4%. Although this may not be the best indicator, the use of renewable energy allowed to avoid 1494 million tons of CO₂ emissions⁴.

Chinese renewable energy has developed rapidly over the past decades, with an average growth rate of 13% from 2000 to 2019. Solar and wind energy developed faster than others, and from promising but underdeveloped sources of energy they turned into the cornerstone of the Chinese economy. Their share in renewable energy is 55%, and the lion's share of the solar and wind energy market belongs to Chinese companies.

The rapid growth of renewable energy in China was also encouraged by the lack of coal to meet the demand and low efficiency of energy generation at coal-fired power plants, which made it easier for renewables to compete with fossil fuels.

Such a rapid development of renewable energy is impossible without competent actions of authorities (Nikonorov & Baraboshkina, 2018). Fortunately, the Chinese government was ready to experiment: first, small projects were launched in certain territories, the efficiency of various legislative measures was checked, and then, if the experiment was successful, the innovation was applied throughout the country.

One of these successful experiments was the Law on Renewable Energy adopted in 2005, which laid the foundation for the development of renewable energy in the country. This law made renewable energy a priority area for energy development. In addition, research and industrial development in the sphere of renewable energy were identified as the preferred area for the expansion of high-tech industry in the national program.

The Law “On Renewable Energy Sources” also empowered the State Council to regulate the development and use of renewable energy sources at the national level. The State Council sets medium-term and long-term goals for the total development of renewable energy and consequently prepares national plans for their achievement. In designing these goals and plans, it interacts with regional and local governments in order to adjust the plan to regional differences.

³ IEA. Data and statistics. CO₂ emissions by energy source. China (People's Republic of China and Hong Kong China). <https://www.iea.org/data-and-statistics?country=CHINA>

⁴ IRENA. Energy Avoided calculator. <https://www.irena.org/Statistics/View-Data-by-Topic/Climate-Change/Avoided-Emissions-Calculator>

The law also regulates the interaction of authorities, energy producers and network owners: developers of projects related to renewable energy should receive administrative permission for their implementation. If several applications are submitted for the same project license, an open tender is held, the winner of which will receive a guarantee of connecting his project to the power grid, gas pipeline or heat pipe, depending on the products being produced. The entire issue can be sold to the owner of energy grid, who is obliged to purchase it at the price established by the results of the tender. In turn, the energy grid owner can compensate for his losses by increasing his own tariffs.

In 2009, this law was finalized by setting four tariffs for renewable energy distribution. The tariff for each case is selected depending on the quality of resources, the cost of the project, and several other parameters that affect the cost of energy. As technology advances and renewable energy becomes cheaper, the government lowers the tariffs.

Another measure to promote the development of renewable energy in China is the establishment of a specialized fund which covers the difference between renewable energy tariffs and the cost of electricity received from coal-fired power plants.

In 2016, in order to avoid overproduction of low-efficiency renewable energy sources, minimum power factor requirements for wind and solar were introduced at the provincial level.

Likewise, in order to control household demand for electricity, the Chinese government introduced a system of “raising block tariffs” in 2012. According to this system, when energy consumption is low (0–240 kWh per month), electricity charges are subsidized covering about 80% of the cost, thus ensuring that the population receives a basic amount of electricity. Moreover, the poor can get a certain amount of energy for free.

The price of the second power unit (241–4400 kWh per month) is set at such a level as to offset all costs.

The price for the third power unit (more than 4400 kWh per month) increases and, in fact, fines consumers for excessive energy consumption and for the resulting excessive greenhouse gas emissions. Similar measures are applied to enterprises, and that motivates consumers to save energy thereby increasing the energy efficiency of the economy.

However, for the country’s transition to renewable energy sources, encouraging their production and saving energy is not enough. One of the difficulties that the Chinese government faced on the path to sustainable development was an outdated grid⁵.

A significant part of Chinese energy producers is located in the north-west of the country, while the main consumers are concentrated in the south-eastern part. Transition to renewable energy also imposes many requirements on the grid. Economic growth and uneven spatial distribution of energy generators can lead to local overloads and blackouts in outdated power grid. Moreover, such grids support only one-way interaction between producers and consumers of energy, which limits the potential of generators installed by the consumer and capable of providing energy not only to their owner, but also supplying excess to the grid. Another problem is inability of this grid to monitor supply and demand

⁵ The Wall Street Journal. China Wants Smart Grid, But Not Too Smart. <https://blogs.wsj.com/chinarealtime/2010/09/29/china-wants-smart-grid-but-not-too-smart/>

in the network in real-time and promptly change the energy production level to meet the demand.

To solve these problems, the Chinese government decided to create a smart grid that will also be able to supply energy over long distances with minimal losses. It is planned to spend about \$128 billion on this goal from 2016 to 2030, which demonstrates the importance of improving energy infrastructure for the implementation of renewable energy sources.

Thus, the successful experience of China is very indicative and allows us to draw conclusions about what steps should be taken to develop renewable energy.

2. Renewable energy implementation in Russia

As for Russia, over the past two decades, RE in our country has practically not developed. Between 2000 and 2019, installed capacity increased by just 24.6%, from 44.3 to 55.2 GW⁶. At the same time, almost 88% of all newly installed capacity is accounted for by hydroelectric power plants, which produced 17.1% of all Russian energy in 2017.

The installed capacity of the remaining renewable energy sources has grown many times over this period. Wind and solar energy were created virtually from nothing, and in recent years their growth has accelerated significantly. However, in absolute terms, the growth is insignificant, and for 2017, only 0.3% of the total energy produced was obtained from renewable sources, excluding hydropower.

The foundation for the development of renewable energy in Russia was laid in 2007 with amendments to the Federal Law “On the Electric Power Industry”⁷. Initially, the law did not contain provisions on renewable energy, however, the definition and types of renewable energy were introduced, as well as a mechanism for supporting renewable energy. Projects for the construction of renewable energy plants are selected through a tender, after which a contract for power distribution in the wholesale market is concluded with the winner. The price under this agreement is determined by the government of the Russian Federation.

In 2013, a Government Decree approved pricing rules for renewable energy capacities, which allowed companies in the renewable energy industry to profit not only from electricity distribution, but also from the capacity of plants. At the same time, the limits of the installed capacity of projects applying for this supporting measure were determined: a minimum limit of 5 MW was set for solar PVs and wind farms, and from 5 to 25 MW for small-scale hydropower plant⁸.

⁶ IRENA. Data and statistics. <https://www.irena.org/Statistics>

⁷ Ministerstvo energetiki Rossijskoj Federacii. Ob otrasli (The Ministry of Energy of the Russian Federation. About the industry). <https://minenergo.gov.ru/node/489>

⁸ Postanovlenie Pravitel'stva Rossijskoj Federacii ot 28 maya 2013 g. No. 449 (red. ot 10.03.2020) “O mekhanizme stimulirovaniya ispol'zovaniya vozobnovlyaemyh istochnikov energii na optovom rynke elektricheskoy energii i moshchnosti” (Decree of the Government of the Russian Federation of May 28, 2013 No. 449 (as amended on 10.03.2020) “On the mechanism for stimulating the use of renewable energy sources in the wholesale market

In 2015, in order to reduce the risks of investment projects in the field of renewable energy, the government made amendments to the previously specified procedure for determining the price of the capacity of renewable energy facilities: when calculating the price of the capacity, a correction factor was used to determine a fairer cost of financing the project using foreign currency. Investors were also given an opportunity to defer fulfilment of capacity deployment obligations⁹.

In 2009, a Government Decree (8th January, No. 1-p) also determined the marginal capital expenditures for the construction of renewable energy facilities, which became an incentive for renewable energy companies to develop technologies and increase the efficiency of projects. Approved indicators are provided in Table 1.

Table 1. Limit values of capital costs for the construction of renewable energy powerplants (*thousand roubles per 1 kW of installed capacity*)

RE type	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Wind power	65,8	110	109,9	109,8	109,7	109,6	109,5	109,3	109,2	109,1	85
Solar PV	116,5	114,1	111,8	109,6	107,4	105,3	103,2	101,1	99,1	65	65
Small-scale hydropower	146	146	146	146	146	146	146	146	146	146	146

Source: <http://docs.cntd.ru/document/902137809> (Appendix 4).

This Decree also set targets for the newly installed RE capacity that are presented in Table 2.

Table 2. Target indicators of the amount of commissioned installed capacity of renewable energy powerplants (*MW*)

RE type	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Wind power	-	51	50	200	400	500	500	500	500	500	214,7	3415,7
Solar PV	35,2	140	199	250	270	270	270	162,6	162,6	240	238,6	2238
Small-scale hydropower	-	-	-	20,7	-	49,8	16	24,9	33	23,8	41,8	210
Total	35,2	191	249	470,7	670	819,8	786	687,5	695,6	763,8	495,1	5863,7

Source: <http://docs.cntd.ru/document/902137809> (Appendix 1).

These indicators were set in such a way as to give manufacturers of renewable energy equipment time to get a return on investment in their projects, but at the same time to support competition in the long term in order to reduce the cost of equipment.

of electric energy and power"). <http://www.consultant.ru/cons/cgi/online.cgi?req=doc&base=LAW&n=347433&fld=134&dst=1000000001,0&rnd=0.23295776881821317#08851836037191898>

⁹ Postanovlenie Pravitel'stva Rossijskoj Federacii ot 28 maya 2013 g. No. 449 (red. ot 10.03.2020) "O mekhanizme stimulirovaniya ispol'zovaniya vozobnovlyaemyh istochnikov energii na optovom rynke elektricheskoy energii i moshchnosti" (Government of Russia "On measures to stimulate the use of renewable energy sources in the wholesale market of electric energy and power"). <http://government.ru/docs/20510/>

Nevertheless, it must be pointed out that if we compare the presented targets with the statistics of the newly introduced installed capacity of renewable energy sources, we can see that in most cases the plans were not implemented sufficiently.

In order to encourage the development of high-tech production in Russia, this Decree specified target indicators for localization of renewable energy facilities commissioned in the period from 2020 to 2024. For wind and small hydropower plants this indicator is 65%, and for solar power plants — 70%.

In 2015, the government adopted Decree No. 47 (23th January), due to which renewable energy companies received support in the retail electricity markets, as well as in off-grid areas: energy grid companies must purchase energy from renewables at established tariffs. Requirements for capital costs and localization were also established for renewable energy companies participating in the retail market.

Another measure to support the renewable energy industry is to cover half of the cost of technological connection of generating facilities with a capacity of up to 25 MW through subsidies from the federal budget (Alikirimova & Ninalalov, 2019).

The support measures described above for companies in the renewable energy sector are already yielding the results. Even though not all targets were achieved, in the period from 2016 to 2019, it was possible to deploy a significant amount of renewable energy capacities, as well as to reduce the average cost of capital for solar and wind power plants that are presented in Table 3.

Table 3. Average planned capital costs based on the results of tenders of renewable energy projects (*thousand roubles per kW of installed capacity*)

RE type	2013	2014	2015	2016	2017	2018	2019
Wind power	115,7	111,6	122,8	-	112,5	78,2	49,8
Solar PV	64,9	-	155,1	136	102,9	67,6	64,9
Small-scale hydropower	-	146	174	-	163,9	174,5	175,9

Source: <https://minenergo.gov.ru/node/489>

Production of equipment for renewable energy plants has also increased: from 140 MW of installed capacity per year in 2012 to 900 MW per year in 2019. Thus, it can be noted that the measures to support renewable energy used in Russia are generally similar to those of the Chinese government (Nikonorov & Baraboshkina, 2018). Of course, the success of Chinese renewable energy is incomparably brighter than the Russian one, but China had a powerful incentive — the high cost of coal-fired energy, while in Russia it was the other way around.

Renewable energy in Russia has significant potential¹⁰. The average level of insolation in the southern and south-eastern parts of Russia is 3.5–4.5 kWh per day, or 1200–1500 kWh

¹⁰ IRENA. (2017). Remap 2030 Renewable Energy Prospects for Russian Federation, Working paper, IRENA, Abu Dhabi. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2017/Apr/IRENA_REmap_Russia_paper_2017.pdf

per year, per square meter, which is higher than in many countries where solar power is already actively used.

Russian wind power has the highest potential in the world, its possible energy production is 2571.8 PWh per year. Just 0.03% of this energy would be enough to cover the need for electricity throughout Russia. At the same time, wind energy is distributed more evenly throughout the country than solar energy.

The best zones for placing wind farms are the northern and south-western territories of the country where the wind speed at an altitude of 100 meters often exceeds 8 m/s.

In general, the economically feasible potential volume of electricity generation from wind power is estimated by experts at 260 TWh per year which is approximately 30% of the country's electricity consumed. However, one cannot fail to notice that these calculations were made back in 2016, and since then the cost of generating energy at wind powerplants has decreased, so now even a larger share of Russian energy consumption can be provided by wind energy.

Hydropower also has great potential. Russian water resources are considered to be among the richest in the world. The volume of economically feasible energy generation using hydroelectric power plants is almost 5 times the current capacity, which is approximately 150% of the electricity consumption of the country. The central and eastern parts of the country have the greatest potential.

A significant difference in water levels during high and low tides in the White and Okhotsk Seas amounting to about 10 meters, as well as in many other territories with a high difference in water levels during the day, provides Russia with a potentially high level of electricity generation when using ocean energy. In general, the potential generation of electricity through a TEC is estimated at 90 GWh per year.

Geothermal energy has significant potential, too. Many regions have reserves of hot geothermal fluids. The potential installed capacity of geothermal power plants is estimated at 2 GW.

Finally, Russia has enormous potential in all types of bioenergy — from by-products of the forest industry and peat to organic waste and urban waste. The Russian Federation possesses 20% of the world's forest resources, which the forest industry can potentially use to produce a huge amount of solid biofuel (wood chips, wood pellets, etc.). Organic agricultural waste amounting to 625 million tons per year can be used in the production of biogas, which, in turn, can be used to generate electricity. 165 million tons per year of urban waste can also be used for biogas production. In total, it is economically feasible for Russia to produce about 830 TWh of electricity per year from bioenergy.

At the same time, renewable energy can solve the problem of energy shortages in isolated areas. The main source of electricity in these regions is diesel power plants, which have many shortcomings:

- 1) Poor technical condition of the equipment that leads to frequent breakdowns and low efficiency of energy generation;
- 2) Dependence on fuel shipments from remote areas via a poorly developed transport network that implies a high cost of energy generation and the possibility of obtaining fuel only under suitable weather conditions;

- 3) Dependence on state financial support since without it energy generation in isolated areas is not economically feasible. However, it is worth noting that at the same time, companies generating electricity in such areas have no incentive to replace diesel generators with renewable energy sources since their costs are compensated from the state budget.

These generators produce about 2.5 TWh per year, and the cost of the electricity they produce varies from 60 to 80 roubles per kWh, and in some cases reaches 120 roubles. In such regions, renewable energy sources may not just be competitive — they will become a salvation for residents. Therefore, the government pays special attention to the development of renewable energy in isolated regions.

Thus, even without considering solar and geothermal energy, Russia has the potential to provide 300% of its energy consumption (according to 2017) using RES alone and, moreover, to supply isolated areas with clean and cheap energy. But at the same time, there are many factors that impede the development of renewable energy in Russia.

The first barrier is high competition from conventional energy. While transition to renewable energy was economically and strategically beneficial for countries that do not have sufficient reserves of fossil fuels on their territory, the opposite is true for Russia. The presence of huge reserves of fossil resources allows our country to not depend on external supplies and create many jobs, as well as significantly reduces the cost of electricity produced by traditional energy, thus increasing its competitiveness.

At the same time, the cost of generating energy from solar and wind power in Russia is not dropping as fast as the global average. The following factors influence the cost of renewable energy in Russia:

- 1) A low level of mastering the production of equipment for powerplants since companies from the renewable energy sphere entered the Russian market relatively recently. At the same time, due to localization requirements, companies are forced to incur significant costs for creating production in Russia in a short time, which are then distributed to a small volume of output;
- 2) The remoteness of power plants construction sites from equipment manufacturing centers, which, along with poorly developed transport infrastructure, seriously increases the cost of transporting equipment. In addition, the best places for energy generation are often located far away from consumers of electricity, which increases transmission losses and requires improvement of existing infrastructure;
- 3) Climatic characteristics of the country. The cost of building electricity generation facilities based on renewable energy sources often increases due to the need to consider significant temperature drops during the year or frozen soil;
- 4) Insufficient elaboration of technical regulation in the field of renewable energy¹¹. Russian standards of technical regulation do not take into account the specifics

¹¹ Kalanov, A. (2018). Vozobnovlyаемая энергетика в России: Стоят' на месте или сделать' первый шаг. *Forbes* 18.04 (Kalanov, A. (2018). Renewable energy in Russia: To stand still or take the first step. *Forbes* 18.04). <https://www.forbes.ru/biznes/342905-vozobnovlyаемая-энергетика-v-rossii-stoyat-na-meste-ili-sdelat-pervyy-shag>

of renewable energy powerplants, therefore irrelevant requirements are often imposed on them, and approval of construction, the process of obtaining certificates of compliance with technical requirements, which begins only after the facility is commissioned, and integration into the power grid can last several years;

- 5) High risks. The dependence of the Russian renewable energy industry on external supplies of equipment for the production of generators along with an unstable exchange rate, as well as the influence of the above factors, leads to a significant increase in risks for investors, which implies an increase in the cost of capital for companies from the renewable energy sector.

The introduction of renewable energy sources is also hindered by excessive electricity production. In 2017, only 760.8 GWh (or 70%) out of 1,094.2 GWh of generated energy was consumed. And introduction of new generating facilities will only increase the imbalance. Another problem is the outdated grid. As noted earlier, it is difficult to integrate renewable energy generators into a conventional grid, and a significant part of their potential remains unexploited. The natural monopoly on the energy infrastructure, in particular, the grid, also complicates the competition of renewables with fossil fuels and makes it difficult to connect renewable energy sources to a single energy system¹².

Thus, as can be seen in Table 4, in 2014, the levelized cost of electricity from renewable sources significantly exceeded the same indicator of traditional energy sources.

Table 4. Levelized cost of electricity in Russia, 2014

Powerplant type	Fuel cost (RUB/GJ)	Lifetime (Years)	Capital cost (RUB/kW)	Operation & maintenance cost (RUB/kW per year)	LCOE	
					Discount rate 10% (RUB/kWh)	Discount rate 12% (RUB/kWh)
Coal-fired	62,4	60	86 400	3504	2,4	2,4
Gas	132,96	30	38 400	2064	1,92	2,4
Solar PV	-	30	114 122	2448	12–16,8	13,92–19,2
Wind	-	30	110 000	1680	4,32–6,24	4,8–7,2
Small-scale hydropower	-	40	146 000	2928	5,28–5,76	6,24–6,72

Source: Kalanov, A. (2018). *Vozobnovlyaemaya energetika v Rossii: Stoyat' na meste ili sdelat' pervyy shag*. *Forbes* 18.04 (Kalanov, A. (2018). *Renewable energy in Russia: To stand still or take the first step*. *Forbes* 18.04). <https://www.forbes.ru/biznes/342905-vozobnovlyaemaya-energetika-v-rossii-stoyat-na-meste-ili-sdelat-pervyy-shag>

¹² Ernst & Young. *Obzor elektro-energeticheskoy otrasli Rossii (Overview of the electric power industry in Russia)*. [https://www.ey.com/Publication/vwLUAssets/EY-power-market-russia-2018/\\$File/EY-power-market-russia-2018.pdf](https://www.ey.com/Publication/vwLUAssets/EY-power-market-russia-2018/$File/EY-power-market-russia-2018.pdf)

3. Efficiency of introducing RE in the Krasnoyarsk Territory

The Krasnoyarsk Territory is one of the largest subjects of the Russian Federation (after the Republic of Yakutia). The land area of the region is 2.36 million km² — 13.9% of the country's total territory¹³. Its length from north to south is almost 3000 km, and from west to east it reaches 1250 km.

According to a study conducted by the Ministry of Housing and Public Utilities of the Krasnoyarsk Territory and the Siberian Federal University, renewable energy sources have significant potential¹⁴.

30 out of a total of 44 municipal entities, located mainly in the southern part of the region, have conditions suitable for sustained operation of photovoltaic generators. In another 11 districts located in the central part, operation of photovoltaic generators is possible, however, generation of energy will not be so efficient. 3 northern regions are unsuitable for solar power plants.

Using data on the gross insolation of the districts, calculations of the potential power generation in these municipalities were made, the results of which can be seen in Appendix 6. Data on the efficiency of Hevel PV modules were used for calculations¹⁵ since this is the only company in Russia that has own production of these plants and therefore it is the most preferred and probable supplier of equipment for solar power plants, given the localization requirements and the government's commitment to develop high-tech production in Russia.

As for another technology of utilizing solar power for electricity production — concentrated solar energy — application of this technology is advisable only near the equator, and therefore it cannot be used in the Krasnoyarsk Territory.

To determine the potential energy production using wind turbines located onshore, we used data on the average wind speed in the most suitable locations of wind farms in the entities, as well as indicators of the Ulyanovsk wind farm built by Fortum.¹⁶ The calculation of the electricity generated by one generator per year was carried out according to the following formula (Aubakirov, 2016):

$$E_{annual} = (\eta * WEUR * \rho * V_{av.a.}^3 * \pi * D^2) / 8, \quad (1)$$

where η — generator's efficiency; $WEUR$ — Wind Energy Utilization Ratio; ρ — air density, kg/m³; $V_{av.a.}$ — average annual wind speed, m/s; D — the diameter of the blades of the generator, m.

Since in this case we used the example of the Ulyanovsk wind farm and the characteristics of its equipment, the only variable is the wind speed. Thus, wind energy in the region does not have as much potential as solar energy, but it can be used in areas isolated from the

¹³ <http://www.krskstate.ru/about>

¹⁴ Ministerstvo promyshlennosti, energetiki i zhilishchno-kommunal'nogo hozyajstva Krasnoyarskogo kraia. Investicii v vozobnovlyemuyu energetiku (The Ministry of Industry, Energy and Housing and Communal Services of the Krasnoyarsk Territory. Renewable energy investments). <http://gkh24.ru/pages/view/61/>

¹⁵ <https://www.hevelsolar.com/catalog/solnechnye-moduli/>

¹⁶ <https://www.fortum.ru/vetryanaya-elektricheskaya-stanciya-v-ulyanovskoy-oblasti>

central network where the level of insolation is insufficient. These include the Taimyr and Turukhansky municipal entities — their insolation rates were the lowest, while the level of electricity generation with the help of wind generators was the highest.

Despite the formation of a thick layer of ice on the rivers of the region in winter, the potential for developing small-scale hydropower plants in the region is very high: due to the fact that many settlements, including energy-deficient ones, are located near rivers, small hydropower can be used to supply these settlements with electricity. The construction of such plants in these settlements would not only solve the problem of their energy shortages, but also create an opportunity for them to develop an industry based on the processing of taiga resources.

Calculation of the potential and economic efficiency of full-scale hydropower plants is very difficult due to the lack of necessary data in the public access and high dependence of indicators on the individual characteristics of the project. In this regard, further study will only use their energy generation cost which averages about 32 kopecks.

Bioenergy in the region is geographically tied to certain agricultural and woodworking enterprises and peat deposits. In this regard, the development of this energy sector is feasible only in several municipal entities of the region. Biogas production can be carried out in areas with developed livestock farming. The list and potential of this areas is presented in Table 5.

Table 5. Biogas potential in the Krasnoyarsk Territory

Municipal entity	Electricity generation potential (MWh per year)
Berezovsky	21 495
Emelyanovsky	16 728
Nazarovsky	82 281
Uzhursky	30 010

Source: The Ministry of Industry, Energy and Housing and Communal Services of the Krasnoyarsk Territory. Renewable energy investments. <http://gkh24.ru/pages/view/61/>

Thus, these areas have significant potential for biogas energy. As for the other areas of bioenergy, despite the presence of significant peat reserves and a developed woodworking industry, the use of these resources is extremely difficult due to the remoteness and inaccessibility of peat deposits, and, in the case of the woodworking industry, due to the use of its waste for other purposes.

Geothermal energy cannot be used either for energy generation, or for heating buildings as there are no geothermal resources in the region that are close to the surface and have a high temperature for energy generation, and the use of heat pumps can only be feasible in places with an average annual air temperature from +4.5 C⁰ to +5 C⁰, while the average annual temperature even in the southern part of the region is +1.6 C⁰.

The use of ocean energy in this territory is also very difficult since the Kara Sea and the Laptev Sea that wash the region belong to the Arctic Ocean basin, and therefore the

bays where ocean energy powerplants can be located are covered with ice for most of the year. At the same time, consumers are often located far away from such places and that makes the use of ocean energy for electricity production even more difficult. For the same reasons, the use of offshore wind power is also difficult.

Thus, further research on the effectiveness of RE implementation will concern the use of solar energy, wind energy, small-scale hydropower, and biogas.

To calculate the cost of energy generation by renewables, we used the indicator of Levelized Cost of Electricity (LCOE) which is actively used in similar calculations by international agencies, including IRENA.

There are many variations of calculating this indicator, but in this work its basic version is used:

$$LCOE = \frac{\sum_{t=1}^n \frac{I_t + M_t + F_t}{(1+r)^t}}{\sum_{t=1}^n \frac{E_t}{(1+r)^t}}, \quad (2)$$

where I_t — investment costs in year t ; M_t — operating costs in year t ; F_t — fuel acquisition costs in year t ; E_t — electrical energy generated in year t ; r — discount rate; n — expected lifetime of powerplant.

Investment and operating costs for wind farms, solar power plants, small-scale hydropower and biogas, the limit values of the corresponding costs per 1 kW of installed capacity were taken from the Decree of the Government of the Russian Federation (July 28, 2015 No. 1472-p)¹⁷. The data on the capital and operating costs of thermal power plants were taken from the article by VYGON Consulting¹⁸.

The cost of fuel for a solar power plant, wind farm and small-scale hydropower plant is zero — it is simply not required for these types of stations. For biogas plants, fuel costs are also accepted as zero, since they use livestock waste. For thermal powerplants, fuel costs were determined based on the average cost of coal supplied to Russian power plants.

The generated energy volume of solar and wind power was calculated based on the previously determined potential volume of electricity generation, set for 1 kW of power. For a small-scale hydropower plant, electricity generation was determined based on the indicators of the RusHydro project¹⁹. To calculate the energy production by biogas power plants, data on the company BioEnergSila²⁰ products were used.

The discount rate for renewable energy sources was determined based on the average level of rates for green bonds taken from the Moscow Exchange website. It amounted

¹⁷ Pravitel'stvo Rossijskoj Federacii. Rasporyazhenie ot 28 iyulya 2015 g. No. 1472-r. (Government of the Russian Federation. July 28, 2015 No. 1472-r). <http://static.government.ru/media/files/goomAd8bkYkAzjAwAOpRJ5pt2mqbviW.pdf>

¹⁸ https://vygon.consulting/upload/iblock/7f1/vygon_consulting_power_plants_modernization.pdf

¹⁹ PAO "RusGidro". Opredeleyeni postavshchiki gidrosilovogo oborudovaniya dlya Krasnogorskih MGES (PJSC RusHydro. Suppliers of hydraulic power equipment for the Krasnogorsk SHPPs were identified). <http://www.rushydro.ru/press/news/110853.html>

²⁰ <http://www.bioenergosi.ru/services/biogas/>

to 10.3%. The discount rate for thermal powerplants was set at 8.54% based on the average coupon rate for bonds of Enel Russia. This company is chosen for calculation due to the fact that it is the only energy company that has only thermal power plants in its assets and has issued bonds on the Moscow Exchange²¹. The discount rate for renewable energy sources, as expected, turned out to be higher due to increased risks for investors.

The data on the service life of the facilities were taken from the IRENA study indicated earlier, and, in the case of biogas plants, from the product description on the corresponding company's website.

Further, the maximum and minimum indicators were identified for various types of power plants: for solar PVs and wind farms — based on the resource potential of the entities; for small-scale hydropower and biogas plants — based on their installed capacity; for thermal power plants and large-scale hydropower, only an average indicator was calculated. Thus, the following results were obtained in Table 6.

Table 6. Levelized cost of electricity

Powerplant type	LCOE (RUB/kWh)	
	Min	Max
Solar	10,96	17,47
Wind	1,73	525,63
Small-scale hydropower	4,59	10,76
Biogas	2,92	4,60
TPP	3,28	
Large-scale hydropower	0,32	

Source: authors' calculations.

The results are generally similar to the previously indicated IRENA data on the normalized cost of electricity in Russia, however, one can note a rise in the cost of thermal powerplants energy generation due to rising coal costs and inflation, and, at the same time, LCOE conservation for solar PVs and a decrease for small-scale hydropower that is a consequence of improved technology and the gradual establishment of equipment production.

To assess the efficiency of RE implementation in the Krasnoyarsk Territory, three scenarios will be considered: an initial one that illustrates the current situation; a 10% increase in the share of renewable energy sources, according to which renewable energy sources will be introduced everywhere; and optimal deployment of renewable energy sources, in which the share of renewable energy sources increases by 10% only in those areas where it is economically feasible (Papenov & Nikonorov, 2017).

²¹ https://www.moex.com/s3019?utm_source=www.moex.com&utm_term=%D1%81%D0%B5%D0%B3%D0%BC%D0%B5%D0%BD%D1%82%20%D0%B7%D0%B5%D0%BB%D0%B5%D0%BD%D1%8B%D1%85

To compare the scenarios, the Krasnoyarsk Territory was divided into two zones:

1. Having a central power grid. It includes the southern part of the region, as well as the city of Norilsk and part of the Taimyr Region.
2. Isolated from the central grid. This area includes remote areas in which diesel generators are used to generate energy.

The efficiency assessment itself will be carried out according to the following parameters:

- 1) Investment costs for the introduction of RES;
- 2) Expenditures for the capacity supply contracts;
- 3) Energy generation cost;
- 4) Air pollutant emissions.

Scenarios will be compared based on the data for 2018 (data on diesel generation is taken for 2014).

According to the initial scenario, the current situation in the Krasnoyarsk Territory remains unchanged, and RE powerplants are not introduced. In this case, the cost of implementing the scenario is zero.

In the zone with central energy supply, the average normalized cost of electricity is 1.54 RUB/kWh. In the isolated zone there is no certain level of cost of electricity generation. It is set individually for each locality due to the high and variable costs of transporting diesel fuel. Since most points cost in the range of 60–80 RUB/kWh, in this study we will use the average value of 70 RUB/kWh.

Thus, the average normalized cost of electricity in the whole region is 1.74 RUB/kWh.

The level of all emissions of pollutants is 529.1 thousand tons²², 229.4 account for the energy sector. At the same time, emissions from diesel generators which are not considered in regional statistics are added to them. Their volume accounts for additional 13.3 thousand tons.

In the case of a 10% increase in the share of renewable energy sources, in order to replace TPPs, it is necessary to introduce plants capable of generating 5.6 billion kWh per year in a zone with central energy supply, 983 million — in a separate power grid of Norilsk and part of the Taimyr Region, and 160 million kWh per year — in an isolated area.

Renewables will be deployed in such a way as to try to achieve the minimum cost of electricity, thus four biogas power plants will be commissioned in the zone with central energy supply since this type of facility has the lowest cost of generating electricity. Their total generation will amount to 150.5 million kWh per year, which will require the introduction of 18.6 MW of capacity. Capital costs for their construction will amount to 3.3 billion roubles for investors. Of course, biogas power plants will emit CO₂ in the course of work, however, due to the fact that at the same time they process livestock waste polluting the atmosphere, in this work the emission from these greenhouse gas stations will be considered as zero (Klochkova & Harlamova, 2015).

²² Ministerstvo ekologii i racional'nogo prirodopol'zovaniya Krasnoyarskogo kraya. Gosudarstvennyj doklad «O sostoyanii i ohrane okruzhayushchej sredy v Krasnoyarskom kraev 2018 godu» (Ministry of Ecology and Environmental Management of the Krasnoyarsk Territory. State report “On the State and Environmental Protection in the Krasnoyarsk Territory 2018”. <http://mpr.krskstate.ru/dat/File/3/Gosdoklad%20.pdf>

Another 60 million kWh will be generated using small-scale hydropower deployed in 30 entities with a total capacity of 17.8 MW, which will cost potential investors 2.6 billion roubles.

The remaining energy could be provided by wind farms located in the Achinsk Region, which is the most suitable for such power plants in the southern part of the Territory. However, to generate 5.39 billion kWh, it would require deploying a power plant with a capacity of 3376.8 MW produced by 1350 generators. Given that such a power plant would require a huge area, which is unlikely to have enough space with high wind speed, this project is not feasible. Therefore, for further research, the maximum wind farm size for the southern regions will be set at 35 MW, which corresponds to the largest wind farm in Russia — Ulyanovsk.

Thus, wind farms will be built in 4 entities: Achinsky, Bogotolsky, Nazarovsky, and Uyarsky. Their total capacity will be 140 MW, energy production — 191.7 million kWh per year, and the average LCOE — 9.31 RUB / kWh. It will require 15.3 billion roubles of investments.

Since further introduction of wind farms is impractical, the remaining energy will be generated by solar powerplants, the most expensive renewable energy source according to the LCOE. The installed capacity of the required power plant will be 4.3 GW, and generated energy — 5.2 billion kWh per year. It will occupy the territory of the Ermakovsky entity with an area of 2588 hectares (excluding the space between solar panels) and require investments in the amount of 463 billion roubles.

Norilsk and the Taimyr entity will be supplied with energy by a huge wind farm capable of generating 983 million kWh per year since this is much more realistic in this area than in the Achinsky entity. This will require an installed capacity of 135 MW, 54 wind generators, and 14.7 billion roubles of investments.

To provide isolated areas with RE, it will be necessary to place power plants in each of them due to their large size and low population density. Data on powerplants in these areas is provided in Table 7.

Thus, the average LCOE of renewable energy in isolated areas will amount to 10.82 RUB/kWh, which is significantly less than the current cost of electricity. LCOE in entities supplied by central energy grid will account for 9.29 RUB/ kWh, and in the whole region — for 9.34. The average cost of generation, including all energy sources, is 64.08, 2.49 and 3.15 roubles per kWh, respectively.

The introduction of RES will also require the support of their owner. Under the renewable energy supply contract, their owners will be able to receive payment for electricity generated by the plants at an increased rate. This rate strongly depends on the individual characteristics of powerplants, however, based on the fact that 1.5 GW of renewable capacity was constructed under the capacity supply contracts which cost consumers 43.7 billion roubles over 5 years, we can assume that the cost of maintaining 4.7 GW of capacity will amount to 27.3 billion roubles a year, but will decrease every year.

Another cost item is the placement of a power grid capable of realizing the potential of renewable energy in an area with a centralised energy distribution. The infrastructure

Table 7. Energy supply of isolated areas

Municipal entity	RE type	Installed capacity (kW)	Energy generation (kWh per year)	Investments required (million roubles)	LCOE (RUB/kWh)
Abansky	Small-scale hydropower	6,24	21 000,00	1,87	10,76
Balakhtinsky	Small-scale hydropower	2,66	8960,00	0,80	10,76
Boguchansky	Small-scale hydropower	0,03	100,80	0,01	10,76
Yeniseisky	Small-scale hydropower	449,61	1 512 940,00	134,88	10,76
	Solar	2061,40	2 105 488,00	221,42	12,94
Ermakovsky	Small-scale hydropower	6,58	22 130,00	1,97	10,76
Idrinsky	Small-scale hydropower	7,88	26 530,00	2,37	10,76
Kezhemsky	Small-scale hydropower	136,01	457 690,00	40,80	10,76
Motyginsky	Small-scale hydropower	37,30	125 530,00	11,19	10,76
North					
Yeniseisky	Solar	17,47	17 650,00	1,88	13,08
Taseevsky	Small-scale hydropower	4,44	14 950,00	1,33	10,76
Turukhansky	Wind	2257,50	5 309 650,00	247,58	5,86
Evenkisky	Solar	6760,21	6 222 420,00	726,11	14,35

Source: authors' calculations.

improvement project in the Krasnoyarsk Territory has already begun, and the expected investments required to modernize the network are 6.5 billion roubles for the southern part of the region²³.

Also, technological connection of plants to the power grid will require additional investments. However, due to the fact that the cost of connection is calculated individually for each project, it is impossible to estimate investments for connecting to the power grid, as well as subsidies from the state budget that cover part of the costs of connecting renewables.

As for environmental efficiency, thanks to reducing fuel consumption of TPPs and diesel generators by 24.2% and 10%, respectively, emissions will be reduced in the amount of 56.7 thousand tons.

According to the scenario of optimal development of renewable energy, the share of renewable energy will be increased by 10% only in those areas where this will lead to a decrease in the cost of electricity.

As follows from the scenario considered earlier, the introduction of renewable energy plants is advisable only in isolated areas. The Taimyr entity will also be added to those indicated in Table 7, however, now it will only include settlements isolated from the central grid and using diesel generators.

²³ <https://neftegaz.ru/news/powernetworks/193394-mrsk-sibiri-planiruet-zavershit-sozdanie-2-y-tsifrovoy-podstantsii-v-krasnoyarske-uzhe-v-avguste-201/>; <https://tass.ru/ekonomika/6515200>

According to this scenario, the average levelized cost of electricity in the entire region will be 1.72 roubles. The amount of investments needed to deploy the generators will be 1.4 billion roubles. The expenditures for the capacity supply contracts will be about 71.3 million roubles per year.

At the same time, reducing the cost of energy generation will save up to 1.15 billion roubles a year. We can state that the return period of investments is just over a year; however, these funds will not be received by investors themselves, but by the entire economy, since the cross-subsidization method is introduced to compensate for excessively high tariffs in some regions by aligning them with tariffs in other. This method led to an increase in electricity tariffs for the enterprises in the Central Federal District, thus making them pay for isolated areas (Chugunov, 2019).

Investments in the improvement of the power grid will not be required since each settlement will be connected to its own power plant which has all the necessary equipment to create local smart grid. Under this scenario, the emission of pollutants into the atmosphere will be reduced by 1.33 thousand tons. Thus, it is possible to compare the scenarios. The summary of this comparison is presented in Table 8.

Table 8. Summary of the scenarios overview

Scenario	Initial	10% increase in the share of renewables	Optimal introduction of renewables
Investments required (billion roubles)	0,0	506,8	1,5
Expenditures under capacity supply contracts (million roubles per year)	0,0	27 300,0	71,3
Average LCOE in central grid areas (RUB/kWh)	1,5	2,5	1,5
Average LCOE in isolated areas (RUB/kWh)	70,0	64,1	64,1
Average LCOE (RUB/kWh)	1,74	3,15	1,72
Emission of air pollutants by the industry (thousand tons)	242,7	186,0	241,4
Total emission of air pollutants (thousand tons)	542,4	485,7	541,1
Cost of electricity reduction efficiency (RUB/kWh for 1 billion roubles)	-	-0,003	0,014
Emission reduction efficiency (thousand tons for 1 billion roubles)	-	0,112	0,917

Source: authors' calculations.

Thus, as can be seen in the table above, the introduction of renewable energy in the isolated areas of Krasnoyarsk is the most economically and environmentally efficient solution as it will provide a reduction in both emissions and the average cost of electricity.

Conclusion

Renewables are rapidly developing. Its technologies are improved every year, the installed capacity of power plants is growing, and the cost of electricity generated by them is decreasing. Russia's application of the successful practices of China, a pioneer of renewable energy, creates the basis for the development of renewables, but existing barriers hold back their potential. The Krasnoyarsk Territory has the same problem — the region has significant potential, but it is difficult to utilize it.

The study reveals that in the current conditions, the massive introduction of renewable energy in the Krasnoyarsk Territory is inefficient since this will require huge investments that will lead to sufficient reduction of pollutant emissions but increase the average cost of energy generation. However, the use of renewable energy in isolated areas is much more appropriate: this will significantly reduce the cost of energy generation in remote settlements, lessen the burden on all energy consumers, and lower the amount of air pollutant emissions. Thus, we can conclude that the introduction of renewable energy in the Krasnoyarsk Territory can prove effective.

References

- Alikirimova, T., & Ninalalov, S. (2019). Analiz effektivnosti gosudarstvennoj podderzhki vobnovlyaemykh istochnikov energii v Rossii. *Bol'shaya Evraziya: Razvitie, bezopasnost', sotrudnichestvo, Ezhegodnik. Vyp. 2. Ch. 1*, 192–194 (Analysis of the effectiveness of state support for renewable energy sources in Russia. *Greater Eurasia: Development, Security, Cooperation, Yearbook, 2-1*, 192–194). http://inion.ru/site/assets/files/4009/bolshaia_evraziia_2019-2-1.pdf
- Aubakirov, R., Virailo, A., & Gavrilovich, E. (2016). Primer rascheta parametrov vetroenergeticheskoy ustanovki dlya potrebitelya maloj moshchnosti. *Molodoj Uchenyj*, 28(2), 1–7 (An example of calculating the parameters of a wind power installation for a consumer of low power. *Young scientist*. 28(2), 1–7). <https://moluch.ru/archive/132/36967>
- Chugunov, D. (2019). Rassmotrenie voprosa perekrestnogo subsidirovaniya v elektroenergeticheskom komplekse. *Sbornik nauchnykh trudov po materialam III Mezhdunarodnoj nauchno-prakticheskoy konferencii "Novye napravleniya i koncepcii v sovremennoj nauke". Mezhdunarodnyj Nauchno-Informacionnyj Centr "Naukosfera"*, 68–70 (Consideration of the issue of cross-subsidization in the electric power industry. *Proceedings of the III International Scientific and Practical Conference "New directions and concepts in modern science"*, International Scientific and Information Center "Naukosfera", 68–70).
- Klochkova, E., & Kharlamova, M. (2015). Sokrashchenie vybrosov parnikovyh gazov v rezul'tate primeneniya tekhnologii anaerobnogo sbrazhivaniya organicheskikh othodov na primere pticefabrikiv Leningradskoj oblasti. *Vestnik RUDN. Seriya: Ekologiya i bezopasnost' zhiznedeyatel'nosti*, 3, 96–104 (Reducing greenhouse gas emissions as a result of applying the technology of anaerobic digestion of organic waste on the example of poultry farms in the Leningrad region. *Bulletin of the RUDN University. Series: Ecology and Life Safety*, 3, 96–104). <https://cyberleninka.ru/article/n/sokraschenie-vybrosov-parnikovyh-gazov-v-rezultate-primeneniya-tehnologii-anaerobnogo-sbrazhivaniya-organicheskikh-othodov-na-primere>
- McKinsey. (2019). *Global Energy Perspective 2019*; McKinsey Solutions Sprl.
- Nikonorov, S., & Baraboshkina, A. (2018). Upravlenie sistemoy zelenogo finansirovaniya v Kitae. *Ekonomika ustojchivogo razvitiya*, 2(4), 67–72 (Management of the green financing system in China. *Sustainable Development Economics*, 2(4), 67–72).

- Nikonorov, S. M., & Baraboshkina, A. (2018). Celi ustojchivogo razvitiya i sistema zelenyh finansov v Kitae i v Rossii. *Menedzhment i biznes-administrirovanie*, 2, 136–145 (Sustainable development goals and the green finance system in China and Russia. *Management and Business Administration*, 2, 136–145).
- Papenov, K., & Nikonorov, S. (2017). Zelenaya ekonomika dlya ustojchivogo razvitiya v sisteme priroda-chelovek-proizvodstvo. Sbornik statej Mezhdunarodnoj nauchno-prakticheskoy konferencii “Ekonomika i ekologiya: Trendy, problemy. resheniya”. Noyabr’ 23–24, ChSU, 56–61 (Green economy for sustainable development in the nature-man-production system. *Proceedings of the III International Scientific and Practical Conference “Economics and Ecology: Trends, Problems. Decisions”*. November 23–24, ChSU, 56–61).

Migration policy towards skilled labor in the Russian Federation¹

Olga Chudinovskikh*,

Faculty of Economics, Lomonosov Moscow State University

Oxana Kharaeva,

Faculty of Economics, Lomonosov Moscow State University

Reference to this paper should be made as follows: **Chudinovskikh, O., & Kharaeva, O. (2020).**

Migration policy towards skilled labor in the Russian Federation.

BRICS Journal of Economics, 2(1), 80–102. <https://doi.org/10.38050/2712-7508-2020-11>

Abstract

The article analyzes the policy of the Russian Federation towards skilled foreign labor in retrospect — from the moment of the collapse of the USSR to the present day. It is shown that throughout the recent history of law-making and in practice, labor migrants have been considered mainly as a temporary phenomenon despite the country's need for qualified personnel who could become a part of its resident population. The article attempts to systematize existing channels of skilled migration and provides main principles of their operation. It is shown that, with the exception of a program aimed at the so-called highly skilled specialists (HSS), other forms of attracting foreign workers do not offer a package of conditions that can interest potential migrants in moving to Russia. The system of attracting HSS has not yet shown its effectiveness and is mainly used for simplified temporary access to the Russian labor market. The State Program of assistance to the resettlement of compatriots, formally intended for migrants with ethnic and cultural affinity to the population of Russia, actually uses the principles of selection of skilled labor migrants. Only at the end of 2019, steps were taken that made it easier for graduates of Russian universities and technical schools, as well as specialists with professions in demand, to obtain a residence permit. However, these steps look half-hearted. Comparing the Russian experience with the practice of some foreign countries gives grounds for thinking about what tools and approaches can improve the effectiveness of the Russian policy towards qualified migrants and arouse their interest in moving to our country for permanent residence.

Keywords: foreign workers, labor migration, skilled specialists, highly skilled specialists, migration policy.

JEL: E24, J08, J15, J61.

¹ This article was prepared as part of a research carried out with the support of the Russian Foundation of Basic Research, grant No. 19-010-00670 “Evaluation of the results of the migration policy of the Russian Federation and proposals for its modernization in the new economic and geopolitical conditions”.

* E-mail of the corresponding authors: olga@econ.msu.ru; oxa-na1@yandex.ru

Introduction

In contrast to migration through family reunification and even migration of asylum-seekers, which is difficult to regulate since it depends not only on national but also on international law, labor migration policy is the prerogative of the state and, in theory, should best reflect its interests. Migrant receiving countries regulate this process taking into account the current situation in the national labor market and its long-term needs. A special place in the flows of international labor migration is occupied by those who are allowed to legally stay in the country of destination for a long period of time or move there for permanent residence. As a rule, this applies to people with necessary competencies and professions which are in demand in the country. Such migrants are considered by the host countries as potential citizens, their rights are much wider than those of unskilled workers or people who come to work on a short-term basis (which often coincides). The exact number of skilled migrants in the world is unknown, and most likely they are a minority, but “in terms of development, however, these migrants have an importance far greater than their numbers might imply” (Skeldon, 2004, p. 7). The contribution of skilled migrants is not limited to the performance of their work responsibilities. The most talented and motivated of them contribute to the creation of the new enterprises and jobs and to the technology’s development (Moore, 2006, pp. 330–331).

Experience of the foreign countries shows that the main approaches of migration policy regarding long-term labor migration have stood the test of time. Sponsorship of migrants by employers or, on the contrary, admission of foreigners with necessary human capital on a competitive basis made it possible to establish relatively stable immigration regimes. They ensure selectivity of migration policy and allow to achieve a balance between the capacity of the labor market and the supply of foreign workers.

Countries regulate the influx of skilled labor force taking into account the situation in the labor market, narrowing or, vice versa, expanding this channel. In times of economic downturn, migrants’ eligibility criteria become more stringent (Ruhs & Anderson, 2010, pp. 1–2). When the situation changes, the selection criteria are reviewed in the direction of simplification (OECD, 2019, p. 47). Migration policy adjustments in the field of labor migration can be either radical or, to a greater extent, “cosmetic”. It is about creating new forms of admission of foreigners to the labor market, launching new immigration programs, or about some modifications of the rules that regulate existing migration flows. A country’s migration attractiveness for skilled workers depends on a set of rules that make up the “immigration package”: availability of quotas that control the flows of skilled immigrants, ease of employment, restrictions on admission to permanent residence, citizenship and employment opportunities for adult family members (primarily spouses) (De Smet, 2013, pp. 6–7).

For almost three decades after the breakdown of the Soviet Union, Russia has been a destination country for hundreds of thousands of labor migrants not only from the countries of the former USSR but also from other parts of the world. Demographic trends indicate an increasing need for migratory influx. According to the medium variant of demographic prospect, by 2035, the working-age population of Russia will decrease

by 4.4 million people, and without migration – by 5.6 million². Despite the continuing demand for unskilled labor, the goals of the country's long-term economic development require attraction of migrants with certain skills and occupations which are in demand in Russia. According to the Federal State Statistics Service, in 2018, the number of employees needed to fill vacancies reached almost a million people, including almost 94 thousand in manufacturing, more than 150 thousand in healthcare, almost 100 thousand in transportation and storage, and about 40 thousand in the energy sector³. The main documents that define the vector of migration policy in Russia traditionally emphasize the need to attract migrants with necessary competencies. However, domestic policy in this direction can hardly be called consistent, and its effectiveness is low. This needs to be understood, and the approaches used need to be reviewed and developed.

It is difficult to give an exact definition of “long-term” or “skilled” labor migration in the Russian context. Most migrant-receiving states establish differentiated mechanisms for different skills and professional groups. A peculiarity of the Russian approach is an attitude to labor migration as to a temporary phenomenon and the absence of direct link between the level of qualification and the duration of a foreigner's stay in Russia. In 2019, some steps were made towards expanding the rights of skilled migrants, but they also look half-hearted and timid.

The purpose of this article is to analyze the Russian policy in the field of long-term labor migration after the breakdown of the USSR and determine the directions of its modernization taking into account foreign experience. It is important to understand which of the most common models – employer sponsored migration, or admission of migrants to free competition for jobs – is most appropriate in the Russian context. The article is based on the analysis of legal acts of Russia and foreign countries, analytical publications on our topic of interest, as well as data from national statistical and migration services. In this article, we do not consider the methods of assessing the needs of the Russian economy in foreign workers but focus on the analysis of conceptual approaches to regulating skilled labor migration.

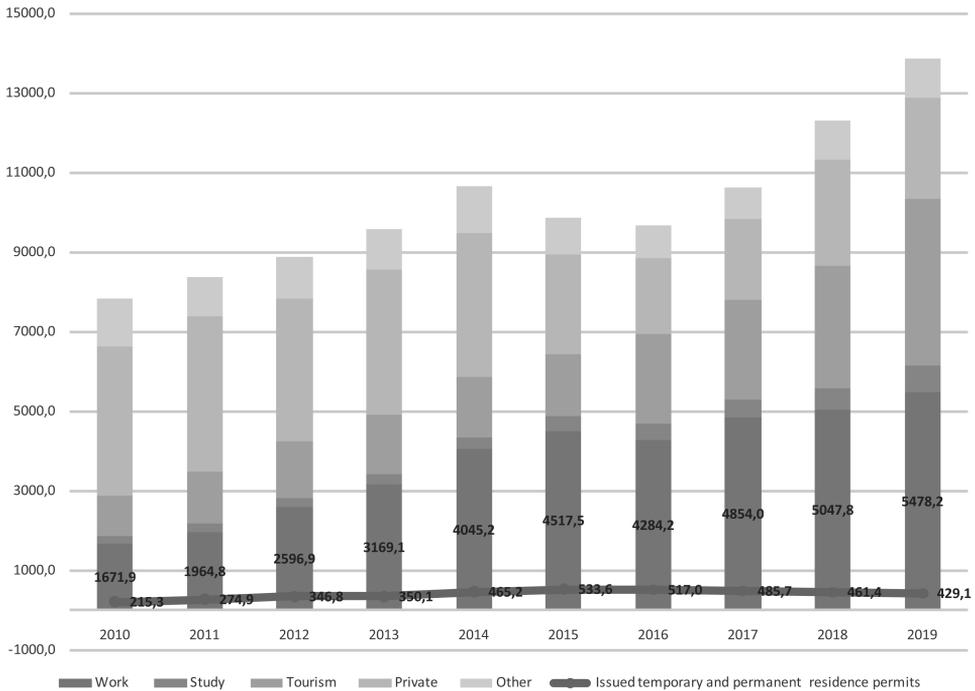
1. The first steps in regulating labor migration in Russia after the breakdown of the USSR

A particular feature of the migration situation in Russia is a significant scale of short-term and temporary forms of labor migration. In recent years, the number of foreigners annually registering with authorities and specifying work as the reason for arrival has exceeded five million people. This is the largest group of foreigners registering at the place of temporary stay in our country. Less than half a million people a year are granted the right to reside in Russia with temporary residence permit (TRP) or permanent residence permit (Figure 1). Many of these migrants also become part of the labor force of our country as over 80 percent of them are people of working ages.

² Estimates based on the UN data <https://population.un.org/wpp/Download/Standard/Population/>

³ Rosstat 2019. Trud i zanyatost' v Rossii. Statisticheskij ezhegodnik. 2019, s. 77 (Rosstat 2019. Labor and employment in Russia. Statistical Yearbook. 2019, p. 77).

In the previous years, temporary labor migration determined the whole migration landscape in Russia and throughout the post-Soviet space. It is difficult to compare the number of issued work permits⁴ and the number of arrivals for permanent residence⁵ in retrospect, because until 2007, the majority of labor migrants worked without documents, the area of free movement of labor was gradually expanding (excluded from the account are citizens of countries that are now members of the EAEU), and the methodology of accounting for both labor migration and migration for permanent residence changed.



Source: Data of the Federal migration service (FMS) and Main directorate for migration issues (MDMI) of the MIA of Russia, Form 2-RD⁶.

Figure 1. The number of foreign citizens registered with migration authorities for the purpose of stay, and the number of decisions made on issuing temporary and permanent residence permits in Russia, 2010–2019 (thousand)

In the first years after the breakdown of the USSR, nascent labor migration was regulated by the 1981 law on the legal status of foreign citizens in the USSR. Article 7

⁴ Administrative data of migration authorities on the number of issued work permits, patents (from 2010) and notifications of hiring citizens of states with a visa-free entry procedure (from 2007 to 2010).

⁵ Rosstat data based on registration of the population at the new place of residence and, since 2011, at the place of stay for a period of 9 months or more.

⁶ Data starting from 2016 are available on the MDMI website; for earlier years, it was received at a request of the Faculty of Economics of Lomonosov Moscow State University.

of this law designated the right of foreigners to work in its most general terms, in effect, equating them with the citizens of the country⁷. For several years, the processes of labor migration developed without a regulatory framework relevant to the new geopolitical realities. It was necessary to create regulators capable of streamlining the presence of foreign workers in the Russian labor market. In December 1993, the Decree of the President of Russia “On attracting and using foreign labor in the Russian Federation” was signed⁸. The decree introduced a system of permits to hire foreign workers, both for legal entities and individuals, quotas for the number of foreign workers employed (by groups of professions), and confirmations (documents) of an employee’s right to work. Duration of contract most often did not exceed one year, but could be extended at the request of the employer. The Decree defined the categories of foreigners who had a simplified access to the Russian labor market. These included foreigners permanently residing in Russia, workers in science and culture, university professors, crew members of Russian sea and river vessels, students employed during holidays, and some other categories of foreigners. The decree also mentioned highly skilled specialists. They could be employed without a work permit in enterprises with foreign investment and in the positions of heads (and their deputies) of these enterprises and their divisions. Until the adoption of the Law on the Legal Status of Foreign Citizens in the Russian Federation in 2002⁹, over a dozen documents on the regulation of labor migration were issued on the federal level. Some regions (like Moscow) introduced their own rules (David, 2000, p. 32). However, same as before, a significant part of migrants from the countries of the former USSR worked in Russia without documents (Chudinovskikh & Denisenko, 2020, p. 59), control mechanisms were weak, and many issues of the legal status of foreigners in Russia remained unresolved.

2. Temporary status of foreign workers is the main feature of the Russian labor migration policy

The law “On the Legal Status of Foreign Citizens”, which belatedly replaced the outdated USSR law of 1981, established uniform conditions for the use of foreign labor in the country, defined the terms “foreign employee” and “employment of a foreign citizen”, and also fixed a system of annual quotas for invitations to enter the Russian Federation for employment¹⁰. In 2003, a decree of the Ministry of Labor determined the procedure of

⁷ Law of the USSR dated 06.24.1981 No. 5152-X (as amended on 08.15.1996, as amended on 02.17.1998) “On the legal status of foreign citizens in the USSR”.

⁸ Decree of the President of the Russian Federation of December 16, 1993 No. 2146 “On the attraction and use of foreign labor in the Russian Federation”.

⁹ Federal Law of July 25, 2002 No. 115-Φ3 “On the Legal Status of Foreign Citizens in the Russian Federation”.

¹⁰ See, for example, Decree of the Government of the Russian Federation of October 30, 2002 No. 782 on approval of a quota for issuing invitations to foreign citizens to enter the Russian Federation for employment.

forming quotas¹¹. The proposed mechanism was cumbersome and inconvenient, and the results of campaigns to collect requests from employers did not reflect the real needs for foreign labor¹². Over time, the corruption component has developed in the quota system, and this has become one of the main reasons for introducing the patent system in 2010 (Denisenko et al., 2013). Subsequently, the branch of legislation related to labor migration developed. New freedoms or restrictions were introduced for workers and employers, and new forms of admission of foreigners to the Russian labor market appeared. Since 2007, citizens of countries with visa-free entry procedures could apply for a work permit without an invitation from the employer¹³, and employers were exempted from having a permission to hire foreigners. Almost at the same time, at the end of 2006, restrictions were first introduced on recruitment of foreigners in certain sectors and occupations. The practice still exists today¹⁴. Experts note that binding of this system to sectors of economy and lack of connection with occupations and jobs puts people with completely different skill levels in the same position (Romodanovskij & Mukomel, 2015, p. 14).

The definition of a foreign worker in the law “On the Legal Status...” denotes “a foreign citizen temporarily residing in the Russian Federation and carrying out labor activity in established order”. There are various approaches to the definition of labor migrants¹⁵, but temporary nature of stay, noted in the 2002 Law and enshrined in all its subsequent versions, demonstrates attitude of the Russian legislator to foreign labor as to an exclusively temporary phenomenon. Such a definition conflicts with practice. Foreigners who work in Russia and have a permanent or temporary residence permit (TRP), in the terminology of the same law “On the Legal Status...”, do not refer to “temporarily staying”. However, they definitely should be treated as foreign workers if they are involved in remunerated labor activities in Russia. The perception of labor migration as a temporary phenomenon, tacit rejection of the prospect of long-term employment and residence of foreigners in Russia led to the fact that until 2010, the issues of creating special conditions for recruitment of such labor migrants were not considered in Russian legislation.

¹¹ Decree of the Ministry of Labor of the Russian Federation of April 29, 2003 No. 23 “On approval of the Procedure for preparing and considering proposals for determining a quota for issuing invitations to foreign citizens to enter the Russian Federation for labor activity”.

¹² The quota system has not proved its effectiveness over the entire period of its application. It was and remains characterized by a cumbersome procedure of application campaign, multi-stage passing of instances, and inability to take into account current fluctuations in demand for labor. During the decade under review, a quota for work permits was not selected. The share of permits issued within the quota in relation to its volume averaged 63% in 2010–2014 (i.e. 37% remained unclaimed), and 66% in 2015–2019. In 2019, only 42% of permits were issued within the established quota.

¹³ Since 2007, the concept of quotas for this part of labor migrants refers to work permits, not invitations.

¹⁴ For example, Decree of the Government of the Russian Federation of September 30, 2019 No. 1271 “On establishing for 2020 the permissible share of foreign workers used by business entities engaged in certain types of economic activity on the territory of the Russian Federation”.

¹⁵ The definitions used in statistics on labor migration differ from formulations of national legislation. The ILO guide on statistics of labor migration defines long-term and short-term labor migrants, persons who have arrived for work and permanent residence, and temporary labor migrants. The main emphasis is placed on the difference between workers permanently residing in the country or arriving for temporary employment. (ILO, 2018, pp. 11–12).

This is not the only logical contradiction laid down in the law “On the Legal Status...”. The quota for work permits was always formed with indication of specific professions or positions, and the list included such positions that imply long-term employment of a foreign worker. For example, permits for top managers of establishments, organizations and enterprises, as well as their structural divisions (services), specialists in the field of natural and engineering sciences, mid-level specialists in physical and engineering fields, etc. have always been subject to quota limits¹⁶. We see the problem not in the quotas themselves: this tool is successfully used in foreign practice of skilled workers recruitment. Within the framework of a quota, people get the right to immigrate to a country or obtain a relatively long-term employment. And spouses of migrants get the same rights. In Russia, most specialists have to annually renew their work permit. Many of them have to leave the country after a certain time and then return. Issues of bringing family members along are not considered in the law at all. Lack of stability could have a negative effect on the productivity of such specialists artificially causing turnover and rotation of personnel. Citizens of states with a visa entry procedure, apparently, were in a more convenient position. Multiple extended visas allowed them to stay in Russia for a long time, and extension of the visa was carried out through the FMS/MIA authorities without leaving Russia¹⁷.

In 2008, the Ministry of Health and Social Development decided to issue work permits without taking into account the quota to the so-called “skilled specialists” — representatives of a number of professions (positions)¹⁸. Subsequently, the list of professions was repeatedly revised, and their number increased¹⁹. The latest edition includes already 80 titles²⁰. In addition to managers of various levels, it includes engineering professions, technicians and technologists, professions related to theater, circus and other types of

¹⁶ For example: Decree of the Government of the Russian Federation of December 29, 2007 No. 984 “On the determination for 2008 of the need to attract foreign workers to the Russian Federation”; Decree of the Government of the Russian Federation of December 6, 2018 No. 1494 “On determining the need to attract foreign workers arriving in the Russian Federation on the basis of a visa, including for priority vocational qualification groups, and approving quotas for 2019”.

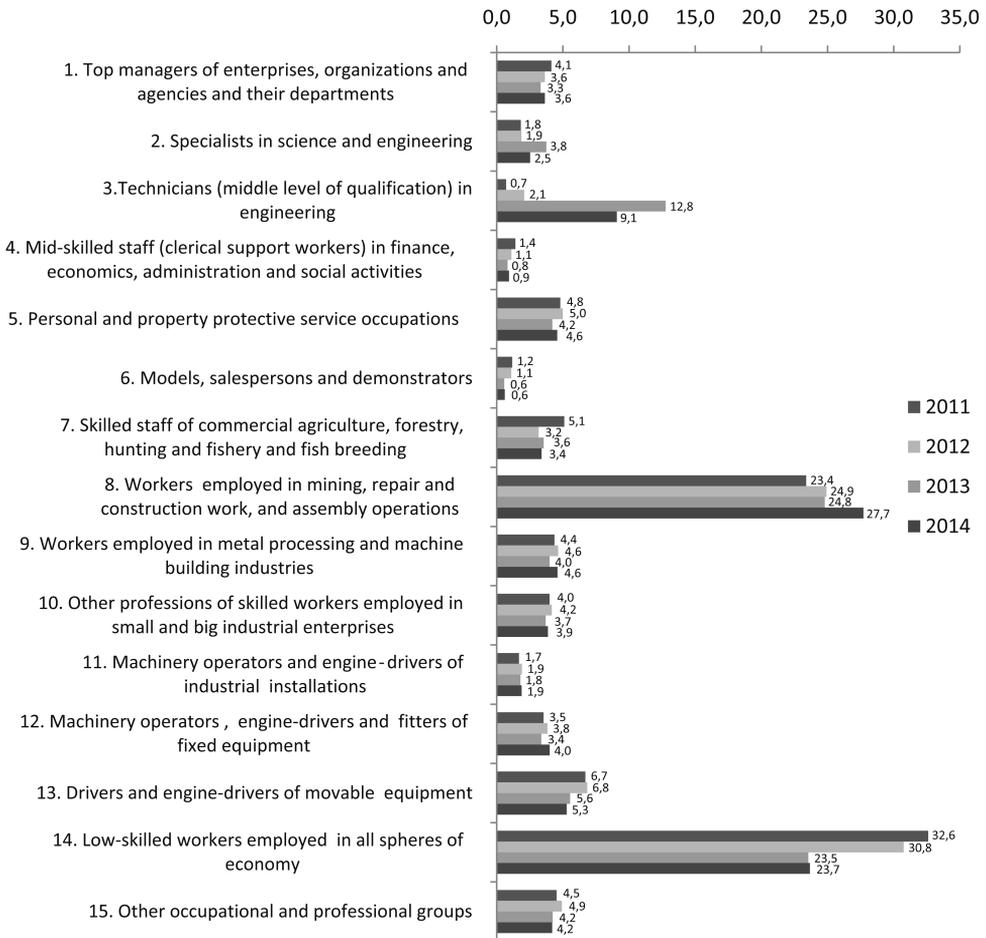
¹⁷ For the period from 2010 to 2019, the bodies of FMS/MDMI MIA issued 1 million 680 thousand work visas. In 2010–2014, more than 200 thousand visas were issued annually, in 2015 their number decreased to 150 thousand, and by 2019 amounted to only 99 thousand.

¹⁸ Order of the Ministry of Health and Social Development of the Russian Federation of July 25, 2008 No. 355H “On approval of the list of professions (specialties, positions) of foreign citizens — qualified specialists who are employed in their existing profession (specialty), to which quotas do not apply, for 2008”. Order of the Ministry of Health and Social Development of the Russian Federation of December 22, 2009 No. 1010H “On approval of the list of professions (specialties, positions) of foreign citizens — qualified specialists who are employed in their existing profession (specialty), to which quotas do not apply, for 2010”.

¹⁹ Order of the Ministry of Labor and Social Protection of the Russian Federation of December 20, 2013 No. 768H Moscow “On approval of the list of professions (specialties, positions) of foreign citizens — qualified specialists who are employed in their profession (specialty), on which quotas for implementation of foreign citizens do not apply, to work in the Russian Federation” — before that — Order of the Ministry of Labor and Social Protection of the Russian Federation of December 3, 2012 No. 568H and others.

²⁰ Order of the Ministry of Labor and Social Protection of the Population of November 25, 2019 No. 734H “On Approving the List of Professions (Specialties, Positions) of Foreign Citizens and Stateless Persons — Qualified Specialists Eligible for Admission to the Citizenship of the Russian Federation in a Simplified Procedure”.

entertainments. Medical professions are not included in the list, apparently because in most cases they need certification of the right to work in healthcare or pharmaceuticals. Short period of work makes it unreasonable to spend time on this procedure. The legislation does not require a migrant to have a diploma confirming formal professional training, and the names of positions themselves sound not like professions that imply certain competencies, but just like job titles.



Source: Calculated according to the materials of FMS of Russia (based on Central Bank of Data on the Registration of Foreign Citizens).

Figure 2. Distribution of persons granted work permits in Russia (all categories), by enlarged professional qualification groups. 2011–2014 (%)

According to the data for 2018 on work permits issued to “visa workers” by professions, the largest group (27.3%) were workers engaged in mining, repair and construction work, and assembly operations, 13.5% were specialists in the field of natural and engineering sciences, and 12.3% – managers. About 11 percent were skilled workers in large and

small industrial enterprises. Only 2.5% of the permits were received by unskilled workers. Elimination of quotas will stop unnecessary procedures that have been lobbied and justified for decades only by the Ministry of Labor under the pretext of protecting the interests of Russian workers²¹.

The lack of requirements for certificates of professional training has encouraged employers to hire unskilled workers as technicians and technologists (mid-level specialists in physical and engineering fields). Such a “maneuver” allowed to avoid the difficulties of obtaining quotas. It was the main reason of changes in the share of unskilled workers in 2011–2014. It decreased from 33% in 2011 to 24% in 2014, and the share of middle-level technical specialists (which includes technicians and technologists) increased from 0.7% in 2011 to 9% in 2014 (and in 2013, it reached 12.8%). Such dynamics indirectly testifies to a formal redistribution of unskilled workers to the category of “skilled specialists”. Figure 2 shows the structure of people who received work permits in 2011–2014, by major professional groups. Such information for patent holders has been never collected, therefore, the data reflect only a part of the foreign workforce. The observation period in Figure 2 is limited to 2011–2014 due to the quality and availability of data that we received from the FMS of Russia. Until 2011, statistics were not available, and in 2015, migrants from the CIS countries were fully transferred to the patent system. A system for collecting information on occupations of the largest part of labor migrants was not established yet.

The main problem in attracting “skilled specialists” was that, regardless of their position, all of them remained persons with temporary status, having to re-pass the procedure for obtaining work permits every year, leaving Russia, etc. Due to their temporary status, these people were not allowed to bring their family with them, even for the period of their work.

Many countries issuing non-immigrant work visas allow the “main applicant” to move with family members. The world experience shows that the possibility of moving together with immediate relatives is associated with a high level of qualification of a labor migrant and is an important element of the country’s migration attractiveness (Ruhs, 2013, p. 47). As will be shown below, in Russia, such a right was granted only to the so-called “highly skilled specialists”, and a little later – to citizens of the states that are members of the EAEU²². Depriving other skilled workers, whose quantitative potential is more significant compared to HSS, of this opportunity, Russian legislation creates artificial obstacles to the growth of the flow. Skilled specialists who have not yet decided to move to Russia, or in principle do not consider it necessary, should be allowed to renew their contract without leaving Russia and obtaining a new work permit. Some types of visas allow this, but the vast majority of so-called “skilled specialists” remain persons with temporary status and short-term stay in Russia.

²¹ The quota system has not proved its effectiveness. It was and remains inherent in the cumbersome procedure of the application campaign, multi-stage passing of instances, inability to quickly adjust to the fluctuations in demand for labor. During the decade under review, the proportion of permits issued within quota to its volume amounted to 63% on average in 2010–2014 (i.e. 37% remained unclaimed), and in 2015–2019 – to 66%. In 2019, only 42% of permits were issued within the established quota.

²² And EAEU citizens, regardless of qualifications for the duration of the contract for work.

Since 2015, this category has been represented by citizens of foreign countries with entry visa requirement, and the potential for such immigration is not great. The times when there were many CIS citizens in this flow have already passed, and chances in this regard have been missed. However, granting skilled workers from foreign countries the right to reunite with family members over time may encourage them to decide to move to Russia for a long term or permanent residence. A lesser tendency to return migration (and, accordingly, the desire to gain a foothold in the host country) is one of the characteristic features of the migration of skilled workers (Docquier & Rapoport, 2007, pp. 14–15), but this potential is not realized in the Russian context.

Perception of all labor migrants as a temporary phenomenon once again demonstrated the attitude of the Russian leadership towards numerous foreign workers of other ethnic groups who do not fit into the concept of gathering the Russian World (subsequently partially implemented in the State Program for the Promotion of Relocation of Compatriots and enshrined in the new Concept of Migration Policy for 2019–2025). We can agree with Malakhov and Simon that political considerations dominate over economic interests in regulating labor migration in Russia (Malakhov & Simon, 2016, p. 9).

The lack of specialized programs aimed at skilled labor migrants and difficulties in finding jobs matching educational attainment have led to a large-scale underutilization of human capital. As V. Mukomel notes, “The problem is that skilled specialists are also employed in jobs that do not require any qualifications” (Mukomel, 2016, p. 33). A similar problem exists in foreign countries, but most often it is associated with migrants who are already part of the country’s resident population. Discrepancy between work performed and educational attainment is associated with difficulties in recognizing the diploma, knowledge of the language of the host country, etc. (Batalova et al., 2016). In Russia, skilled migrants with temporary residence and employment are not interested in going through a complicated nostrification procedure. A simpler solution for the majority is to search for the most affordable vacancies not requiring high qualifications and live a “circular” lifestyle.

3. The Reform of 2010: Patent system and program for attracting highly skilled specialists

In 2010, amendments were made to the Federal Law on the Legal Status of Foreign Citizens that became a milestone in the development of the legal framework for international labor migration in Russia. On July 1, a system of patents²³ for citizens of the former USSR

²³ Patent – a document confirming the right of a foreign citizen who arrived in the Russian Federation in an order that does not require a visa for temporary employment. Patents are granted without a quota and involve monthly payments to the regional budget, which are considered to be the equivalent of income tax (fixed advance payment). Absence of payment invalidates the patent. At the beginning of the application of the system, the price of a patent was the same for all regions and amounted to 1000 rubles (about 25 euros in 2010). Since 2015, the size of payments is set by the regional government with (or without) a deflator coefficient to the base value. In 2019, the cost of a patent ranged from 2172 rubles in the Chechen Republic and the Magadan Region to 9772 rubles in the Republic of Sakha (Yakutia). Until April 24, 2020, an employee had the right to renew the patent in total for a period of up to two years without leaving Russia. In April 2020, the requirement to leave the Russian Federation was canceled.

countries with visa-free entry procedure²⁴ was introduced, as well as a system of attracting highly skilled specialists (HSS). The introduction of patents was a revolutionary step that in the following years freed hundreds of thousands of temporary labor migrants from the quota system for work permits. Affordable price and simple procedure soon made patents the most common form of authorization document for labor migrants from the CIS countries (Table 1). Initially, a patent allowed working in private households, and in 2015, the system was extended to legal entities and individual entrepreneurs.

At the same time, the conditions for admitting almost all foreign workers to the Russian labor market were changed²⁵. The new rules included mandatory testing of knowledge of the Russian language, the basics of Russian history, culture and legislation, requirement for medical insurance of employees, and submission of application only to special regional “migration service centers”. Since 2015, the price of patents, previously the same for all regions, has become subject to free regulation by regional authorities. The legal novelties have fixed the procedure of attracting workers from the CIS countries without taking into account their qualifications. Both unskilled workers and engineers with tertiary education go through the same procedures of obtaining a patent, have the same temporary status, and bear the same material (and moral) costs to legally work in Russia.

As for the system of HSS, the introduced changes can also be called significant. For the first time in its history, Russian legislation defined special conditions for hiring foreign workers with a “high level of qualification” and proposed a package of previously not applied preferences that these workers could count on.

Although since 2009, foreigners with certain professions or invited to work in certain positions were allowed to get work permits without quota, they were still regarded as temporary workers. Such migrants did not receive any other advantages over others.

According to the definition given in the law, a highly skilled specialist is a foreign citizen who has work experience, skills or achievements in a specific field of activity if the conditions for attracting him to work in the Russian Federation imply remuneration in the amount established by law. In the first edition, the lower wage limit was set at a level of two million rubles a year for all HSS. At the end of 2011, new subcategories of HSS were introduced and more flexible criteria for payroll established. Subsequently, Article 13.2 of the Law “On the Legal Status of Foreign Citizens in the Russian Federation” devoted to HSS was repeatedly amended. Currently, there are 6 categories of HSS: teachers and researchers in higher education and research institutions with state accreditation; foreign citizens involved in labor activities by residents of the technology-innovative special economic zone; specialized staff of the international medical cluster; specialists involved in the implementation of the Skolkovo project; employees invited by legal entities operating in the territories of the Republic of Crimea and the city of Sevastopol; other foreign citizens. In the current version of the law, the minimum wage for most categories of workers is calculated not for a year, but for a month, and the payment varies from 58,500 to 167,000 rubles (per month). The threshold of one million rubles is set for highly

²⁴ Visa-free entry and stay is unconditional for citizens of the CIS states except Turkmenistan. Visa is not needed even in case of application for residence permit or employment.

²⁵ The exception was made for the citizens of the EAEU countries and highly skilled specialists.

skilled specialists who are medical, pedagogical or scientific workers if they are invited to engage in relevant activities in the territory of the International Medical Cluster. Wage requirements do not apply to employees of the Skolkovo Innovation Center.

The main advantage of the HSS system is the absence of quotas, extended validity of work permit – from 1 to 3 years, availability of immediate three-year residence permit, and a right to bring family members. The absence of requirements for confirming professional competencies (the right to assess the sufficiency of knowledge of HSS is granted to the employer) allows people with different levels of education to be hired as highly skilled specialists. Workers are not allowed to be engaged in religious activities; restrictions are also imposed on employment in retail trade, except work related to management and coordination of trade activities²⁶.

From 2010 to 2019, 243 thousand work permits were issued for HSS in Russia which amounted to only 1.1 percent of almost 22 million all types permissions issued over the past decade. Patents comprised two-thirds of this amount (Table 1). In the first year, the number of work permits received by highly skilled specialists was small (only 3.1 thousand) and reached a maximum in 2015, exceeding 43 thousand²⁷.

Table 1. Number of permissions to work issued in Russia in 2010–2019 by major categories (*thousand*)

Type of document	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Regular work permits (quota)	1164,8	1218,7	1403,6	1219,8	1142,0	113,2	93,0	103,8	81,8	74,7
Permits for skilled specialists (quota-free)	n/a	n/a	44,1	129,4	158,6	22,1	14,8	18,0	20,1	17,9
Permits for HSS	3,1	11,3	11,8	26,3	34,2	41,8	25,5	26,5	28,2	34,3
Patents	156,8	862,4	1279,1	1534,1	2379,4	1779,8	1492,2	1682,6	1671,7	1767,3
Total	1324,6	2092,4	2738,6	2909,6	3714,2	1956,9	1625,5	1830,9	1801,8	1894,1
The proportion of HSS (%)	0,2	0,5	0,4	0,9	0,9	2,1	1,6	1,4	1,6	1,8

Source: Data of FMS / MDMI MIA of Russia, Form 1-RD²⁸.

²⁶ The list of positions is established by order of the Ministry of Labor. See Order of the Ministry of Labor of Russia dated September 23, 2013 No. 475Н “On approval of the list of professions (positions, specialties) of foreign workers who manage and coordinate activities related to conducting trade, and qualification requirements for such employees”.

²⁷ In the reports of FMS/MDMI MIA of Russia, the data reflect both the documents executed and the number of persons who received them. We are not aware of the reasons for the discrepancies; they are insignificant and most likely are associated with re-issuing forms, or receiving more than one document by an employee within a year.

²⁸ The main source of data on the flows of foreigners who arrived in Russia as HSS are statistical reports of FMS / MDMI MIA of Russia 1-RD and 2-RD (the last one – from 2017). In the form of 1-RD, the details associated

The vast majority of foreigners who arrived in Russia as HSS are citizens of states with visa entry procedure. Their share in the flow averaged 85% over the decade from 2010 to 2019. The main country of origin of highly skilled specialists throughout the observation period was China, its share ranged from 14 to 33% (Table 2)²⁹. The share of citizens of Turkey and Vietnam was noticeable: in 2012–2019, it averaged 11% and 9%, respectively. Citizens of the EU countries together accounted for about 20% of the flow, the United States – about 3%.

Table 2. Distribution of HSS by country of citizenship in 2012–2019 (%)

	2012	2013	2014	2015	2016	2017	2018	2019	2012–2019
Total	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
China	13,6	17,2	20,4	22,9	23,2	16,2	24,3	32,6	22,3
Turkey	8,8	7,9	9,1	7,2	8,0	12,1	17,3	19,3	11,4
Vietnam	4,4	12,4	12,2	15,8	8,7	4,1	3,7	3,0	8,7
Philippines	1,9	6,2	11,4	6,7	5,7	3,0	2,0	1,5	5,2
Ukraine	5,3	4,1	3,3	5,2	4,9	6,1	4,0	2,8	4,4
Serbia	1,4	2,7	5,1	4,2	3,6	4,2	4,4	2,9	3,8
Germany	7,0	4,4	3,5	2,3	3,8	4,4	3,3	2,8	3,6
France	7,2	3,4	3,0	2,2	3,4	4,6	3,3	2,3	3,3
USA	5,5	3,0	3,2	1,7	2,7	3,3	2,4	2,0	2,7
Italy	3,2	2,0	2,2	1,7	2,7	3,7	3,5	2,5	2,6
United Kingdom	5,8	3,6	2,3	1,7	2,8	2,8	2,2	1,8	2,5
Republic of Korea	2,7	1,3	1,8	1,4	2,3	3,7	2,8	2,3	2,2
India	1,5	1,2	0,9	1,3	2,3	2,7	2,8	3,8	2,1
Japan	2,7	1,4	1,2	1,4	1,8	4,1	1,9	1,4	1,9
Uzbekistan	1,1	4,5	0,8	3,8	1,5	0,5	0,7	0,8	1,8
Other	28,0	24,8	19,7	20,7	22,5	24,4	21,4	18,2	21,7

Source: Based on the materials of FMS/MDMI MIA of Russia.

Migrant workers are extremely unevenly distributed across the regions of Russia, but to an even greater extent this is characteristic of HSS. According to the MDMI MIA of Russia (Form 2-RD), for three years (from 2017 to 2019), almost half (47%) of highly

with HSS changed throughout the observation period. From 2016, the report no longer includes information on the validity period of issued work permits from 2016 to 2017. Family members of an employee ceased to stand out among persons who received a residence permit under the program of HSS. Since 2018, this type of residence permit is generally not included in Form 1-RD, possibly due to insignificant numbers.

²⁹ The data on the distribution of HSS by country for previous years were incomplete. Its quality has improved since 2012, when information became available in the FMS's Automated System of Analytical Reporting. Since 2017, a new section – “External labor migration” – has appeared in the statistical report in form 2-RD, which highlights categories of permits, including highly skilled specialists, by country of citizenship and regions of Russia.

skilled specialists worked in Moscow, 9% – in St. Petersburg and Leningrad Oblast, and 5% – in Moscow Oblast³⁰.

From 2010 to 2014, FMS of Russia published information on the validity of work permits for HSS. The share of permits issued for a period of one to three years reached 94%, and only 6% were issued for one year. However, this category of migrants, in fact, still remained temporary. The most important difference between the HSS system and all other channels of labor migration to Russia was the right to receive a three-year residence permit not only by the workers themselves, but also by members of their families. In 2010–2017 (data on residence permits for HSS were available for these years only), about 175 thousand foreigners received work permits as HSS, and only 3.4 thousand, including family members, got residence permits (that amounted to less than two percent of the flow). These migrants still consider Russia as a place of temporary residence and work having no intention to move here for permanent residence. It is quite possible that this system is used to circumvent the procedure of obtaining quotas implemented to regular work permits. One cannot ignore the fact that Russia, as a country of permanent residence, is attractive mainly to residents of the former USSR republics, which until recently did not have convenient and transparent rules for immigration to Russia.

Involvement of HSS in some projects that are most important from the official point of view is uneven. Only the Free Port of Vladivostok (and particularly in 2019) hired more or less noticeable number of foreign specialists, that is, almost a thousand. From 2016 to 2019, not a single foreigner was invited to work in the International Medical Cluster as a HSS³¹. As part of the Skolkovo project, about 130 foreign specialists have received work permits since 2016: 108 of them in 2017, and only 5 and 6 people in 2018 and 2019, respectively. More than 200 people were invited to work in the territories of advanced development in 2016–2019.

Table 3. Number of work permits issued to highly skilled specialists for employment in special economic zones of the Russian Federation (*units*)

	2016	2017	2018	2019
Project “Skolkovo”	2	108	5	6
Free Port of Vladivostok	38	89	330	978
Medical Cluster	0	0	0	0
Advanced Development Territories	0	81	168	214

Source: Data from FMS/MDMI MIA of Russia, Form 1-RD.

It is likely that foreigners are employed at the enterprises listed in the table, although they are not recruited as “highly skilled specialists”, but on the basis of ordinary work permits (maybe permissions for “skilled” specialists). But data on the number of such workers are not published.

³⁰ For comparison: the share of Moscow in the number of all issued permits amounted to 26%, and the share of St. Petersburg and Leningrad Oblast – to 14% and Moscow Oblast – to 12%.

³¹ Perhaps, due to the fact that workers in the medical and pharmaceutical professions with diplomas obtained in most foreign countries need to receive a certificate for the right to engage in professional activities in Russia, and this procedure is complicated.

Regarding the professional qualifications of HSS, the information is very scarce. For several years, we requested data from FMS and the Ministry of Internal Affairs dealing with professions of labor migrants who received work permits in Russia. For a number of reasons, this information was very incomplete in relation to HSS and reflected only part of the flow (in some years – only half). The data for 2017 were of satisfactory quality in terms of their completeness³². The data showed that in 2017, 36.2% of permits were issued to top managers of establishments and organizations, 13.3% were received by specialists in the field of natural and engineering sciences, about 2.5% each were received by mid-level specialists in physical and engineering areas of activity, and medium skills staff in the field of financial and economic activity. More than 40% of HSS were assigned to “other vocational qualification groups”.

4. Graduates and representatives of professions in demand — a potential for long-term migration to Russia

Despite the fact that attracting HSS is framed as a separate program, there are other opportunities for long-term migration of skilled specialists in Russian law and practice. They were not in demand due to difficult conditions, but recently there was hope for a slight improvement in the situation.

First of all, we are talking about graduates of Russian institutions of vocational education (tertiary and high) and people who have a profession in demand in Russia (as well as investors and entrepreneurs). Formally, admission of these migrants was already regulated, but the main regulator was chosen incorrectly. Instead of simplifying the issuance of residence permits, the desired categories of immigrants were offered Russian citizenship. Although it was a facilitated procedure, the conditions established for the graduates by law were still inconvenient and became even more difficult than before. In addition, for many foreigners of above listed categories naturalization was not the main purpose of moving to Russia. The new rules for simplified citizenship acquisition for 2015–2019 were used by 2.7 thousand graduates, 6 entrepreneurs, not a single investor, and 224 skilled specialists with a three-year work experience in Russia (Table 4).

Table 4. Number of foreigners of certain categories granted Russian citizenship in a simplified manner, 2014–2019 (*persons*)

	2015	2016	2017	2018	2019
Graduates of Russian institutions of vocational education	255	690	292	695	729
Entrepreneurs	0	0	0	1	5
Investors	0	0	0	0	0
Specialists with a 3 year work experience in a profession in demand	0	0	4	84	136
Total received Russian citizenships	209 799	265 319	257 822	269 362	497 817

Source: Data from FMS/MDMI MIA of Russia, Form 1 RD.

³² The issues of information support for migration studies of highly qualified specialists will be addressed in the final part of the article.

Graduates of Russian universities and technical schools could previously obtain Russian citizenship without any additional conditions. An amendment to the Law on Citizenship adopted in 2014 introduced a new requirement for this category of applicants – to work in Russia for three years before applying for citizenship. The possibility of naturalization became more distant for the applicants. The number of graduates who received Russian citizenship after the changes in 2014 decreased significantly. In 2010–2014, 5199 persons who received Russian professional education were accepted into citizenship, and in 2014–2019 – only 2720.

Such an approach confirmed an already observed trend: there is no direct interest in state policy in retaining in Russia and using the potential of foreign students at the end of the learning process (Belova, 2014, p. 78), despite the fact that most of them are people who know the Russian language well, who have received education in Russia and are fully integrated over the years of study.

In addition to graduates, a simplified procedure for obtaining citizenship was introduced in 2015 for people with professions in demand in Russia. In July 2015, the Ministry of Labor published the first list³³. As with issuing work permits without taking into account the quota, it was about “skilled specialists”. But the lists of professions for simplified citizenship acquisition and for obtaining work permits without a quota were significantly different. The first order of the Ministry of Labor included 74 professions, mainly medical doctors, engineers, and skilled workers. In 2019, the list was revised, and it currently includes 135 points³⁴. It has more medical and veterinary specialties (40% of the list), professions of skilled workers (more than 30%), and engineers of various profiles (20%). It also includes positions in agriculture (10%), professions of teachers, and some others. As shown in Table 4, in 2015–2019, only 224 people were able to take this opportunity. The 3-year work experience which was supposed to allow a migrant to change his temporary status step by step to permanent residence and then to acquire citizenship, appeared to be a difficult condition.

The gradual transition of temporary migrants to permanent ones is a common phenomenon. The concept of “two-step migration” implies retention of temporary workers and former international students who have secured domestic qualifications (Hawthorne, 2014, p. 2). Upon graduation from a national university, a graduate is immediately granted access to the labor market and permanent status if he or she finds a vacancy. The amendments of 2014 backfired: the waiting period for acquisition of citizenship turned out to be tied to three years of work in Russia with a temporary status. First, a migrant had to obtain a temporary residence permit on a quota basis, and then a permanent residence permit to be eligible to apply for citizenship. The same procedure was

³³ Order of the Ministry of Labor and Social Protection of the Russian Federation of July 13, 2015 No. 446n “On approval of the list of professions (specialties, positions) of foreign citizens and stateless persons — qualified specialists entitled to receive Russian citizenship in a simplified manner”.

³⁴ Order of the Ministry of labor and social protection of the Russian Federation of 05.07.2019 No. 490n “On approval of the list of professions (specialties, positions) of foreign citizens-qualified specialists who are employed in their existing profession (specialty), in which quotas for issuing work permits to foreign citizens arriving in the Russian Federation on the basis of a visa do not apply”.

assumed for specialists with professions in demand. There was a legal conflict: the listed categories of foreigners were offered a simplified procedure for admission to citizenship, but the complex procedure for obtaining previous statuses remained unchanged. As noted by Russian researchers, there was a paradoxical situation: after graduation, it was almost impossible to immediately obtain a long-term status, and a university graduate had to work on a patent basis (Demintseva et al., 2018, p. 33) under the same conditions as an unskilled worker.

The immigration potential of graduates of Russian institutions of vocational education is significant. In 2019, the stock of foreign students at universities reached almost 300,000, of which 64% were citizens of the former Soviet republics. Around 49 thousand foreign students graduated from Russian universities, of which 32 thousand were citizens of countries that were previously part of the Soviet Union. About 6 thousand people graduated from technical schools and colleges, almost all of them were citizens of the newly independent states and the Baltic states³⁵.

The rules for admission of graduates of vocational education institutions, as well as skilled specialists, to TRP and permanent residence permits have changed only since November 2019. The law adopted in the summer of 2019³⁶ introduced important amendments addressed to these categories of foreigners. Graduates were granted the right to receive TRP without a quota³⁷. Persons who graduated with honors were able to apply for a permanent residence permit, bypassing the stage of TRP. Skilled workers could also immediately apply for a permanent residence permit, and the period of professional activity before application was reduced to six months.

Outside the scope of the amendments listed above, the question remains whether graduates and skilled specialists will be allowed to bring their families with them. We have already noted this problem in the context of quota-free work permits for “skilled specialists”. There is possibly a certain logic in such an approach if we are talking about temporary (short-term) work permit holders. A person with a short-term status has less rights than a person who is granted the right to settle. However, the amendments of 2019, along with simplification of obtaining a residence permit for graduates and specialists in demand, were again focused on single people and offered nothing to members of their families. This does not give a sense of stability to potential migrants. The possibility of family reunification becomes a problem that migrants will solve themselves.

³⁵ Data of the Ministry of higher education and science and Ministry of education of Russia.

³⁶ Federal Law dated 02.08.2019 No. 257-Φ3 “On Amendments to the Federal Law “On the Legal Status of Foreign Citizens in the Russian Federation” regarding the simplification of the procedure for granting temporary residence permits and residence permits to selected categories of foreign citizens and stateless persons”.

³⁷ This right is granted to citizens of the former USSR republics which obtained higher or secondary vocational education in state educational or research institutions located in the Russian Federation within state-accredited educational programs.

5. The State Program of voluntary resettlement of compatriots as a program of migration of skilled personnel

The functions of the missing programs of skilled labor migration in our country have been for many years partially performed by the State Programme to Assist Voluntary Resettlement of Compatriots Living Abroad to the Russian Federation. Formally, the goal of this program was to recreate the Russian World, and it was presented to the society as a repatriation program. The normative documents of the federal level emphasize the ethno-cultural closeness of potential migrants to the Russian population. In fact, this program is a hybrid combining repatriation and economic goals. We can cite the Decree of the government of Leningrad Oblast of 2015 that states that an increase in demand for skilled workers and structural changes in the regional labor market cannot be satisfied with existing labor resources and without attracting external labor migration. The next phrase of the Decree emphasizes that resettlement of compatriots with demanded vocational qualifications, educational, economic, demographic, socio-cultural, and other characteristics who can successfully adapt and integrate into Russian society is one of the sources of population growth in the region that is needed for its further socio-economic development³⁸. Similar requirements can be found in other regions of Russia.

Due to a combination of dissimilar criteria, the State Program turned out to be ineffective, as evidenced by the relatively small number of its participants. Over the entire period of the program implementation (2006–2019), about a million people moved to Russia along this line. For Russia with a population of 146 million, this is rather a small amount. Kazakhstan, with population of 18 million, also received about 1 million migrants under the program of resettlement of ethnic Kazakhs (oralmans), which does not require professions or skills. This contradiction of the State Program can be eliminated by giving it an exclusively humanitarian, repatriation character, while migration of skilled labor must be regulated by special programs devoid of the requirements of “ethno-cultural closeness”. Significant financial resources allocated to support the participants of the State Program will be saved, since labor migrants are self-sufficient and do not count on assistance. At the same time, true repatriates will not have to prove that they are of pragmatic value to their historical homeland.

6. The issues of attracting skilled specialists in the Concepts of the State Migration Policy of the Russian Federation

The issues of attracting skilled personnel are reflected in two Concepts of the State Migration Policy of Russia. In the first Concept, adopted in 2012, it was noted that “attraction of foreign workers in priority vocational qualification groups to fit the needs of the Russian economy is a necessity for its further progressive development”. One of

³⁸ Decree of the Government of the Leningrad Oblast of June 29, 2015 No. 240 “On Amending the Decree of the Government of the Leningrad Oblast of November 14, 2013 No. 394” On the Approval of the State Program of the Leningrad Oblast “Stimulating the Economic Activity of the Leningrad Region”.

the most important strategic tasks was “creating the conditions and mechanisms for attracting highly skilled and skilled specialists of various fields, entrepreneurs and investors, demanded by the economy, primarily on a long-term basis”³⁹. Many tasks of the first Concept have not been completed (Denisenko & Chudinovskikh, 2017). Instead of offering diverse immigration channels, the lawmakers went the simplest way. They decided to provide simplified access to citizenship for these categories of migrants. It was supposed to increase the attractiveness of Russia for immigrants. As mentioned above, the measures taken were formal and did not bring the expected result because the preliminary statuses (based on residence permits) remained hard to obtain. The time was wasted.

In October 2018, a new Concept of the State Migration Policy for 2019–2025 was adopted⁴⁰. It generally does not contain provisions dealing with skilled specialists as an independent target group of migrants. The issue is considered exclusively in the context of the State Program of the Voluntary Resettlement of Compatriots, thereby fixing its economic rather than repatriation character. At the same time, skilled migrants who, for various reasons, do not participate in the state program are left to their own devices. No special conditions are offered to them to facilitate their resettlement to Russia. Hopefully, the novelties of the legislation on residence permits that were put in force at the end of 2019 will find their audience and to some extent compensate for the lack of programs to attract skilled migrants to Russia.

Concluding remarks

In what direction should the Russian policy of attracting qualified migrants be modernized? The experience of major migrant-receiving countries of the West shows that until recently, they used two fundamentally different approaches to selecting economic migrants. One of them was focused on meeting the demand from employers, the other was aimed at building human capital (Papademetriou & Hooper, 2019, p. 5). The first model, used mainly for temporary but also for permanent migration, has become more widespread. Sponsorship from the employer is considered a guarantee of the demand for certain competencies and qualifications. The second selection model is the points-based assessment of candidates according to characteristics related to their human capital, as well as, in some cases, the demand for a profession, regional nomination. It is a flexible and transparent system that insures an influx of immigrants able to adapt to changing labor market conditions (Papademetriou & Simption, 2011, p. 3). To better use the advantages of both migrant selection systems, the host countries started to implement hybrid models designed to balance the current and long-term interests of the labor market.

Analyzing in retrospect the policy of Russia in the field of skilled labor migration or long-term labor migration, we can see a dilemma: on the one hand, Russia’s interest

³⁹ The Concept of the State Migration Policy of the Russian Federation through to 2025 (approved by the President of the Russian Federation on June 13, 2012).

⁴⁰ Decree of the President of the Russian Federation of October 10, 2018 No. 622 “On the Concept of the State Migration Policy of the Russian Federation for 2019–2025”.

in skilled migrants is recognized, and several categories of skilled foreign workers are distinguished in the law, but on the other hand, effective targeted programs to stimulate their relocation to Russia and long-term employment are not created. The multiplicity of categories of skilled workers shows that different regulators are applied to persons who may have the same characteristics. To a certain extent, the management of labor migration in Russia is characterized by an artificial retention of its participants in a temporary status and restriction of rights, which apply equally to low-skilled workers and specialists with high-demand professions. “Skilled specialists” receiving work permit without quota are essentially temporary labor migrants, their stay in Russia is limited by the duration of the visa. A work permit is issued for a year, the vast majority of the employees, even having the prospect of receiving a new contract, is obliged to leave Russia to receive an invitation and a work permit again. Although such migrants can bring accompanying family members (on a special visa), they rarely use this opportunity.

The program for attracting highly skilled specialists, although it is declared as a special migration channel designed to attract long-term workers and provide the Russian economy with particularly valuable foreign personnel, also does not stimulate these people to move to Russia. The scanty numbers of issued residence permits for both specialists and their families confirm that the system of HSS is used very selectively to overcome the difficulties that an employer and employee encounter when obtaining quotas and work permits. Almost none of the highly skilled specialists use the opportunity to repeatedly extend an ordinary work visa for up to three years⁴¹.

The systems for receiving skilled and highly skilled specialists from the “visa” countries have much in common, and in terms of effectiveness they do not differ from the rest of the flow of labor migrants who come to Russia by visa.

The State Program of compatriots resettlement, which is formally considered a repatriation program, in reality is a program for selection of labor migrants, and we can say that such a combination does not bring tangible results. It needs to be freed from an unnecessary and even unfair function – the selection of potential participants by profession. If Russia wants to collect the Russian World, the terms of admission should not be connected with professional skills of potential migrants. These issues should be left to special labor migration programs. On the one hand, this will prevent labor migrants from the need to become “compatriots”, and on the other hand, it will make the state program itself consistent and improve its image and attractiveness.

When developing policies in the field of skilled migration, Russia should apply a wider range of tools and create different channels of labor migration with the possibility of status change. Given the experience of foreign countries, it makes sense to reconsider approaches to attracting skilled labor, removing unnecessary restrictions, and, on the contrary, giving migrants more rights. First of all, it concerns the right to a long-term contract and family reunion.

⁴¹ See Decree of the Government of the Russian Federation of 09.06.2003 No. 335 “On approval of the Regulation on the establishment of a visa form, the procedure and conditions for its processing and issuance, extension of its validity, its restoration in case of loss, as well as the procedure for canceling a visa”, paragraph 29 (1).

The possibility of introducing a points based system is a debatable issue in Russian conditions so far. We believe that with a constant demand for skilled workers, it can work, but in a relaxed mode. The set of criteria should not be too large, and the “passing score” – too high. The main requirement should be the availability of a profession needed in Russia, knowledge of the Russian language, education, and professional experience. Vocational education received in Russia may be one of the circumstances giving additional preferences. Regional programs of attracting specialists would be effective with differentiated selection conditions and lists of professions in demand. And of course, foreigners who are of interest to the economy of Russia and its regions should have the right to bring their closest family members with them. Spouses and children of skilled workers should have the same rights to temporary or permanent residence and citizenship as the “main” migrant. Adult family members must have an unconditional right to work. These measures will make it possible to formalize disparate and not always logically connected rules into a relatively ordered package of measures, create a program (or programs) to attract workers with demanded professions and a prospect of gaining a foothold in Russia for a long time or moving here for permanent residence.

Within the framework of this article, we have not considered some important issues directly related to migration of skilled labor. In particular, it is the issue of recognizing the qualifications of migrants, which is considered one of the most significant elements in the development of immigration policy (ILO, 2013, p. 127). We also cannot investigate in detail the motivation and immigration intentions of skilled migrants who come to Russia as part of the so-called “intra-company transfer”, do not compete with local workers for a specific workplace, and may not consider their country of destination as a place of voluntarily chosen residence⁴². Another important problem is the incompleteness and poor quality of data on foreign specialists’ position in the Russian labor market. We know practically nothing about what jobs and in which sectors of the economy are occupied by skilled workers from the CIS countries who work on patents, and to what extent their education matches the performed work. And we also do not have comprehensive assessments of the needs of the Russian economy in skilled migrants⁴³.

It is impossible not to think about a possible impact of the coronavirus pandemic on the skilled workers migration to Russia. According to the Pew Research Center, as of April 1, 2020, about 91% of the world’s population live in countries with entry restrictions⁴⁴. Most likely, these measures will be temporary; however, there is a risk that “temporary measures have a nasty habit of outlasting emergencies”⁴⁵. Compared to the first 5 months of 2019,

⁴² Although they have a positive attitude to working abroad during their assignment both from the viewpoint of earnings and career growth (Moodley, 2014, p. 63).

⁴³ In foreign practice, trade unions are involved in such assessments, advisory councils are created that can link research results with political decisions (Ruhs & Anderson (Eds.), 2010, p. 3).

⁴⁴ Connor, P. *More than nine-in ten people worldwide live in countries with travel restrictions amid COVID-19*. 1 April 2020. Pew Research Center. <https://www.pewresearch.org/fact-tank/2020/04/01/more-than-nine-in-ten-people-worldwide-live-in-countries-with-travel-restrictions-amid-covid-19/>

⁴⁵ Harari, Yu. N. The world after coronavirus. *Financial Times*. March 20, 2020. <https://www.ft.com/content/19d90308-6858-11ea-a3c9-1fe6fedcca75>

in 2020, the number of work permits issued for skilled and highly skilled specialists in Russia accounted to 35% and 53%, respectively, and the number of patents — to 70%. Nevertheless, it is obvious that the demand for skilled workers in Russia — with some structural changes — will remain in the future. If Russia needs skilled workers who will become part of our society, it is necessary to simplify the terms of reception conditions for migrants and allow them to bring their families, that is, to enable them to form a new vision of Russia as a country of future residence, and not just a place of short-term employment and earnings.

References

- Batalova, J., Fix, M., & Bachmeier, J. D. (2016). *Untapped talent: The costs of brain waste among highly skilled immigrants in the United States*. Migration Policy Institute. December. <https://www.migrationpolicy.org/research/untapped-talent-costs-brain-waste-among-highly-skilled-immigrants-united-states>
- Belova, L. G. (2014). *Privlechenie inostrannykh vysokokvalificirovannykh specialistov v Rossiiu: Tendencii i puti sovershenstvovaniya gosudarstvennoj politiki*. Dissertaciya na soiskanie uchenoj stepeni kandidata ekonomicheskikh nauk. RUDN (*Attracting foreign highly skilled specialists to Russia: Trends and ways to improve public policy*). The dissertation for the degree of candidate of economic sciences. RUDN).
- Chudinovskikh, O., & Denisenko, M. (2020). Labor migration on the Post-Soviet territory. In M. Denisenko, S. Strozza, & M. Light (Eds.). *Migration from the Newly Independent States. 25 years after the collapse of the USSR*. Springer Nature Switzerland AG.
- David, Ya. U. (2000). Inostrannaya rabochaya sila v Moskve. *Sociologicheskie issledovaniya*, 4, 32–40 (Foreign labor force in Moscow. *Sociological studies*, 4, 32–40).
- de Smet, D. J. (2013). *Employing skilled expatriates: Benchmarking skilled immigration regimes across economies*. Policy Research working paper, No. WPS 6708. The World Bank.
- Demintseva, E., Mkrtychyan, N., & Florinskaya, Y. U. (2018). *Migracionnaya politika: Diagnostika, vyzovy, predlozheniya*. Centr strategicheskikh razrabotok, NIU VSHE (*Migration policy: Diagnostics, challenges, suggestions*). Center for Strategic Research, HSE). <https://publications.hse.ru/books/217173926>
- Denisenko, M., & Chudinovskikh, O. (2017). Prichiny nerealizacii polozhenij Konceptii gosudarstvennoj migracionnoj politiki Rossijskoj Federacii. *Demoskop Weekly*, 753–754, 18–31 dekabrya (The reasons for the failure to implement the provisions of the Concept of state migration policy of the Russian Federation. *Weekly Demoscope*, 753–754, December 18–31). <http://www.demoscope.ru/weekly/2017/0753/analit01.php>
- Denisenko, M., Mkrtychyan, N., & Chudinovskikh, O. (2013). Vremennye trudovye migranty v Rossii. *Demoskop-weekly*, 579–580, 16–31 dekabrya (Temporary labor migrants in Russia. *Demoscope-Weekly*, 579–580, December 16–31). <http://www.demoscope.ru/weekly/2013/0579/tema02.php>
- Docquier, F., & Rapoport, H. (2007). *Skilled migration: The perspective of Developing Countries*. IZA DP No. 2873. Discussion paper series. Forschungsinstitut zur Zukunft der Arbeit Institute for the Study of Labor.
- Hawthorne, L. (2014). A comparison of skilled migration policy: Australia, Canada and New Zealand (October 16). https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2808881
- ILO. (2013). *Recognition of qualifications and competences of migrants*. A. Schuster, M. V. Desiderio, & G. Urso (Eds.). International Labor Organization 2013. https://publications.iom.int/system/files/pdf/recognition_qualifications_competencesofmigrants.pdf

- ILO. (2018). *Guidelines regarding statistics of international labor migration*. International labor Organization 20th International Conference of Labor Statisticians. October 10–19.
- Malakhov, V., & Simon, M. (2016). The political economy of Russian migration politics. Preprints 2016, 2016090058 (doi: 10.20944/preprints201609.0058.v1).
- Moodley, A. (2014). *Motivation for skilled professionals to accept expatriate assignments*. Research project. Gordon University of Business Science, University of Pretoria.
- Moore, S. (2006). Give us your best, your brightest: Immigration policy benefits US. Society despite increasing problems. In A. M. Messina & G. Lahav. (Eds.). *The migration reader. Exploring policies and politics*. Boulder, Lynne Rienner Publishers.
- Mukomel, V. (2016). Trudovye migranty v kontekste problem demograficheskogo, ekonomicheskogo i social'nogo razvitiya Rossii. V: *Trudovaya migraciya i politika integracii migrantov v Germanii i Rossii*, pod red. M. S. Rozanova. Centr grazhdanskih, social'nyh, nauchnyh i kul'turnyh iniciativ "Strategiya", Skifiya-print (Migrant workers in the context of the problems of demographic, economic and social development of Russia. In M. S. Rozanova (Ed.). *Labor migration and the policy of integration of migrants in Germany and Russia*. Center for Civil, Social, Scientific and Cultural Initiatives "Strategy", Scythia-print).
- OECD. (2019). *International migration outlook*. OECD Publishing.
- Papademetriou, D. G., & Hooper, K. (2019). Competing approaches to selecting economic immigrants: Points-Based vs. Demand-Driven systems. Transatlantic Council on Migration. Migration Policy Institute. April. <https://www.migrationpolicy.org/research/selecting-economic-immigrants-points-based-demand-driven-systems>
- Papademetriou, D. G., & Simpion M. (2011). *Rethinking points systems and employer-selected immigration*. Migration Policy Institute. June. <https://www.migrationpolicy.org/research/rethinking-points-systems-and-employer-selected-immigration>
- Romodanovskij, K. O., & Mukomel', V. I. (2015). Regulirovanie migracionnyh processov: Problemy perekhoda ot reaktivnoj k sistemnoj politike. *Obshchestvennye nauki i sovremennost'*, 5, 5–18 (Regulation of migration processes: Problems of transition from reactive to systemic politics. *Social Sciences and Modernity*, 5, 5–18).
- Ruhs, M., & Anderson, B. (Eds.). (2010). *Who needs migrant workers? Labor shortages, immigration and public policy*. Oxford University Press.
- Ruhs, M. (2013). *The price of rights: Regulating international labor migration*. Princeton University Press.
- Skeldon, R. (2004). *More than remittances: Other aspects of the relationship between migration and development*. Paper presented at the Third coordination meeting on international migration. Population Division Department of Economic and Social Affairs United Nations Secretariat. 27–28 October.

Author's guidelines

Articles submitted to the journal should not have been published before in their current or substantially similar form, or be under consideration for publication with another journal.

The article should have a scientific novelty, relevance of the problem, clarity of presentation, and be of interest to a wide audience. Before submitting the author should be familiar with the standards of publishing ethics.

Articles in English only are eligible for submission. Authors are recommended to have their manuscripts edited by a native English speaker or professional English language editor **before** submission.

The journal does not accept submissions not meeting the content and layout requirements (see <https://www.brics-econ.org/guidelines/>).

Editorial Office
Of. 612, 1-46, Leninskiye Gory,
Lomonosov Moscow State University,
Faculty of Economics,
119991, Moscow, Russia
Editorial staff: A. Plotnikov, E. Sharko, I. Zakharina.
Tel.: +7 495 939 28 82
E-mail: info@brics-econ.org

Moscow University Press
Russia, Moscow, Akademika Khokhlova street, 11
Tel.: +7 495 939 32 91
E-mail: secretary@msupress.com

Publication manager O. V. Gavrilov
Layout A. V. Plotnikov
Cover Design K. V. Sautenkov
Signed for print 25.07.2020. Format 70 x 100/16.
Offset paper. 130 copies.
Ed. № 11620. Order № .

Printed by Pablit LLC.
127282, Polyarnaya 31B-1, Moscow