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Back to the Iron Cage? Institutional Isomorphism of the AIIB[1]

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Abstract

During its first five years of operation, the Asian Infrastructure Investment Bank (AIIB) is becoming more and more similar to traditional Multilateral Development Banks (MDBs) in terms of operational goals, business area, and environmental and social standards. Why has the AIIB, the newest type of multilateral development bank (MDB) initiated by an emerging economy, undergone institutional isomorphism? Based on the socialization theory, this paper argues that the institutional environment in which the AIIB is operating has a strong influence on AIIB's institution-building, mainly through the coercive, mimetic, and normative institutional isomorphic processes. On coercion, the pressures from European donors, international credit rating agencies, and global civil society have resulted in the AIIB's institutional isomorphism. On mimicking, the social uncertainty of the relationship between the AIIB and the Belt and Road Initiative and the technical uncertainty of infrastructure projects have triggered the AIIB's institutional isomorphism. On normativeness, the similar educational backgrounds and working experience of the AIIB's staff and active interactions among the MDB family members have caused the AIIB's institutional isomorphism. The paper concludes that the international institutional environment might hamper emerging economies' capabilities of institutional innovation.

Keywords: AIIB, New MDB, Traditional MDB, Institutional Isomorphism, Institutional Environment

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Introduction

The Asian Infrastructure Development Bank (AIIB) represents China's ambition to establish a new multilateral development bank (MDB) and innovate the global development finance system. Chinese president Xi Jinping addressed at the AIIB inauguration ceremony, "The founding of the AIIB means a great deal to the reforming global economic governance. It is consistent with the evolving trend of the global economic landscape and will help make the global economic governance system more just, equitable, and effective" [Hu, Wang and Wang, 2016]. "Former Chinese Finance Minister Xiao Jie also stressed at the Second Annual Meeting of

[1] This article was submitted 5 August 2021.

AIIB's Board of Governors that the AIIB should exhibit its uniqueness and innovativeness as a 21st-century development bank and inject new vitality into the existing multilateral development system" [Global Times, 2017].

Meanwhile, during its first five years of operation, the AIIB and traditional MDBs have become more a like Social infrastructure has become the latest investment trend of the AIIB in 2021 [AIIB, 2021a], challenging AIIB's original operational focus on productive sectors [AIIB, 2015]. By 2019, AIIB had agreed to consider investing in coal-fired power plants if "they replace less efficient capacity or are essential to the reliability and integrity of the system, or if no viable or affordable alternative exists in specific cases" [AIIB, 2019a, Para. 37]. However, at the annual meeting of the Climate Bonds Initiative in 2020, AIIB's President Jin Liqun pledged that AIIB would not finance any coal-fired power plants or any projects that are functionally related to coal [Farand, 2020]. In terms of environmental and social framework, China initially aimed to simplify the existing MDB's environmental and social safeguards. However, from 2016 to 2021, the AIIB has elevated the importance of climate change, gender equality, labor rights, and disability rights in its latest version of the environmental and social framework [AIIB, 2021b], deviating from the "result-oriented" and "risk-oriented" principles. It seems that the AIIB has moved away from its original plan and resembles other traditional MDBs such as the World Bank and the Asian Development Bank (ADB).

Why the AIIB, the newest multilateral development bank (MDB) initiated by an emerging economy, has undergone institutional isomorphism? Most existing research focuses on AIIB's establishment, governance structure, as well as the great power competition within the AIIB [Chin, 2019; Freeman, 2019; Humphrey, 2019; Wang, 2016; Zhao, 2015; Chen, 2015; Luo and Yang, 2018; Zhu, 2018; Xu and Feng, 2019; Gu, 2019; Wang,2019; Ye, 2020]. Few researchers have paid attention to the institutional isomorphism of AIIB's institutions during its first five-year operation.

Based on the socialization theory, this paper argues that the institutional environment in which the AIIB is operating has a strong influence on AIIB's institution-building. There are three main isomorphic processes, the coercive one, the mimetic one and the normative one. As for coercion, the pressures from European member states, international credit rating agencies, and global civil society have led to the AIIB's institutional isomorphism. As for mimicking, the AIIB's institutional isomorphism has been caused by the uncertain relationship between AIIB and Belt and Road Initiative and the technical complexity of infrastructure projects. As for normativeness, AIIB's staff shared similar educational and vocational background with other members of traditional MDBs. Active interactions also occur among the MDB family, thus causing the AIIB's institutional isomorphism. We conclude that the international institutional environment might hamper emerging economies' institutional innovation in global governance.

We suggest that this paper is critical both at theoretical and practical levels. We explore the mechanisms of international organizations' socialization process using the socialization theory of sociological institutionalism [Hall and Taylor, 1996]. Meanwhile, our focus on the AIIB, the first international financial institution initiated by China, has thought-provoking implications on the rising power and global governance reform. Have China enabled innovations in the China-initiated international organizations? What are the implications of AIIB's institutional isomorphism? How to deal with AIIB's isomorphic trend?

This paper has seven parts. In the part one, we have presented our research question. Second, we illustrate some evidence of the AIIB's institutional isomorphism during the last five years. Third, we introduce a theoretical framework of international organization socialization, including three isomorphic mechanisms – coercive, mimetic, and normative isomorphism. In the fourth, fifth, and sixth parts, we use coercive, mimetic, and normative mechanisms to explain the institutional isomorphism of the AIIB. In the last part, we discuss the implications

of the AIIB's institutional isomorphism for the relationship between China rising and global governance reform.

The Operational Institutional Isomorphism of AIIB

In a broad sense, institutions are artificial rules that govern human behaviors. During the start-up period, the AIIB has set up its institutional system. On the one hand, there are basic text institutions such as the *Articles of Agreement of the Asian Infrastructure Investment Bank* and *Report on the Articles of Agreement of the Asian Infrastructure Investment Bank*. The AIIB's governance structure, the voting power of each member, and general laws and rules for operations are defined in basic documents. Any amendments require a super majority voting among the board of governors, thus hard to be revised. On the other hand, there are operational institutions formulated by the staff of the AIIB and approved by the board of directors. AIIB's operational institutions consist of a series of operational policies and strategies established in the past five years, including *Procurement Policy for Projects*, *Policy on Public Information*, *Energy Strategy*, *Environmental and Social Framework*, *Operational Policy on International Relations*, and *Water Strategy*.

When evaluating AIIB's operational institutions, we find that the AIIB is becoming increasingly similar to the traditional MDBs mainly in three aspects, namely operational goals, business area, and environmental and social standards.

Operational Goals

According to the Articles of Agreement of the AIIB, one of the purposes of the Bank is to "foster sustainable economic development, create wealth and improve infrastructure connectivity in Asia" mainly through "promoting the investment of public and private capital in particular for the development of infrastructure and other productive sectors" [AIIB, 2015, Art. 1&2]. AIIB President Jin Liqun also stressed in his speech at the Brookings Institute in 2015 that the productive sector would be the AIIB's priority lending area [Brookings Institute, 2015].

However, the dominant priority of the productive sector has been changed during the past five year. According to AIIB's first Corporate Strategy (2020–2030), climate finance has become one of the thematic priorities of the AIIB. By 2025, the Bank aims at reaching a 50 percent share of climate finance in the actual financing approvals [AIIB, 2020a]. In 2021, AIIB has incorporated social infrastructure into its newest investment trend and has planned to build a new specific department for social infrastructure [AIIB, 2021a]. This possible trend closely matches the distribution by sector trends at the World Bank and the ADB. The productive sectors' lending proportion at the World Bank declined from 54% in 1976 to 28% in 2016. As for the ADB, the proportion declined from 36% in 1968 to 10% in 2016 [Kellerman, 2018].

Some members of the AIIB have some doubts on AIIB's corporate strategy. For example, at the AIIB's 2019 annual meeting in Luxembourg, the Egyptian Finance Minister pointed out that the AIIB member states have not agreed on the definition of the infrastructure that the AIIB prioritizes [Gabusi, 2019]. Chris Legg, AIIB's Australian member of the board of directors from 2016 to 2020, also raised out the question, "Should the AIIB extend its operations higher up the project cycle? How can it better address the needs of its low-income members without seeking additional grant resources?" [Legg, 2020].

Business Area

According to AIIB's energy strategy, coal accounted for 40 percent of Asia's energy consumption during 2000-2014, 11 percent higher than the global average [AIIB, 2019a]. Meanwhile, driven by their commitments to the 2015 Paris Climate Change Agreement, many developing countries focus more on nuclear energy. BRICS countries stated that they underlined the importance of predictability in accessing technology and finance to expand civil nuclear energy capacity. They believed that civil nuclear energy would contribute to the sustainable development of their countries [BRICS, 2016]. Based on developing countries' needs, AIIB President Jin Liqun at the Davos Forum in 2016 said that AIIB would consider coal-firing projects and nuclear projects if they meet AIIB's environmental and social standards. Jin also stated that the safety issues of the nuclear projects "can always be solved" [Tang and Liu, 2017].

Member states have disagreements on whether the AIIB should invest in coal and nuclear power projects. On the one hand, the AIIB's European members are all explicitly opposed to coal and nuclear power investment. On the other hand, during the consultation on energy strategy, coal-producing and oil-producing countries represented by Australia, Indonesia, and Saudi Arabia actively lobbied the AIIB to support the coal and nuclear power projects. Australia even addressed that coal and nuclear power play a central role in providing economic opportunity and better living standards for hundreds of millions of people in the east and south Asia [Hutchens, 2016]. Based on the fact that some members "have no viable alternative" other than coal-fired power [Gombar, 2017], the AIIB decided to consider investing in coal-related plants and civil nuclear energy if there are no other alternatives [AIIB, 2019a, Para. 37].

However, at the annual meeting of the Climate Bonds Initiative in 2020, AIIB's President Jin Liqun pledged that AIIB would not finance any coal-related projects [Climate Home News, 2020]. When it comes to nuclear power, AIIB's latest energy strategy has made it clear that the AIIB would not finance any nuclear plants or develop highly specialized expertise in nuclear projects [AIIB, 2019a]. By ruling out the possibility of financing coal and nuclear projects, the AIIB becomes more and more similar to traditional MDBs, who have rejected financing coal and nuclear power after the 2015 Paris Climate Change Agreement.

Environmental and Social Standards

The AIIB's Environmental and Social Framework (ESF) was created in 2016 and amended through February 2019 and May 2021.

Initially, the Chinese proposal on the AIIB's ESF was a simplified version of MDB's environmental and social safeguards policies that is "risk-oriented" and "result-oriented". China pointed out that the ESFs of the traditional MDBs are usually a unified legal framework that incorporates many unrelated assessment criteria, which is unfriendly to borrowing countries and increases unnecessary operational costs [Zhu, 2018]. However, after two amendments, the AIIB's ESF closely resembles the safeguards policies of the traditional MDBs in several aspects.

Firstly, the AIIB has expanded its duty of regulating environmental and social risk. Based on the World Bank's Environmental and Social Standard 5 and 6, the AIIB adds Land Acquisition and Dam Safety rules into the 2019 version of ESF. The 2021 version explicitly incorporates regulatory rules on climate change, gender equality, labor rights, and disability rights [AIIB, 2021b]. The AIIB also widened the scope of the environmental and social assessment for its clients.

Secondly, the AIIB has tightened the responsibilities and obligations of its clients. The 2016 ESF only required private sector projects to establish a specific grievance mechanism for

laborers. Nevertheless, the 2019 ESF clarifies that all clients should set up a labor grievance mechanism and effective information disclosure procedures. In addition, the AIIB also requires clients to estimate the greenhouse gas emissions of the whole project.

Third, the AIIB has added its responsibility for monitoring. The 2016 ESF approved its clients to adopt the «country system" under certain circumstances with a gap analysis comparing the country ESF to the AIIB's ESF [Gransow and Price, 2018]. However, in 2019, the ESF has made it clear that clients should adopt an environmental and social safeguards system that complies with the AIIB's policies and strategies. The Bank may also conduct an environmental and social action plan, if necessary, to ensure the compliance of the clients. Thus, it is less likely to apply the "country system" in future AIIB projects [AIIB, 2021b].

Overall, the AIIB is a clear example of institutional isomorphism during its first five years. Regarding operational goals, the AIIB might change its top priority on financing productive sectors. The AIIB has ruled out the possibilities of investing in coal and nuclear power projects regarding business areas. The AIIB has adopted a more comprehensive risk management framework regarding environmental and social policies, which is opposite to the initial Chinese proposal. To explaining this ongoing institutional isomorphism of the AIIB, we will draw on the socialization theory of sociological institutionalism to construct a theoretical framework for international organizations in the following section.

Theoretical Framework: IO Socialization Theory

Institutional isomorphism is a process that forces one organization to resemble other organizations in the same institutional environment and organization characteristics tend to become similar to environmental characteristics. The socialization theory of International Relations focuses on interactions among international actors in which actors will internalize certain norms of a given community within the international society and eventually become members of the international society [Meyer and Rowan, 1977; DiMaggio and Powell, 1983; Checkel, 2005; Johnston, 2008; Guo, 2006].

Two pioneers of sociological institutionalism, John Meyer and Brian Rowan, first explore the relation of organizations to their institutional environments. The institutional environment refers to the widely accepted social facts such as the legal system, cultural expectations, social norms, and the conceptual system. Thus, institutionalization is the process that the organization adopts these widely accepted characteristics of the institutional environment in which it operates. Organizations can gain more legitimacy and resources needed to survive, thus promoting their development throughout becoming isomorphic [Meyer and Rowan, 1977].

Based on Meyer and Rowan's research, Paul DiMaggio and Walter Powell operationalized the institutional environment and developed a middle-level theory of how the institutional environment shapes the institutional characteristics of organizations. Why do organizations adopt similar forms and practices? What are the causal mechanisms through which institutional isomorphic occurs? Under what condition do new organizations adopt the characteristics of the former organizations? DiMaggio and Powell propose three main causal mechanisms and corresponding empirical research hypotheses [DiMaggio and Powell, 1983].

The first is the coercive isomorphism. New organizations are forced to become isomorphic throughout the coercive mechanism by other actors that provide resources for the newcomer. Thus, coercive isomorphism is mainly related to the degree of dependence of the new organization. For example, although the companies themselves do not want to do so, they are forced by law to disclose their financial information to obtain various resources for going public. Therefore, we propose our first hypothesis:

Hypothesis 1: More dependent the new organization is on the resources in the institutional environment in which it operates, the more likely the new organization will experience institutional isomorphism.

The second is the mimetic isomorphism. When an organization has inadequate technologies, goals are ambiguous, or the environment has a high level of uncertainty, new organizations may model themselves on traditional organizations. For example, although most universities mainly focus on education and scientific research, the evaluation criteria are vaguer than that of companies, of which the main goal is to profit. Thus, the degree of imitation among universities is much higher than that among companies. Therefore, we propose our second hypothesis:

Hypothesis 2: The higher the level of uncertainty in the institutional environment in which a new organization operates, the more likely the new organization will experience institutional isomorphism.

The third is the normative isomorphism. The third source of isomorphic organizational change is normative and stems primarily from professionalization. Professionalization and shared knowledge tend to lead to institutional isomorphism of the new organization since professionals "exhibit many similarities to their professional counterparts in other organizations" [DiMaggio and Powell, 1983]. For example, after China's reform and opening up, MNCs are much more similar than non-MNCs, since most of the staff recruited by MNCs have international education backgrounds and frequently participate in international activities and interactions. Thus, we propose our third hypothesis:

Hypothesis 3: The higher the degree of professionalization and idea-sharing in the institutional environment in which new organizations operate, the more likely the new organization will experience institutional isomorphism.

In a word, coercive, mimetic, and normative mechanisms are the principal causal mechanisms that lead to institutional isomorphism. It is worth mentioning that as a middle-level theory, the socialization theory integrates theoretical elements of rationalism and constructivism. Therefore, three institutional isomorphism mechanisms are not entirely isolated but interconnected in an empirical setting. While the coercive mechanism and the mimetic mechanism derive from the perspective of the survival and development of the organization, the normative mechanism derives from constructivism, emphasizing the power of shared ideas.

Next, we will draw on and apply this analytical framework (see Figure 1) to explain the institutional isomorphism of the AIIB.

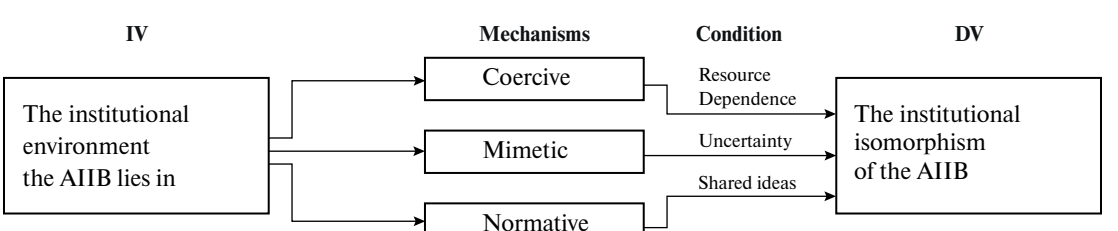

Fig. 1. The socialization mechanisms of the AIIB

Source: Drawn by the authors.

Coercive Mechanism and the Institutional Isomorphism of the AIIB

As a new MDB, AIIB wants to be genuinely international, so it is dependent on the resources of its member states, the international credit rating agencies, and the international civil society, which are the fundamental reasons for the AIIB's institutional isomorphism.

Firstly, AIIB's member states. Members of the AIIB, especially the European non-borrowing countries, have exerted pressure on the AIIB to become a high-standard MDB like the World Bank and the European Banks [Wilson, 2019]. Many non-borrowing founding members decided to join the AIIB to ensure that the AIIB embodies the best standards in accountability, transparency, and governance [UK Government, 2015]. For example, UK stated that the AIIB's Environmental and Social Framework is the primary evidence of whether the AIIB meets the best standards for European powers [AIIB, 2020b]. France stated that European countries leveraged the negotiations to join the AIIB to promote the global climate change agenda [Gabusi, 2019]. Germany stressed that the AIIB should rule out support for projects involving nuclear energy [Germany Federal Ministry of Finance, 2019]. Meanwhile, according to the AIIB agreement, no less than three-fourths of the total voting power is required to establish policies for the AIIB [AIIB, 2015, Art. 26, Para. 2]. Since European constituencies account for 22.8% of the total voting power, and the non-borrowing members within the AIIB account for 36.155%, European members and non-borrowing countries are critical for the AIIB's policy-making.

During the past five years, European members do have a significant impact on the AIIB institution-building. As for the accountability mechanism, European members mentioned in the AIIB's agreement that there should be an oversight mechanism for the operation of the AIIB that is in line with principles of transparency, openness, independence, and accountability [AIIB, 2015, Art. 26, Para. 4]. In 2018, European powers represented by Germany and the UK urged the AIIB to clarify the division of responsibilities between the management and the Board of Directors under the Accountability Framework [Germany Federal Ministry of Finance, 2019]. The Accountability Framework of the AIIB allows the Board of Directors to supervise the AIIB's president and conduct annual evaluations [AIIB, 2018a]. Australia, Austria, Switzerland, Sweden, and Poland have explicitly appreciated the new Accountability Framework [AIIB, 2019b]. As for the energy strategy, the objections of many European countries against the coal and nuclear-related projects have pushed the AIIB to abandon the investment of coal and nuclear projects [Germany Federal Ministry of Finance, 2019; AIIB, 2020b].

The second is the international credit rating agencies. The ability of AIIB to raise resources from capital markets is critical for the AIIB to operate as a truly international MDB. By September 2020, the AIIB had issued bonds of US$9 billion, accounting for one-third of its total assets, and most AIIB bonds are in US dollars and British pounds [AIIB, 2020c]. Generally speaking, the higher the credit rating of a multilateral development bank has, the lower the interest rate required to issue bonds [Humphrey and Michaelowa, 2013]. Therefore, the credit ratings given by international credit rating agencies are essential for the AIIB to reduce the cost of bonds issuance and to improve its ability to raise financial resources.

The three major international credit rating agencies, Moody's, Standard & Poor's, and Fitch, all have required the AIIB to meet the standards of the traditional MDBs such as the World Bank and the ADB (see Table 1). For example, S&P's 2017 report clearly expressed its expectations that AIIB would have the same high standards as the ADB and the World Bank Group institutions. Moody's 2017 rating report urged the AIIB's risk management processes and corporate governance to evolve consistent with the highest-rated MDBs. Otherwise, they may downgrade the rating of the AIIB. These agencies also expressed their appreciation of the AIIB's establishment of the risk management framework and the Project-affected People's

Mechanism and the revision of the ESF [AIIB, 2021c]. President Jin Liqun also said, "It is not easy for the AIIB to get a 3A credit rating. The 3A rating is different from a Ph.D., which is for life. If the Bank does not operate well, the rating can be downgraded at any time. Therefore, we have to work tirelessly."

Since sustainable development bonds have accounted for most of the AIIB's bonds and the environmental, social, and governance (ESG) issues rank highly on the AIIB's agenda, the ESG rating given by rating agencies is also essential for the AIIB. In the past, international rating agencies focused mainly on the financial performance of the MDBs rather than their performance on ESG [Ye, 2020]. However, ever since 2019, the three major international credit rating agencies have launched ESG credit rating systems. Investors have also paid more attention to ESG rating reports. ISS-oekom's 2019 ESG report stated that AIIB's performance on climate change and related risks is below the industry average [ISS-oekom, 2019]. In this context,

AIIB announces the exclusion of the coal-related investments and intends to significantly increase the share of climate finances to 50% of the total investment.

Table 1. The Requirements and Concerns of the three international rating agencies on the AIIB

	Moody's	**Standard & Poor's**	**Fitch**
Consistent with other highest-rated MDBs	Explicitly require the AIIB to be consistent with other highest-rated MDBs	Explicitly require the AIIB to be consistent with other highest-rated MDBs	Mentioned when evaluating the risk management framework
Focusing area	Risk management; Corporate governance	Environmental and social risk management; Corporate governance	Risk management
Focusing policies	the Project-affected People's Mechanism; Accountability Framework; Risk Management Framework	Environmental and Social Framework; Risk Management Framework; Accountability Framework	Risk Management Framework

Source: AIIB, 2021c, compiled by the author.

The third is the global civil society. Civil society organizations have been following both performances and policies of the AIIB since its establishment. NGOs such as Accountability Counsel, Inclusive Development have actively participated in the public consultation process of the AIIB's institutional development, suggesting that the AIIB as a new type of multilateral development bank should meet the "highest international standard". Accountability Counsel even expects that the AIIB could become the leading member of the MDB, while Inclusive Development becomes an advocate for the AIIB's Project-affected People's Mechanism and enhancing its visibility among residents. Meanwhile, Bank Watch and German Watch have become critical third-party supervisors by tracking the impact of some controversial AIIB projects on residents and the environment.

NGOs had played an important role in forcing the AIIB to abandon coal-related projects. NGOs, including Youth for Climate and Extinction Rebellion, had held several demonstrations outside of the pavilion of the AIIB's Luxembourg annual meeting, urging AIIB to rule out coal-related projects and pay more attention to the risk management of hydropower projects [Geary, 2019]. Meanwhile, the Big Shift Campaign has called on people to email the AIIB, pushing the

AIIB to develop a more ambitious climate action plan and shift its investments away from fossil fuels [The Big Shift Campaign, 2019].

The AIIB also values advice and critics given by civil society organizations. AIIB's Vice President for Policy and Strategy, Joachim von Amsberg, once wrote back to NGO Forum on ADB that the AIIB would cover some of the points NGO raised in their recommendations, including carefully reviewing projects related to FI financing and interacting with other MDBs to learn lessons from their operations [Accountability Counsel, 2018]. Moreover, the AIIB has also made public the comments and suggestions received during the public consultation period, showing AIIB's appreciation of the participation of civil society organizations [AIIB, 2016].

Overall, from 2015 to 2020, pressures from those who provides resources for AIIB like European member states, international credit rating agencies, and global civil society have led to the institutional isomorphism of the AIIB, which is consistent with our first hypothesis:

Hypothesis 1: More dependent the new organization is on the resources in the institutional environment in which it operates, the more likely the new organization will experience institutional isomorphism.

Mimetic Mechanism and the Institutional Isomorphism of the AIIB

A rational strategy for a new organization to adapt to an institutional environment with a high level of uncertainty is to imitate the established organizations. During the first five years of the AIIB, the social uncertainty arising from the relationship between the AIIB and the "Belt and Road Initiative"(BRI), and the technical uncertainty stemming from the AIIB's relatively high-risk infrastructure investments are two crucial reasons for the AIIB to model itself on traditional MDBs.

On the one hand, the AIIB and the Belt and Road Initiative (BRI) have an ambiguous relationship, which negatively affects the AIIB's legitimacy as a real multilateral institution and raises social uncertainty. The AIIB and the BRI are all international cooperation initiatives proposed by China around 2013, focusing on infrastructure and interconnectivity. Thus, the AIIB has been regarded as a bank for the BRI. Raffaello Pantucci from the Royal United Services Institute regards the AIIB as a tool of the "Belt and Road" rather than a new independent financial institution, because 75% of the AIIB's projects are related to Belt and Road countries [Pantucci, 2016]. Once the AIIB's international and multilateral characteristics have been questioned, its credit ratings, ability to access high-quality projects, and co-financing with other MDBs will be badly influenced.

The AIIB President, Jin Liqun, has clarified the AIIB's relationship with the BRI. He stated that the AIIB and the BRI are "distinct and separate entities. As a high-standard international organization, AIIB has its standards in choosing the projects, including the debt sustainability, environmental protection and local people support" [The Paper, 2019]. Vice President Joachim von Amsberg further stressed that "if a project comes to you, and it is Belt and Road Initiative, are you going to invest it? Well, we could, but just because it is BRI does not mean we will" [VOA, 2017; Zhu, 2019].

However, as the saying goes, "Actions speak louder than words." The best way to deal with the social uncertainty is to adopt rules and policies consistent with the existing MDBs. Just as President Jin Liqun said at the Brookings Institute, "No one would question the AIIB when we adopt institutions of the World Bank and the ADB" [Brookings Institute, 2021]. Chris Humphrey, a leading scholar on MDBs, also stated that while there is still room for improvement

in the existing MDBs, many officials have already felt satisfied if the AIIB can take the similar rules to these existing MDBs [Humphrey, 2019].

On the other hand, infrastructure projects bring technical uncertainty for the AIIB. Although focusing on infrastructure-related sectors is a comparative advantage of the AIIB within the MDB family, the AIIB has to manage the higher risks and raise more money for infrastructure projects. From 2016 to March 2021, the AIIB has 27 "Category A" projects that may have significant adverse environmental and social impacts that are irreversible, cumulative, diverse, or unprecedented, and has 47 "Category B" projects that may have limited impacts on environmental and social aspects [AIIB, 2021b]. The new-establishing AIIB has to manage those risks and face higher levels of technical uncertainties.

For instance, in 2016, the AIIB co-financed the Trans Anatolian Natural Gas Pipeline Project (TANAP project) with the World Bank, the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB), and the ADB. Controversial land acquisition for the pipeline project led to strong opposition by the local communities [Bankwatch Network, 2016]. In 2017, the AIIB's co-financing project, the Hydropower plant project in Georgia, raises concerns about dam safety, the protection of the fragile river and mountain ecosystems, and the livelihoods of the local indigenous communities [Bankwatch Network, 2017]. In 2019, the AIIB and the World Bank jointly financed the Amaravati Sustainable Capital City Development Project. Involuntary resettlement evidence and negative influence on marginalized people led to the withdrawal of the World Bank and AIIB [BIC, 2019].

Thus, the AIIB has begun to imitate the institutional frameworks and standard practices of the existing MDBs in project approval, risk evaluation and management, and bank operations to address risks effectively and efficiently. For instance, the 2021 ESF incorporates dam safety and land acquisition regulations based mainly on the World Bank's ESS4 and ESS5 [World Bank, 2018a; World Bank, 2018b]. After modeling itself on the existing MDBs, however, the AIIB has gradually moved away from its initial "results-oriented" and "risk-oriented" principles and has begun to align itself with the comprehensive risk management systems of the World Bank or the ADB.

Overall, the AIIB faces high uncertainties revive from the ambiguous relationship between the AIIB and the BRI and the technical uncertainties derived from the vast infrastructure projects. Thus it is reasonable for the AIIB to imitate the existing MDBs, which is consistent with our second hypothesis:

Hypothesis 2: The higher the level of uncertainty in the institutional environment in which a new organization operates, the more likely the new organization will experience institutional isomorphism.

Normative Mechanism and the Institutional Isomorphism of the AIIB

New organizations are more likely to experience institutional isomorphism if their staff have similar educational and vocational backgrounds with their counterparts of traditional organizations and if organizations are in a highly professionalized institutional environment with shared ideas and norms. Most senior management and staff of the AIIB have educational experiences in prestigious universities in the UK or the USA. Many also have rich experiences working in other international financial institutions. Thus, the normative mechanism is also an essential causal mechanism that led to the AIIB's institutional isomorphism.

AIIB's senior management responsible for institution-building generally has Western educational backgrounds and formal working experience in traditional MDBs. Natalie Lichtenstein, the first General Counsel of the AIIB who had made significant contributions to the Articles of the agreement of the AIIB, was graduated from Harvard University and had worked at the World Bank for nearly 30 years. Gerald Sanders, the General Counsel of the AIIB from 2016 to 2020, holds law degrees from Victoria University of Wellington and Harvard University. He also spent nearly 20 years at the EBRD. Joachim von Amsberg, the Vice President for Policy and Strategy, had been the World Bank's Vice President for 25 years and had actively participated in the revision of the World Bank's ESF. Hamid Sharif, responsible for the AIIB's Complaints-resolution, Evaluation, and Integrity Unit, had worked for the ADB's oversight mechanism for eight years. Standard & Poor's report also stated that the AIIB's diverse and experienced senior management team is a fundamental reason why the S&P decides to give the AIIB 3A ratings [AIIB, 2021c].

In addition to the senior management, the AIIB also emphasized working experiences in traditional MDBs in recruiting its staff. President Jin Liqun said that the newly-established AIIB is in great need of experienced staff who have experience in other international financial institutions as "seed players" to help train young staff and get the AIIB's operations on track [Caixin News, 2016]. For example, when recruiting for the Project-affected People's Mechanism, the AIIB required candidates to have at least 8-10 years of international professional experience working in infrastructure sectors and have experience in applying environmental and social safeguard policies [Devex, 2019].

Moreover, the AIIB is also an active member within the so-called "MDB family", seeking opportunities to co-finance with other MDBs and participating in policy dialogues among MDBs. As for co-financing, the AIIB had signed co-financing frameworks with MDBs, including the World Bank Group, ADB, EIB, EBRD [World Bank, 2016; ADB,2016; EBRD, 2016]. Until 2020, the AIIB has co-financed 30 projects with the World Bank, 19 projects with the ADB, and 5 projects with the EBRD [AIIB, 2021d].

As for policy dialogues, on the one hand, the AIIB conducts benchmarking exercises with other MDBs during the policy-making process. For instance, the AIIB conducts benchmark tests with AfDB, ADB, EBRD, EIB, IaDB, and World Bank when drafting the Public Information Interim Policy to learn from other MDBs [AIIB, 2018b]. On the other hand, AIIB is an active participant in international conferences and networks. The AIIB has attended the Global Infrastructure Forum, the Ethics Network of Multilateral Organization, the Independent Accountability Mechanisms Network with other multilateral organizations. The AIIB has also developed an alignment approach to the Paris Agreement objectives as a member of the family of MDBs on the United Nations Climate Change Conference (COP), which directly influenced the AIIB's thematic priorities and its stance on climate change issues [AIIB, 2018c]. Close connections with other MDBs enable the AIIB to learn from and internalize shared ideas and norms within the MDB family.

To sum up, similar educational backgrounds and working experiences of AIIB's senior management and staff, and the active interactions among the MDBs, have created a highly professionalized and homogeneous institutional environment for the AIIB, thus causing the isomorphism. It is consistent with our last hypothesis:

Hypothesis 3: The higher the degree of professionalization and idea-sharing in the institutional environment in which new organizations lie, the more likely the new organization will experience institutional isomorphism.

Conclusion

The case of the AIIB has thought-provoking implications for global governance reform and China's role in it. AIIB President Jin Liqun once explained China's role in the global governance system as a beneficiary, a supporter, and a future reformer who should integrate valuable development experiences into the existing system dominated by developed countries [Sheng, 2019]. Initially, the AIIB was tasked with the mission to innovate the international financial system, with the focus on infrastructure construction and economic growth, avoiding "one-size-fits-all" standards and distinguishing itself from the traditional MDBs. However, it has resembled traditional MDBs during its formative period.

Drawing on the socialization theory of sociological institutionalism, we suggest that pressures from other stakeholders, the AIIB's legitimacy crisis, and the socialized staff of the AIIB have altogether caused the AIIB's institutional isomorphism. Thus, our first implication for China's role in the global governance system is that international institutional environment will constrain China's ability to reform the current system.

Our second implication is that although there are some difficulties for China in changing global governance system at the first place, reforms will be more likely to succeed when China has more discursive power and Chinese-led institutions have more legitimacy. As for the discursive power, if China's proposals are widely accepted as innovative solutions to the global governance and are for the good of mankind, it will be easier for China to sell its reform schemes. As for the legitimacy, the AIIB's President Jin Liqun once emphasized that the international society had praised the bank's approval of Indian projects during the China-India border dispute period [Jin, 2021]. He thinks highly of the AIIB's legitimacy more than anything because it is crucial for a newly-established institution to survive at the first place. With the rise of China's discursive power, the development of the AIIB, and even the gradual change of institutional environment of the MDB family, the AIIB may have the potential to break the iron cage.

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What Determines the Ambitiousness of Climate Policy in Different Countries?[1, 2]

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Abstract

Climate change is considered one of the most challenging problems of the 21st century and requires coordinated action by governments across the globe. The Paris Agreement, ratified by most countries, sets the goal of keeping the average temperature rise within 2°C compared to pre-industrial levels. As part of the Agreement, countries set nationally determined contributions (NDCs) – targets for reducing greenhouse gas emissions – which are determined voluntarily. Since these targets are nationally determined, they depend on domestic constraints and the additional opportunities that individual countries' emission reduction strategies present.

As a result, climate policies vary widely among countries, both in terms of the emission reduction targets and the policy instruments used. The purpose of this study is to systematize the factors influencing climate policy using factor and cluster analysis methods. Factor analysis is used to aggregate a set of investigated statistical indicators, reflecting a country's development level, exposure to climate risks, energy endowment, and foreign trade specialization, into a series of principal components. Based on the selected principal components, the countries are clustered into homogeneous groups, and the indicators of climate policy ambition are compared among the clusters.

The results of the study demonstrate that climate change vulnerability is not a determinant of climate policy. As a rule, the poorest and most vulnerable countries set the least ambitious emission reduction targets. At the same time, rich and energy-abundant countries are more likely to implement active climate policies and set more ambitious emissions reduction targets compared to energy-intensive countries and countries that specialize in exporting carbon-intensive products. Advanced climate policy instruments, such as a carbon tax or emissions trading system, are used with greater frequency in more advanced and energy-deficient countries.

Key words: climate change, climate policy, GHG emissions reductions, Paris Agreement, nationally determined contributions (NDCs), economic development, energy dependency

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Introduction

Global climate change is recognized as one of the most challenging issues of the 21st century, requiring joint action by national governments. The Paris Agreement, which came into force in 2016 and has been ratified by 193 countries worldwide, sets the goal of keeping average temperatures within 2°C of pre-industrial levels. Under this framework, countries set nationally determined contributions (NDCs) – targets for reducing greenhouse gas (GHG) emissions – which are determined voluntarily.[3]

Since the setting of these goals is national in scope, it depends both on domestic constraints and on the additional opportunities that individual countries' emission reduction strategies offer. As a result, goals vary widely in their ambitiousness, as do climate policy measures: some countries limit themselves to administrative measures to control emissions (such as efficiency standards and regulations and mandating the use of specific technologies), while others use more advanced instruments, such as a carbon price (in the form of a carbon tax or emissions trading system).

In the academic literature, there is a great amount of evidence that the ambitiousness of climate policy is determined by a combination of climatic and socio-economic factors [Baker, Newell, Phillips, 2014; Dolata-Kreutzkamp, 2008; Ide, 2020; McMullen-Laird et al., 2015; Schmitz, 2017; Tørstad, Sælen, Bøyum, 2020]. The willingness of a country to adopt strict targets to reduce or limit emissions growth depends not only on objective factors of exposure to climate change, but also on the level of its economic development, fossil fuel endowment, energy and technological policy objectives, and other socio-economic factors. With few exceptions, in general, the literature on the influence of such factors is not systematic and is limited to the research of specific countries or particular factors [Ide, 2020; Tørstad, Sælen, Bøyum, 2020].

The purpose of this study is to classify the factors determining climate policy by clustering countries according to the influence of different groups of factors. The study is based on the methods of factor and cluster analysis. Factor analysis is used to aggregate the set of statistical indicators under review, reflecting the country's level of development, vulnerability to climate change, energy supply, and foreign trade specialization, into a series of principal components. Based on the selected principal components, countries are clustered into homogeneous groups, and indicators of climate policy ambitiousness are compared between the clusters.

The study demonstrates that exposure to climate change is not a key determinant of climate policy. As a rule, the poorest and most vulnerable countries set the least ambitious emission reduction targets. At the same time, rich and energy-deficient countries are more likely to set aggressive climate policies and more ambitious emissions reduction targets compared to energy-abundant countries and countries that specialize in exporting carbon-intensive products. More advanced climate policy instruments, such as a carbon tax or emissions trading system, are used more frequently as climate policy instruments in more advanced and energy-deficient countries.

The paper consists of four sections. The first considers the main factors influencing climate policy and national GHG emission reduction targets. The second defines and formalizes the concept of climate ambitiousness through a description of various approaches to its quantitative measurement. The third describes the methodology of the study, and the fourth presents its results. Additionally, the fourth section formulates the main conclusions, including the importance of redefining current international approaches to national climate responsibility.

[3] Climate change is a long-term statistically significant change in climate variables, such as surface temperature and precipitation. Climate change is also manifested in the growing "nervousness" of the climate – an increase in temperature amplitudes and an increase in weather anomalies, such as droughts, extreme precipitation, gusty winds, and so on.

Factors Determining Climate Policy

Climate change has a direct impact on the lives and economies of countries around the world. Several studies demonstrate that developing countries dependent on agriculture are especially vulnerable to climate change [IPCC, 2018; Mendelsohn, 2009; Parry et al., 2007]. The effects of climate change tend to worsen over time, which poses an additional threat to the poor, agrarian-oriented countries (mostly African and Asian).

Climate change poses a particular threat to small island states, which may face the risk of flooding as a result of rising ocean levels [IPCC, 2018]. These countries traditionally play an important role in the international negotiation process on the climate problem [Brun, 2016]. Many of them perceive climate change not just as a long-term risk, but as posing a direct threat to their existence within a few years [Hassan, Cliff, 2019].

The climate change vulnerability can be considered one of the factors shaping countries' attitudes to the demand for urgent emission reduction measures and, thus, influencing the ambitiousness of their climate policy [Heggelund, 2007; Tørstad, Sælen, Bøyum, 2020]. At the same time, the mission of industrialization and economic growth may be the factor limiting the possibilities for the implementation of an active policy for emissions reduction.

Development goals, especially in developing countries, often conflict with emission reduction goals because, while solving fundamental social problems is more urgent for these countries, it seems impossible without affordable and low-cost fossil fuel energy [Grigoryev, 2020]. The level of socio-economic development largely determines the ability, and therefore the willingness, of the country to support measures to combat climate change [Höhne et al., 2017]. For developing countries, the task of adapting to climate change through accelerated development often presents a more attractive alternative to costly measures for emissions reduction [Halsnæs, Trærup, 2009; Mertz et al., 2009].

The mutual exclusivity between the objectives of environmental policy and growth is well illustrated by the theoretical concept of the environmental Kuznets curve [Grossman, Krueger, 1995; Selden, Song, 1994; Shafik, Bandyopadhyay, 1992], according to which, in the initial stages of economic development, the increase in production capacity leads to an increase in GHG emissions. After passing the phase of active industrialization, there are changes in the industrial structure (growth in the share of the services in gross domestic product (GDP)) and in the overall efficiency of production processes (through development of cleaner and less resource-intensive production technologies). The tendency to transfer some industrial capacities to developing countries that are more attractive for production increases [Makarov, 2018], which leads to a decrease in emissions compared to previous periods [van Alstine, Neumayer, 2010]. Currently, most countries of the world are still far from the trajectory of GHG emissions reduction [Laika, Zervas, 2013a; 2013b]. Most empirical estimates of the Kuznets curve for GHG emissions indicate that for most countries the breaking point is hardly achievable over a horizon of several decades [Stern, 2017; Uchiyama, 2016].

Nevertheless, a high level of welfare can serve as a prerequisite for a relatively more active environmental and climate policy, both because of the relatively greater financial capacity of developed countries compared to developing countries, and because of the presence of several indirect factors that play out especially in wealthy countries. These include the quality of political institutions, which are more responsive to social demand for environmental issues [Bättig, Bernauer, 2009; Tørstad, Sælen, Bøyum, 2020].

However, several works indicate that vulnerability to climate change and the level of economic development are far from being the only factors influencing climate policy and emission

reduction targets [Ide, 2020; Tørstad, Sælen, Bøyum, 2020]. Especially in developed countries, policies to reduce emissions have long been closely correlated with energy policy objectives.

The European Union's (EU) policies to improve energy security and industrial competitiveness are simultaneously aimed at realizing the potential of renewable energy and reducing GHG emissions. By 2030, the EU plans to reduce emissions by at least 55% from the 1990 level, increase the share of renewables in total energy consumption to 32%, and increase energy efficiency by 32.5% [EC, n. d.]; by 2050 the goal is to achieve carbon neutrality. In the European context, the policy of reducing emissions to a large extent underlies policies aimed at strengthening the positions of national producers of renewable energy and at the reduction of the Union's dependence on fossil fuels imports.

H. Schmitz [2017] explained China's climate policy from the perspective of its energy policy. In the case of China, the country's rapidly growing demand for energy has forced it to import large quantities of energy, which poses the problem of energy dependence.

In addition to the influence of energy policy on emission reduction goals, several studies note that other country-specific factors influence countries' climate policy [McMullen-Laird et al., 2015; Schmitz, 2017; Woodward et al., 2019]. For example, the development of renewable energy in China solves the problem of air pollution, as well as significantly stimulating small businesses. The development of this industry not only contributes to economic growth, but also creates jobs and increases the income level of the population [Schmitz, 2017].

Finally, countries' specialization in fossil fuel extraction and export [Ide, 2020; Tørstad, Sælen, Bøyum, 2020] can influence emission reduction policies. First, countries with large fossil fuel reserves as a source of government and corporate revenues tend to find it more difficult to implement an active climate policy. Second, in countries with large fossil fuel reserves, the implementation of climate policy measures is often obstructed by large fossil fuel lobby groups. For example, D. Levy and D. Egan [2003] demonstrated the way a coalition of the fossil fuel industry successfully prevented the U.S. from adopting ambitious targets under the Kyoto Protocol.

Policies to reduce GHG emissions are not just about combating global climate change; they have become a tool for addressing a range of development challenges, from enhancing the competitiveness of individual industries to addressing energy security issues. Willingness to set ambitious emission reduction targets depends on several socio-economic development factors. Analysis of these factors is presented below.

The Comparison of the Ambitiousness of Climate Policies: Existing Approaches

In this article, the ambitiousness of climate policy implies both the country's willingness to commit to reducing GHG emissions and the desire to pursue an active climate policy. It is assumed that more significant commitments indicate a greater ambitiousness of climate policy.

One of the possible criteria for assessing the ambitiousness of climate policy is the nationally determined contributions (NDCs) to the reduction of GHG emissions, formulated within the framework of the Paris Agreement. The use of this indicator is suitable because it allows us to include a significant number of countries – 194 countries have already submitted their first NDCs. At the same time, comparison of NDCs between countries is difficult for several reasons.

First, different countries use different base years (for example, 1990, 2005 and 2010), relative to which the emission reduction target is calculated, as well as different target years (2025, 2030, 2035), by which they plan to achieve this reduction.

Second, there are several approaches to formulating NDCs: some countries set goals to reduce the absolute amount of GHG emissions directly whereas others formulate them in terms of the carbon intensity of GDP indicating relative goals – an expected reduction in GHG emissions per unit of output. Finally, another approach to determining NDCs is to set emission reduction targets relative to the "business as usual" (BAU) scenario, an approach used by countries such as Indonesia and Mexico (Table 1).

To overcome these barriers and compare the NDCs of different countries, the years 2016 and 2030 were chosen as the base and target year, respectively. For some countries, relative emission reduction targets have been converted to absolute and vice versa.[4] The carbon intensity of GDP was calculated as the ratio of the absolute volume of GHG emissions (according to the stated goals) to the projected GDP in 2030. Absolute emissions in 2016 and 2030, as well as changes in the carbon intensity of GDP by 2030, were used to recalculate the goals formulated with respect to BAU.

Table 1. Examples of Conversion of NDCs in Given Countries Into the Compatible Indicator of Ambitiousness of Climate Policy

Country / base year NDCs	**NDCs reduction by the target year (2030) compared to the base year, %**	**Target type**	**Emissions in the base year, million tons of CO_2-eq.**	**Emissions in 2016, million tons of CO_2-eq.**	**Compatible target: absolute change by 2030 compared to 2016, %**	**Compatible target: change in the carbon intensity of GDP by 2030 compared to 2016, %**
Brazil / 2005	–43	Absolute	2,015.5	1,379.4	–17	–42
Chile / 2010	–26	Relative	70.2	87.9	–41	–13
Mexico / 2013	–25	BAU	0	688.4	+10	–24
Denmark / 2010	–41	Absolute	62.2	46.7	–21	–39
Malta / 2010	–35	Absolute	3.0	1.9	+2	–
India / 2005	–33...–35	Relative	1,803.3	3,235.7	–64	–9
China / 2005	–60	Relative	9,280.0	11,576.9	–20	–49

Source: Compiled by authors based on data from Climate Watch [n. d.].

In addition to assessing ambitiousness through NDCs, this work takes into account the estimates by the Climate Action Network (CAN), the leading European coalition of public organizations fighting climate change. The objective of their assessment is to characterize the

[4] The transition from absolute emission reduction goals formulated in the NDCs of most parties to the Paris Agreement to relative ones is due to the need to mitigate the problem of the difference in the ambitiousness of climate policy in countries with different levels of economic development. In other words, a 10% reduction in absolute emissions in a developing country is a much less ambitious goal compared to a 10% reduction in emissions in a developed country, where the potential for cheap emission reductions has already been largely exhausted. The transition to relative emission reduction targets partially solves this problem.

efforts of countries aimed at combating climate change, as well as the results of the climate policy in European countries. The methodology for measuring the CAN indicator is based on five main components:

1. the degree of achievement of the goals set by the countries by 2020 for the development of renewable energy, energy saving technologies, and emissions;
2. a number of climate and energy indicators (including GHG emissions per capita; share of renewable energy sources; and percentage of European financing allocated for low-carbon development);
3. national goals set in parallel with pan-European ones (reduction of GHG emissions by 2030; reduction of GHG emissions by 2050; share of renewable energy sources by 2030; and goals for abandoning coal-fired electricity generation);
4. countries' efforts to develop climate and energy legislation; and
5. the level of support for the EU's most ambitious climate and energy goals by 2030 and 2050.

According to these criteria, European countries are divided into five categories – very high, high, moderate, low, and very low. At the moment, no country is included in the first, most ambitious group, and only for one country – Sweden – the policy to reduce emissions is assessed at the level of high ambitiousness. Most European countries are characterized by low and very low levels of ambitiousness.

The main disadvantage of the European CAN assessment is the small sample of countries (27 EU countries and the UK), which does not allow for a comparison of EU countries with others in the region, or of the European region with other regions.

Another tool for monitoring countries' efforts to combat climate change is the Climate Change Performance Index (CCPI), which covers 57 countries and the EU as a whole and allows for a comparison of countries' ambitiousness and their progress in climate policy. The results of the rating are determined by the total efficiency of the country's activities on 14 indicators within four categories: GHG emissions (40% of the total estimate), renewable energy sources (20%), energy use (20%), and climate policy (20%).

The last category – the climate policy component – of the CCPI includes two components: domestic and international. Data for climate policy assessment are collected in non-governmental institutions from questionnaires completed by independent experts containing estimates from 1 (weak policy) to 5 (strong policy) regarding the effect of measures taken by the government of the country to reduce GHG emissions.

The domestic component evaluates the effectiveness of measures related to the development of renewable energy sources and increasing energy efficiency in various sectors (including housing, transport and industry), and also considers measures to prevent deforestation. In addition, the rating evaluates the NDCs and their achievement.

Likewise, in the CCPI rating, so far, no country has achieved sufficiently good results in implementing an effective climate policy aimed at reducing GHG emissions.

Finally, another indirect indicator of the ambitiousness of climate policy may be the use of a carbon price (carbon tax or emissions trading system). At present, a carbon price has been introduced in more than 60 countries [WBG, 2020]. The growing popularity of the carbon price is due to its high efficiency against other climate policy instruments. Its implementation directly affects the economic incentives of enterprises and can reduce the competitiveness of the most carbon-intensive industries. In this regard, the willingness to implement a carbon price in one form or another demonstrates the loyalty of most business and government entities to the introduction of economic restrictions on carbon-intensive activities in the form of an additional fee for emissions, which can serve as an indirect indicator of a country's ambitiousness to reduce GHG emissions [Meckling, Wagner, Sterner, 2017].

Factor and Cluster Analysis: Input Data and Results

To compare the ambitiousness of climate policy across countries and assess differences in the factors that can influence climate policy, factor and cluster analyses were conducted. The sample included 55 countries (see Table 4) and was analyzed for six variables (Table 2).

Table 2. Variables Included in the Factor Analysis and Their Alleged Influence on Climate Policy

Factor	Hypothesis	Variable	Source
Climate change vulnerability	Increased vulnerability leads to more active climate policy	Vulnerability score (0;1)[5]	University of Notre Dame
Economic development	Developed countries can afford more costly policy on GHG emissions reduction	GDP per capita, 2010, $	World Bank
Local air pollution	Local air pollution is often associated with the operation of carbon-intensive industries; local pollution reduction policy and climate policy can complement each other	PM2.5 micrograms per cubic metre	World Bank
Energy dependency	Policies to reduce dependence on energy imports contribute to the adoption of measures to reduce GHG emissions	The ratio of energy production to the amount of energy consumed	IEA
Export of fossil fuels	Dependence on the fossil fuel exports leaves less room for an active policy of GHG emissions reduction	The ratio of net exports to the amount of energy consumed	IEA
Trade specialization	The country's trade specialization in more carbon-intensive products reduces the incentives to reduce GHG emissions	Carbon intensity of net exports (tons of CO_2/$)	EORA

Source: Compiled by authors.

At a preliminary stage, factor analysis was performed in order to reduce the dimension of the cluster analysis. The methodology of factor analysis consisted of withdrawing several principal components based on the variables given, using a Varimax rotation which maximizes the cumulative explained variance, using Kaiser normalization.

According to the results of factor analysis (Table 3), the variables were combined into two principal components. The first characterizes the level of socio-economic development, and the second, the level of self-sufficiency in energy resources.

The Level of Socio-Economic Development

The first principal component with a negative sign consists of GDP per capita and the carbon intensity of net exports, and with a positive sign, the level of exposure to climate change and the level of local air pollution. In general, combining these variables into one principal component seems quite reasonable. A high level of economic development often contributes to protection from climate risks. In developed countries, as a rule, the main problems with local air pollution have been solved to a large extent. Finally, countries with a high level of develop-

[5] Data varies in the interval [0.21; 0.54].

ment are relatively more specialized in high-tech production and export of services compared to developing countries, where the carbon intensity of exports is usually higher.

Self-sufficiency in Energy Resources

The second principal component with opposite signs included two indicators – self-sufficiency in energy resources and export of energy resources. They explain how self-sufficient a country is in meeting its own energy needs and how important the role of energy exports is relative to the volume of its own energy consumption.

Table 3. Rotated Component Matrix

	Component 1	**Component 2**
Climate change vulnerability	0.800	–0.042
Economic development	–0.808	0.177
Local air pollution	0.833	0.034
Energy dependency	–0.070	0.994
Export of fossil fuels	–0.056	–0.994
Carbon intensity of net exports	–0.517	–0.026

Source: Authors' calculations.

By conducting a cluster analysis using the Ward linkage method, four clusters were formed. Several countries in the sample were not included.[6] The main characteristics of these four clusters and examples of the countries included in them are listed below (Table 4).

Cluster 1 – **Very wealthy and energy deficient** (*for example, Austria, Germany, Denmark and Ireland*)

The 1st cluster includes countries with a high level of GDP per capita (median for the cluster is $5,281), a medium level of energy dependence (43.5%) and a medium level of indicator for fossil fuels export (55%).

These countries are also characterized by a very low level of carbon intensity of net exports (–61.5 tons per $), a relatively low level of vulnerability to climate change (0.27) and a very low level of air pollution (10 micrograms per cubic metre).

This cluster includes the countries with the highest absolute and relative emission reduction targets (–32% and –49%, respectively) and the highest CAN rating (42%) and climate policy component of the CCPI (67). Fifteen out of 15 countries in this cluster use a carbon price.

Cluster 2 – **Wealthy and very energy deficient** *(for example, Greece, Spain, Italy, Cyprus and Lithuania).*

The 2nd cluster includes countries with an average level of GDP per capita ($2,318), a very high level of energy dependence (71.67%) and an extremely low level of energy exports (27%).

These countries are also characterized by a very low level of carbon intensity of net exports (–50.7 tons per $), as well as an average level of vulnerability to climate change (0.31) and an average level of air pollution (16 micrograms per cubic metre).

[6] Countries not included in the clusters: Cameroon, India and Zambia – countries with very low levels of wealth and high vulnerability to climate change.

Table 4. Cluster Analysis Outcomes

Clusters	Countries	Climate change vulnerability, 0–1	GDP per capita, $, 2010	Level of local air pollution, microgram per cubic metres	Energy dependency, the ratio of energy production to the amount of energy consumed, %	Export of fossil fuels, the ratio of net exports to the amount of energy consumed, %	Carbon intensity of net exports, tons CO_2/$	Median of absolute NDC 2016–30, %	Median of relative NDC 2016–30, %	Median of CAN estimate, %	CCPI (climate policy component)	Number of countries with carbon price
1. Very wealthy and energy deficient	Austria, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, New Zealand, Sweden, Switzerland, the UK, the U.S., the Netherlands, Spain	Very low (0.27)	Very high (51,281)	Very low (10)	Medium (43.5)	Medium (55)	Very low (-61.5)	–32	–49	42[1]	67[2]	15 of 15
2. Wealthy and very energy deficient	Chile, Costa Rica, Croatia, Hungary, Latvia, Poland, Korea, Belgium, Cyprus, Greece, Italy, Japan, Lithuania, Malta, Portugal, Singapore, Slovenia	Medium (0.31)	Medium (23,381)	Medium (16)	Very high (71.7)	Very low (27)	Very low (-50.7)	–21	–34[3]	35[4]	54[5]	16 of 17

[1] Median for each country from the cluster except the U.S. and Iceland.
[2] Median for each country from the cluster except Iceland.
[3] Median for each country from the cluster except Malta, Cyprus, Croatia and Korea.
[4] Median for each country from the cluster except Costa Rica, Singapore, Japan, Chile and Korea.
[5] Median for each country from the cluster except Costa Rica and Singapore.

Clusters	Countries	Climate change vulnerability, 0–1	GDP per capita, $, 2010	Level of local air pollution, microgram per cubic metres	Energy dependency, the ratio of energy production to the amount of energy consumed, %	Export of fossil fuels, the ratio of net exports to the amount of energy consumed, %	Carbon intensity of net exports, tons CO_2/$	Median of absolute NDC 2016–30, %	Median of relative NDC 2016–30, %	Median of CAN estimate, %	CCPI (climate policy component)	Number of countries with carbon price
3. Medium income and energy abundant	Azerbaijan, Kazakhstan, Indonesia, Russia, Australia, Canada	Medium (0.31)	Low (11,298)	Medium (15)	Very low (-110)	Very high (204)	Very high (51.4)	–12	–	–	39[6]	3 of 6
4. Low income and energy secure	Belarus, Dominican Republic, Botswana, Guatemala, Tajikistan, China, Albania, Brazil, Bulgaria, Estonia, Mexico, Romania, Ukraine, Uzbekistan	Very high (0.36)	Very low (7,512)	Very high (20)	Low (22)	High (72)	Medium (10.6)	+4	–	26	34[7]	6 of 14

Source: Authors' calculations based on the CCPI [n. d.], Climate Action Network [2018], Climate Watch [n. d.] and World Bank [2020].

[6] Median for each country from the cluster except Azerbaijan.

[7] Median for each country from the cluster except Dominican Republic, Botswana, Guatemala, Tajikistan, Albania and Uzbekistan.

This cluster includes countries with high absolute and relative emission reduction targets (–21% and –34%, respectively) and high CAN rating (35%) and climate policy component of the CCPI (54). Sixteen of the 17 countries in this cluster use a carbon price.

Cluster 3 – **Medium income and energy abundant** *(for example, Azerbaijan, Russia, Indonesia and Kazakhstan)*.

The 3rd cluster includes countries with low GDP per capita ($11,298), very low energy dependence (–110%) and very high energy exports (204%).

These countries are also characterized by a very high level of carbon intensity of net exports (51.4 tons per $), as well as an average level of exposure to climate change (0.31) and an average level of air pollution (15 micrograms per cubic metre).

This cluster includes countries with low absolute emission reduction targets (–12%) and low climate policy component of the CCPI (39). Three of the six countries in this cluster use a carbon price.

Russia, due to its high energy supply and dependence on the export of hydrocarbons, is also included in this cluster.

Cluster 4 – **Low income and energy secure** *(for example, Botswana, Guatemala, Belarus and Uzbekistan)*.

The 4th cluster includes countries with very low GDP per capita ($7,512), low energy dependence (22%) and high energy exports (72%).

These countries are also characterized by an average level of carbon intensity of net exports (10.6 tons per $), as well as a very high (relative to other countries) level of vulnerability to climate change (0.36) and a very high level of air pollution (20 micrograms per cubic metre).

This cluster includes countries with extremely low values of absolute emission reductions (de facto increase in emissions to the target year, median for the cluster +4%) and a low CAN rating (26%) and climate policy component of the CCPI (34). Only six of the 14 countries in this cluster use a carbon price.

Conclusions and Discussion

The results of the cluster analysis show that **the most ambitious emission reduction targets are generally set by developed countries**. The countries of the first and second clusters have the highest median of absolute and relative emission reduction targets, CAN rating, and climate policy component of the CCPI. **Almost all countries in the first and second clusters use carbon pricing** in the form of a carbon tax or emissions trading system.

In contrast, the least developed countries – countries in the 4th cluster – have rather modest ambitions for climate policy; only a few of them use carbon pricing. At the same time, it is the countries in the 4th cluster that have extremely high values of indicators of local air pollution and vulnerability to climate change, which is probably explained by the high negative correlation of these indicators with the level of economic development.

For many poor countries, addressing fundamental social challenges through industrialization (which usually involves high emissions of GHGs and localized pollutants) is a higher priority than GHG emissions reduction. Furthermore, many of them consider economic growth and the inevitable increase in emissions to be the main opportunities for mitigating and adapting to climate change in the future.

The results also indicate **that energy-abundant countries typically pursue less aggressive climate policies and set less ambitious emission reduction targets than energy-deficient countries**. These differences are evident when comparing countries in the 3rd cluster with those in the first two clusters, which are characterized by a relatively high share of energy imports in energy

consumption. In contrast, the 3rd cluster countries are characterized by high energy resources and carbon-intensive products export, potentially reducing incentives for active climate policy.

Overall, the results of this study suggest that the level of economic development, but also other factors such as energy availability and trade specialization, determine readiness and ambition to reduce emissions. As a rule, the poorest and most vulnerable countries have the least ambitious reduction targets. At the same time, rich and energy-deficient countries are more likely to build active climate policies and set more ambitious emission reduction targets.

Russia belongs to the cluster of middle-income and energy-abundant countries, possessing significant energy resources and being highly dependent on exports of hydrocarbons and carbon-intensive products. Despite the active development of Russia's regulatory framework for climate policy in recent years, the formulated emission reduction targets (without regard to the natural capacity of forest ecosystems) are still relatively less ambitious than those of the first and 2nd cluster countries. The country lacks a system of emissions regulation capable of creating economic incentives for their reduction at the level of individual industries and companies.

In addition, Russia encounters a number of sensitive socio-economic problems (including falling real incomes and increasing poverty) that require substantial financial outlays from the government. That makes it difficult to pursue a proactive policy to reduce emissions and requires a balancing of priorities between climate goals and development objectives. The ability to resolve this contradiction in the coming years will largely depend on the development of specific solutions to reduce emissions, accompanied by positive effects for economic development – diversification of the national economy, improvement of competitiveness of Russian products in foreign markets, attracting investment, and creation of new jobs in low-carbon sectors of the economy.

Despite the priority of building a balanced domestic climate policy, these efforts could be effectively complemented by external policy engagement.

The results of this work provide a new perspective on the principles of determining the climate responsibilities of different countries. The 1992 United Nations Framework Convention on Climate Change [1992] that underlies the Paris Agreement establishes the principle of common but differentiated responsibilities of the parties. According to it, the level of economic development of countries is indirectly taken into account when submitting emission reduction targets. In other words, the current approach to climate responsibility recognizes the difference in emission reduction capacities that exists between developed and developing countries. The developed countries have traditionally been willing to take on more ambitious emission reduction targets than the developing ones.

This article suggests that evaluating and comparing the success and ambitiousness of different countries' climate policies must initially assume that the economic opportunities and opportunity costs of reducing emissions vary from country to country and depend not only on the level but also on the type of economic development of the countries. In particular, the opportunity cost of reducing emissions in an energy-importing country seeking to reduce import dependence is relatively lower than in a country that exports fossil fuels and carbon-intensive products. Exported fossil fuels and carbon-intensive products are in turn consumed in energy-deficient countries, which is not considered in the perception of global climate responsibility.

Given the different incentive systems for reducing greenhouse gas emissions in energy-importing and carbon-exporting countries, it is difficult to expect the latter to be as ambitious and proactive in terms of climate policy. Within the existing system of international climate institutions, there is a growing urgency for increased cooperation between the two groups of countries – emission exporters and emission importers – aimed at addressing their mutual interests and real opportunities to reduce emissions. **The achievement of the goal of the Paris**

Agreement may be difficult without the development of new mechanisms for cooperation between these groups of countries.

Consideration of differences in the opportunity cost of emission reductions could form the basis of Russian climate diplomacy, including becoming a key link in Russian-European climate cooperation. The EU countries traditionally import Russian energy resources (natural gas and oil) and carbon-intensive products (including metals, chemical products and cement). At the same time, the tightening of European carbon regulation (including growing prices for emissions under the European Emissions Trading System and plans to introduce a border carbon adjustment mechanism) creates direct risks for Russian exporters of energy resources and carbon-intensive products. Moreover, given the limited potential for reducing emissions within the EU (most low-cost emission reduction opportunities have already been depleted), their further reduction within the Union will become increasingly costly.

A compromise and mutually beneficial solution could be the creation of a new format of cooperation between Russia and Europe – the "Russian-European Green Deal." Several estimates indirectly and directly indicate that it is much cheaper to reduce emissions in Russia than in the EU [Böhringer et al., 2020; Chepeliev, Osorio-Rodarte, van der Mensbrugghe, 2021]. Russia is actively working on the creation of mechanisms for accounting and regulation of GHG emissions. These mechanisms could be compatible with the emission trading system or the EU's carbon border regulation system. As a result, Russia will be able to implement low-carbon projects, including the participation of European capital, while European countries will have additional opportunities for cheap emission reductions, which would bring countries closer to the solution of the global climate change problem.

The development and implementation of this format of cooperation could create a global precedent for the integration of national systems of carbon regulation and lay the foundation for a global system of mutual recognition of emission reduction units. It seems barely possible to solve the problem of climate change without a framework in which both developed (mainly net importers of emissions) and developing (mainly net exporters of emissions) countries, especially the BRICS countries (Brazil, Russia, India, China and South Africa) with their great potential for cost-effective reduction of emissions, can participate equally.

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Annex

Table A1. Conversion of NDCs in Given Countries Into the Compatible Indicator of Ambitiousness of Climate Policy

Country / base year NDCs	NDCs reduction by the target year (2030) compared to the base year, %	Target type	Emissions in the base year, million tons of CO_2-eq.	Emissions in 2016, million tons of CO_2-eq.	Compatible target: absolute change by 2030 compared to 2016, %	Compatible target: change in the carbon intensity of GDP by 2030 compared to 2016, %
Australia / 2005	26–28	Absolute	622.46	519.09	–11	–39
Austria / 2010	25	Absolute	78.38	71.85	–18	–35
Azerbaijan / 1990	35	Absolute	75.56	73.98	–34	–
Albania / 2016	12	Absolute	4.4	4.4	–12	–
Angola / 2005	35	BAU	191.8	180.12	–30	–
Belarus / 1990	28	Absolute	126.04	80.7	12	–
Belgium / 2010	31	Absolute	121.56	107.35	–22	–38
Brazil / 2005	43	Absolute	2,015.48	1,379.38	–17	–42
Great Britain / 2010	30	Absolute	581.78	461.54	–12	–30
Hungary / 2010	12	Absolute	62.94	61.28	–10	–37
Guatemala / 2005	23	BAU	43.82	43.79	9	–
Germany / 2017	38	Absolute		808.73	–38	–49
Greece / 2010	25	Absolute	107.44	86.36	–7	–29
Denmark / 2010	41	Absolute	62.23	46.66	–21	–39
Dominican Republic / 2010	25	Absolute	24.28	28.9	–37	–
Zambia / 2010	47	BAU	459.88	493.99	–88	–
India / 2005	33–35	Relative	1,803.32	3,235.66	–64	–9
Indonesia / 2015	29	BAU	–	2,229	–9	–51
Ireland / 2010	21	Absolute	58.34	65.58	–30	–54
Iceland / 2010	56	Absolute	3.18	3.19	–56	–69
Spain / 2010	22	Absolute	316.47	283.8	–13	–30
Italy / 2010	31	Absolute	437.79	369.63	–18	–27
Kazakhstan / 1990	25	Absolute	309.08	289.02	–20	–
Cameroon / 2010	32	Absolute	201.39	208.38	–34	–
Canada / 2005	30	Absolute	971.7	779.27	–13	–32
Cyprus / 2005	26	Absolute	8.84	8.26	–21	–
China / 2005	60	Relative	9,280	11,576.87	–20	–49
Costa Rica / 2012	25	Absolute	2.97	4.36	–49	–68
Latvia / 1990	40	Absolute	26.3	11	43	3
Lithuania / 2010	67	Absolute	19.28	17.71	–64	–72
Luxembourg / 2010	30	Absolute	11.91	9.77	–15	–44

Country / base year NDCs	NDCs reduction by the target year (2030) compared to the base year, %	Target type	Emissions in the base year, million tons of CO_2-eq.	Emissions in 2016, million tons of CO_2-eq.	Compatible target: absolute change by 2030 compared to 2016, %	Compatible target: change in the carbon intensity of GDP by 2030 compared to 2016, %
Malta / 2010	35	Absolute	3.01	1.92	2	–
Mexico / 2013	25	BAU	–	688.38	10	–24
Netherlands / 2010	37	Absolute	200.66	186.98	–32	–49
New Zealand / 2005	30	Absolute	67.62	63.13	–25	–49
Norway / 2010	83	Absolute	26.53	23.81	–81	–85
Poland / 2010	26	Absolute	282.52	349.76	–40	–58
Portugal / 2010	15	Absolute	68.18	69.39	–16	–34
Russia / 1990	33	Absolute	3,559.4	2,391.38	0	–
Romania / 2010	11	Absolute	110.23	91	8	–
Singapore / 2005	36	Relative	50.8	63.25	–26	27
Slovenia / 2010	63	Absolute	11.26	10.99	–62	–70
U.S. / 2005	26–28	Absolute	6,477.6	5,833.49	–32	–48
Tajikistan / 1990	25–35	Absolute	11.09	5.35	55	–
Uzbekistan / 2010	10	Relative	215.04	194.67	14	49
Ukraine /1990	40	Absolute	874.78	283.72	85	–
Finland /1990	47	Absolute	54.75	63.16	–54	–63
France / 1990	85	Absolute	466.55	329.6	–79	–83
Croatia / 2010	5	Absolute	16.54	18.94	–17	–
Chile / 2010	26	Relative	70.2	87.9	–41	–13
Switzerland / 2005	51	Absolute	53.11	46.72	–44	–56
Sweden / 2010	58	Absolute	55.23	46.23	–50	–64
Estonia / 1990	70	Absolute	35.16	20.38	–48	–64
Korea / 2017	20	BAU	–	657.4	–18	–
Japan / 2013	26	Absolute	1,335.18	1,263.87	–22	–32

Source: Compiled by authors based on data from Climate Watch [n. d.].

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The Transition of the World's Largest Economies to Carbon Neutrality: Areas of Potential Cooperation With Russia[1, 2]

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Abstract

In 2020, despite the global economic crisis caused by the COVID-19 pandemic, it became clear that decarbonization and energy transition had become strategic goals rather than market trends. Moreover, they have become part of the broader and more ambitious plans of the world's largest economies to move toward carbon neutrality by the middle of the 21st century. These economies include the European Union, the U.S., China, Japan and Korea.

In Russia, these trends are typically viewed through the prism of risk: carbon neutrality implies a dramatic decrease in demand for fossil fuels, the production and export of which still play a key role in the Russian economy. However, apart from the risk to traditional sources of income, the global transition to carbon neutrality creates new opportunities for the development and diversification of the Russian economy, as well as for international cooperation in new areas. This article is devoted to the general identification of such opportunities.

Key words: sustainable development goals (SDGs), Agenda 2030, renewable energy sources (RES), carbon neutrality, net zero emissions

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Introduction

Carbon neutrality has recently attracted considerable attention from the research community. According to the special Intergovernmental Panel on Climate Change (IPCC) report, Global Warming of 1.5°C, human activities have caused an increase in global temperature of 1.0°C compared to pre-industrial levels. To minimize climate-related risks, it is necessary limit this to no more than 1.5°C. To achieve this goal, greenhouse gas emissions should peak as quickly as possible, net global anthropogenic emissions should be reduced by 45% from 2010 levels by 2030, and a net-zero value should be reached by around 2050. Achieving and maintaining net-zero global anthropogenic emissions can stop anthropogenic global warming [IPCC, 2019].

Carbon neutrality, or net-zero anthropogenic emissions, is usually understood as a situation in which anthropogenic greenhouse gas emissions are balanced by their absorption [Chen, 2021]. Carbon neutrality can be achieved through a combination of two strategies: first, reducing emissions by a transition from fossil fuels to renewable energy sources (RES), improving energy efficiency, and changing production processes and consumer habits; second, absorbing greenhouse gases from the atmosphere, for example, through the protection and planting of forests and soil carbon sequestration. A drastic reduction in emissions is necessary since the current volume of global greenhouse gas emissions is almost four times higher than the volume of their absorption by natural sinks [C2ES, n. d.; Neier, Neyer, Radunksy, 2018].

After numerous pledges and commitments by the world's largest economies to transition to carbon neutrality by the middle of the century, researchers are trying to formulate the measures necessary to achieve this goal [Iqbal, 2021; Li et al., 2021; Safi et al., 2021; Wan et al., 2021]. The transition to net-zero anthropogenic emissions opens up significant opportunities for economic growth. These opportunities extend far beyond the so-called "low-carbon sector." In fact, in the coming decades, the entire global economy will transform. At the same time, demand for greener products will grow rapidly, and countries that take action to develop cleaner technologies, products and processes will be able to create new markets and enjoy significant economic benefits earlier than others [Stern, Valero, 2021].

Russia is not yet among the leaders of the global transition to climate neutrality. Moreover, it is one of the few large economies in the world that has not yet set a goal of achieving zero net emissions by the middle of the century and has not yet developed appropriate strategic documents. Considering that the decisions on the transition to climate neutrality have already been made or are about to be made by most countries of the world, including both developed and developing economies, Russia faces the threat of losing its export markets and, consequently, confronts the possibility of a large-scale economic crisis. To identify industries that will grow the most in the world's largest economies as they transition to carbon neutrality, the purpose of this article is, first, to analyze the strategic documents of the respective countries and then formulate their low-carbon sectoral priorities. This is followed by an examination of the level of development of the relevant economic sectors in Russia. Finally, recommendations for transforming the Russian economy are developed and areas that are promising for propelling international economic cooperation are identified, taking into account the emerging global changes.

Plans of the World's Largest Economies to Achieve Climate Neutrality

An increasing number of countries have declared their intention to achieve net-zero emissions by the middle of the century. As of June 2021, 132 countries and the European Union (EU) have discussed or adopted a climate neutrality goal; of these 90 were in the discussion stage,

26 had included a carbon neutrality goal in their strategic documents, four were considering the possibility of adopting laws that would make the achievement of net-zero emissions mandatory, 10 more and the EU had already adopted such laws, and two countries (Suriname and Bhutan) had achieved climate neutrality [Energy & Climate Intelligence Unit, 2021a]. As of March 2021, countries that had made or were discussing a commitment to net-zero emissions accounted for 61% of global greenhouse gas emissions, 68% of gross domestic product (GDP), and 56% of the world's population [Black et al., 2021].

Among the countries in the top 10 in terms of GDP calculated at purchasing power parity (PPP), only two countries – India and Russia – have not yet set a timeline for the transition to carbon neutrality (Table 1). Four out of the 10 largest economies and the EU have set a legally binding goal of carbon neutrality. Five out of the 10 largest economies and the EU have already started to develop plans or programmes for such a transition. The absence of a goal for achieving carbon neutrality and a corresponding strategy in Russia creates risks of a worsening economic situation and a decline in living standards in the country in the coming decades.

Table 1. National Plans to Achieve Carbon Neutrality in the Top 10 Economies of the World and the EU

Country	GDP by PPP in 2020, $ Trillions	Timeline for the Transition to Carbon Neutrality	Carbon Neutrality in the Law	Plan or Strategy for the Carbon Neutrality Transition
China	24.27	2060	–	–
United States	20.94	2050	–	The Biden plan for a clean energy revolution and environmental justice
India	8.91	–	–	–
Japan	5.33	2050	The Act on Promotion of Global Warming Countermeasures	The Green Growth Strategy Through Achieving Carbon Neutrality by 2050
Germany	4.47	2045	The Climate Change Act	The Climate Action Programme 2030
Russian Federation	4.13	–	–	–
Indonesia	3.30	2060	–	–
Brazil	3.15	2060	–	–
France	3.12	2050	The Energy and Climate Law (2019)	The National Low-Carbon Strategy
United Kingdom	3.02	2050	The Climate Change Act	The Ten Point Plan for a Green Industrial Revolution
EU	19.69	2050	The European Climate Law (2021)	The European Green Deal (2019)

Source: Compiled by the authors based on ECIU [2021], WB [2021], and other open sources.

The European Union

The European Green Deal, adopted by the European Commission in 2019, set the EU's goal of transition to climate neutrality by 2050. At the end of 2020, the European Council approved a mandatory EU target for a net domestic reduction in greenhouse gas emissions of at least 55% by 2030 compared to 1990 [European Council, 2020]. Previously, it was planned that emissions would be reduced by 40% by 2030. On 24 June 2021, the European Climate Law was adopted, which legislated the goal of achieving carbon neutrality by 2050 and established the European Scientific Advisory Council on Climate Change, which will provide independent scientific advisory support and publish reports on the realization of the European Climate Law and the implementation of the EU's international obligations under the Paris Agreement [European Council, 2021].

For a fair transition to a green economy, the European Commission developed a set of measures related to energy, industry, consumption, infrastructure, transport, and agriculture, as well as taxation and provision of benefits. Improving energy efficiency, developing renewable energy sources and phasing out fossil fuels will play a critical role in the implementation of the European Green Deal. Reducing greenhouse gas emissions in the energy system will be of prior importance since the production and use of energy in various sectors accounts for more than 75% of all greenhouse gas emissions in the EU [Eurostat, 2021]. In 2020, solar and wind energy alone produced 19.6% of the EU's electricity. The share of coal in electricity generation in the EU fell from 25% in 2015 to 13% in 2020 [Ember, 2021]. In the future, RES will become the basis of the entire EU energy sector. An important part of the European Green Deal is the energy transition in the transport sector, as well as in the heating/cooling sector, in which progress is still significantly slower than in the electricity sector. To achieve the goal of the European Green Deal, it is necessary to reduce greenhouse gas emissions in the transport sector by 90% through the modernization of road, rail, water, and air transport. A significant proportion of road freight transport (75%) should be transferred to rail and inland waterways [EC, 2019]. Large-scale electrification of road transport is planned. By 2035, the EU will ban the sale of cars with internal combustion engines (ICE) [EC, 2021]. Buildings account for about 40% of energy consumption in EU countries [EC, 2019]. To reduce greenhouse gas emissions from buildings, a large-scale renovation is planned. Energy efficiency renovations will primarily affect the poorest households, schools, and hospitals.

The EU's industrial sector accounts for about 20% of all greenhouse gas emissions. European industrial companies have already begun to shift toward a circular economy, but so far only 12% of raw materials in the EU are recycled materials [EC, 2019]. In May 2021, the European industrial sector received an updated strategy that has three main priorities: environmental friendliness, digitalization, and competitiveness. The most energy-intensive industries, such as steel, chemicals, and cement production, will modernize first. The strategy provides for a transition to a new business model with the introduction of technologies for the reuse of materials for production, increasing responsibility of producers, sharing of goods and services, and expanding opportunities and participation of consumers. In addition to energy-intensive industries, priority will be given to resource-intensive industries such as construction, electronics, textiles, and plastics production. The environmental policy in the field of production will also touch upon the problems of waste generation and disposal, which will require legislative approval of new targets and measures, including the expansion of the market for secondary raw materials and the use of environmentally friendly primary raw materials. Digital technologies will play an important role in this transition, allowing for optimal use of energy resources, as well as innovative technologies in key industries.

In addition, the European Green Deal contains plans to solve the problems of ecosystems and biodiversity as well as air pollution. For example, concerning biodiversity, the proposals relate to extending the coverage of protected areas on land and at sea and for restoring damaged ecosystems, including carbon-rich ecosystems [EC, 2019].

Germany

Germany's path to carbon neutrality is enshrined in the 2019 Climate Protection Act [Federal Office of Justice of the FRG, 2019]. Germany is one of the few EU countries that have legislated the transition to a carbon neutral economy. In April 2021, Germany's Federal Constitutional Court made a historic decision that, because the country's key climate law does not detail the goals of reducing greenhouse gas emissions after 2030, it is insufficient to rapidly reduce emissions [Federal Constitutional Court, 2021]. Subsequently, an updated version of the Climate Protection Act was developed and approved by the German government in May 2021. According to the updated version, by 2030, greenhouse gas emissions should be reduced, not by 55% as previously planned, but by 65%; moreover, they should be reduced by 88% compared to the 1990 level by 2040. Climate neutrality must be achieved by 2045. The German federal parliament adopted these amendments on 24 June 2021 [Federal Government of the FRG, 2021].

To fulfil the objectives of the Climate Protection Act, in 2019 the Climate Action Programme 2030 was developed [Federal Government of the FRG, 2019]. A key element of this programme was the introduction of a carbon price for the transport and heating sectors from 2021, in addition to the EU emissions trading scheme. The proceeds from this mechanism will be directed to the green sectors of the German economy. The programme provides tax incentives to improve energy efficiency in buildings and replace old fossil-fuelled central heating systems with new, more environmentally friendly ones, or those running on RES. By 2030, RES will provide 65% of the country's electricity needs. In 2020, 50.5% of all German electricity was produced using RES, including 10.5% using solar photovoltaic (PV) energy and 27.0% using wind energy [Fraunhofer ISE, 2021]. All coal-fired power plants in Germany will be closed by 2038. In the transport sector, electrification, the use of railways, and public transport will be encouraged. By 2030, the German network of electric charging stations will reach 1 million units. There are also plans to introduce RES in industrial processes, develop hydrogen energy, and produce energy storage devices and technologies for storing and using CO_2. In the agricultural and forestry sectors, priority will be given to organic farming, waste reduction, and sustainable forest management. Following the amendments to the Climate Protection Act, another programme was adopted aimed at achieving Germany's climate neutrality by 2045, the Immediate Action Programme for 2022 [Federal Ministry of Finance of the FRG, 2021]. The programme prioritizes the reduction of greenhouse gas emissions in the industrial sector (using hydrogen in the steel industry for green steel production and stimulating investment in the chemical industry), energy (energy transition in thermal energy and green hydrogen production), and buildings.

France

On 8 November 2019, France adopted the Energy and Climate Law, which requires a transition to carbon neutrality by 2050 [Law No 2019-1147, 2019]. According to the law, climate neutrality will be achieved through more than sixfold reductions in greenhouse gas emissions. The law envisages the closure of the last coal mines by 2022, a 40% reduction in fossil fuel consumption by 2030 compared to 2012, a reduction in the share of nuclear energy in the electricity

sector to 50% (currently 70%), stimulation of the development of offshore wind energy, covering with solar panels at least 30% of the roof surfaces of new warehouses, supermarkets, and parking lot canopies. Much attention is paid to improving the energy efficiency of buildings, in particular, through mandatory energy audits for residential premises leased or offered for sale and a ban on rent increases for non-energy efficient residential premises.

In 2020, to make France carbon neutral, the National Low-Carbon Strategy, first adopted in 2015, was revised [Ministry of Ecological Transition, 2020]. According to the strategy, by 2050, the French energy sector will be completely carbon-free. Due to the developed nuclear energy sector, the share of fossil fuels in the French electric power sector is already low – 9% in 2019 [IEA, 2021a]. The transport sector, excluding domestic air transport, will be completely decarbonized by 2050 through electrification and a switch to hydrogen fuel, traffic management, and the promotion of public transport. Significant increases in the energy efficiency of buildings, including through the renovation of 500 thousand houses per year, is also planned. Emissions from the industrial sector will be reduced by 81% by 2050 due to the introduction of renewable energy technologies and energy efficiency, the management of raw materials flows, the introduction of elements of a circular economy, and research and development (R&D) in the field of low-carbon production processes. Measures are also planned for agriculture and forestry (development of agroecology and agroforestry, minimizing the use of nitrogen fertilizers, carbon sequestration in agricultural soils, and sustainable forestry) and the waste management sector (waste reduction, reuse, and recycling).

United Kingdom

In 2019, the UK passed a law mandating net-zero emissions by 2050 through amendments to the 2008 Climate Change Act [The Climate Change Act, 2019]. Originally, the law provided for an 80% reduction in greenhouse gas emissions by 2050 compared to 1990.

In November 2020, British prime minister Boris Johnson presented the Ten Point Plan for a Green Industrial Revolution [Gov.UK, 2021]. The plan aims to rebuild the economy after the pandemic, create 250,000 green jobs by 2030, and accelerate the transition to net-zero emissions. The plan provides for the development of offshore wind energy, the production of low-carbon hydrogen, the development of nuclear energy, the transition to zero-emission transport, the stimulation of green public transport, air and water transport with zero emissions, green construction, the attraction of investments in carbon capture, use and storage, protection of natural ecosystems, and fostering green finance and innovation. The UK is already a global leader in offshore wind energy. It plans to quadruple the capacity of offshore wind farms by 2030.

Over the past five years, the UK has practically abandoned coal-fired power generation: in 2015, British coal-fired thermal power plants produced 23% of all electricity in the country, in 2020 – less than 2%. The transition was mainly due to the rapid development of renewable energy; the share of electricity production from wind and solar energy in the country increased from 14% in 2015 to 29% in 2020 [Ember, 2021]. By 2024, the UK will decommission all coal-fired power plants. From 2030, the UK plans to introduce a ban on the sale of new cars with internal combustion engines.

United States

The United States does not yet have a law making the transition to carbon neutrality a legally binding goal, but this goal is already part of some strategic documents. For example, on

27 January 2021, U.S. president Joe Biden signed the Executive Order on Tackling the Climate Crisis at Home and Abroad [The White House, 2021], according to which the climate crisis should be at the centre of the U.S. international and national security policy and the U.S. must achieve net-zero emissions no later than 2050.

Also, the goal of achieving net-zero greenhouse gas emissions by 2050 is present in President Biden's plan for a clean energy revolution and environmental justice [Biden-Harris Democrats, 2020]. The plan calls for a 100% clean energy transition by 2050. On 1 April 2021, Biden presented his plan to renovate infrastructure and industry. According to it, a complete transition to clean energy should be carried out by 2035 [Biden-Harris Democrats, 2021]. Nuclear and renewable energy currently produce 38% of all electricity in the country.

The U.S. has traditionally been a leader in R&D and innovation. Biden's 2020 plan [Biden-Harris Democrats, 2020] provides for the creation of the Advanced Research Projects Agency-Climate (ARPA-C), a new interdepartmental agency that will focus on research in the following areas: small modular nuclear reactors, cooling and air conditioning using refrigerants, buildings with zero clean energy consumption, hydrogen production from renewable energy sources at competitive prices, obtaining carbon-free industrial heat required for the production of steel, concrete, and chemicals, production of carbon-neutral building materials, decarbonization of the food and agricultural sectors, capturing and storing carbon in the soil, and capturing carbon dioxide from the exhaust gases of power plants to store it deep underground or use it for industrial purposes. This department will be created by analogy with the Advanced Research Projects Agency-Energy (ARPA-E) and the Defense Advanced Research Projects Agency (DARPA).

In addition to clean energy, U.S. plans for the transition to carbon neutrality include the development of electric transport, improving the energy efficiency of buildings (reducing the carbon footprint of buildings by 50% by 2035), improving agricultural practices, and introducing low-carbon technologies in the manufacturing sector.

Japan

The first announcement of Japan's intention to move toward carbon neutrality by 2050 was made by Prime Minister Suga Yoshihide in October 2020. Before that, Japan had planned to cut greenhouse gas emissions by 80% by 2050. The goal of achieving carbon neutrality was fixed at the legislative level through amendments to the Act on Promotion of Global Warming Countermeasures [2021].

In December 2020, Japan presented the Green Growth Strategy Through Achieving Carbon Neutrality by 2050 [METI, n. d.]. The strategy contains industrial policy measures and sets out the goal to achieve positive economic growth while ensuring environmental protection. The document identified 14 sectors in which transformations are needed and also set a target for the share of RES in electricity production at the level of 50–60%. The strategy provides for the electrification of industry and transport, the active development of offshore wind energy and energy storage, low-carbon hydrogen fuel, nuclear energy (including safer, next-generation reactors), as well as carbon capture, storage, and use technologies (CCUS) due to Japan's heavy dependence on fossil fuels. In particular, actions are planned in such difficult sectors for decarbonization as water transport, aviation, and cargo transportation. In addition, the strategy involves the introduction of sustainable agricultural, forestry, and fishery practices and the development of a circular economy. The document provides for R&D with the state (state fund with a capital of 2 trillion yen) and private financing, the implementation of demonstration projects, and the commercialization of new low-carbon technologies.

The main source of greenhouse gas emissions in Japan is the electric power sector, which accounts for more than half of all emissions in the country, and which is more than 70% dependent on fossil fuels [Nakano, 2020]. Currently, Japan is implementing its fifth energy baseline plan, adopted in 2018. According to this plan, by 2030 the share of RES in electricity production will be 22–24%, the share of nuclear energy – 20–22%, and the share of coal and gas – 63%. In addition, the fifth plan includes targets for energy conservation, hydrogen energy, energy storage, and the implementation of decentralized energy systems. The sixth basic energy plan will be adopted in the summer of 2021. The nuclear energy target is expected to remain the same, while the renewable energy target will almost double to 35–39% by 2030, by reducing the use of fossil fuels.

China

China has not yet presented a long-term strategy for achieving net-zero emissions, but in September 2020, at the United Nations (UN) General Assembly, Chinese president Xi Jinping announced his intention to move toward net-zero greenhouse gas emissions by 2060 [FMPRC, 2020]. China accounts for nearly 30% of the world's total greenhouse gas emissions [C2ES, n. d.]. According to the International Energy Agency (IEA), in 2018, China's greenhouse gas emissions had increased by 356% compared to 1990, showing a slight decrease only in the period from 2013–16, after which growth resumed [IEA, 2021e].

In China, since 1953, the main goals and directions of the country's socio-economic development have been planned for five years. Policy within the 13th Five-Year Plan (2016–20) was largely determined by the Paris Climate Agreement, which China joined in 2016. The goals of the plan for energy included reducing the share of coal in primary energy consumption to at least 58% by 2020, compared to 64% in 2015, mainly due to the large-scale development of RES. The goal was achieved – by the end of 2020, the value of this indicator was 56.8% [Reuters, 2021]. The plan also set a limit on the total capacity of coal-fired power plants at 1,100 GW in 2020, but this limit was exceeded already in 2019. This suggests that coal will continue to be China's largest source of electricity in the near term.

China's coal policy is driven by both environmental and economic priorities, that is, inefficient use of coal is primarily reduced by closing down old power plants and small coal-fired boilers that combust coal in an inefficient manner. The rest of the coal-fired power plants are equipped with technologies for cleaning coal before combustion. Reducing the use of coal at the household level is also a priority policy area due to the large number of households using coal for heating and domestic needs.

China, being a leader in the use of fossil fuels, is at the same time a world leader in the field of renewable energy. In 2020, 10% of Chinese electricity was produced using only solar PV and wind energy [Ember, 2021]. Most of the top 10 manufacturers of solar PV panels and wind turbines are Chinese companies. The share of all RES in electricity generation in China is over one quarter.

In March 2021, the Chinese government presented the main provisions of the 14th Five-Year Plan (2021–25). The new plan provides for an increase in the share of non-fossil fuels in the total energy consumption to 20% by 2025, an increase of 40% in the installed capacity of nuclear power plants, and a decrease in the energy intensity of GDP by 13.5%. Compared to China's 13th Five-Year Plan, the new plan does not look ambitious. The new plan also does not contain targets for reducing coal capacities and allows the building of new coal-fired power plants and an increase in the consumption of oil, coal, and natural gas. This approach is conservative and insufficient to achieve carbon neutrality by 2060.

Countries Without Strategic Documents for the Transition to Carbon Neutrality

In 2020, Brazil committed to the transition to carbon neutrality by 2060 but, in April 2021, President Jair Bolsonaro announced to bring this deadline forward to 2050. However, the transition to climate neutrality is still merely an intention, as it is not enshrined in any strategic documents or plans, and the possibility of bringing the date forward from 2060 to 2050 was contingent on attracting foreign aid in the amount of $10 billion a year to fight illegal logging of the Amazonian forests [Spring, Paraguassu, 2021]. Deforestation is the largest source of greenhouse gas emissions in Brazil due to, among other things, weak government policies to protect forests. In addition, the loss of Brazilian forests has been accelerating: in 2019, more than 1 million hectares of Amazonian forests were destroyed, which is 34% more than in 2018 and 120% more than in 2012 [Climate Action Tracker, 2020].

Brazil's energy system is very different from the systems of other major economies due to the significant share of renewables in it – they account for about 45% of primary energy consumption and more than 80% of electricity production. The basis of renewable energy in the country is hydropower (accounting for over 60% of all electricity production), as well as biomass and biofuels [IEA, 2021c]. Brazil's latest 10-year energy plan envisages that by 2029, the installed capacity of solar power plants will be 8.4 gigawatts (GW) and wind power plants – 24.4 GW [Climate Transparency, 2020]. In addition, while Brazil is expanding the use of bioethanol and biodiesel in the transport sector, there are no targets to phase out sales of cars with internal combustion engine vehicles in the country.

In March 2021, the Indonesian government announced its intention to achieve climate neutrality by 2070 – later this date was changed to 2060. However, this goal is not approved, and there are no strategic documents outlining plans to achieve it [Farand, 2021]. For Indonesia, the main challenge is the decarbonization of the energy sector, in which coal-fired generation plays a significant role. In addition, Indonesia is the largest exporter of coal by weight. In May 2021, there was a decision to stop the construction of new coal-fired power plants. The possibility of phasing out coal-fired generation by 2060 is being considered, given that coal currently provides 60% of the country's electricity production [IEA, 2021d]. It is also possible to introduce a carbon tax in Indonesia.

For India, the timeline for the transition to climate neutrality is still not determined. This is because a drastic reduction in greenhouse gas emissions could limit access to energy for the most vulnerable groups of the population. The country's rapid economic growth led to a sharp doubling in energy consumption during 2000–20. The country's energy balance is based on coal, which provided 44% of the primary energy demand in 2020 [IEA, 2021b]. The demand for coal in the country is likely to grow in the coming years, but India is also actively developing renewable energy and setting ambitious goals in this area. By 2030, India plans to quadruple the installed capacity of RES, up to 450 GW, including due to the competitiveness of solar energy.

For Russia, the timeline for the transition to climate neutrality has also not yet been determined, and there are no strategic documents outlining the implementation of such a goal. In 2018, fossil fuel combustion accounted for 79% of Russia's greenhouse gas emissions excluding land use, land use change, and forestry [UNFCCC, 2020]. Natural gas is the main source of energy consumed in Russia. The share of renewable energy sources in the electric power industry is about 18%, mainly due to hydroelectric power plants, the vast majority of which were built in the USSR. Solar and wind energy are just beginning to develop in the country – in 2020, only 0.3% of all electricity was produced from these sources, which is significantly lower than the global average of 9.4% [Ember, 2021].

Promising Areas for Low-Carbon Economic Development and International Cooperation

It should be noted that all of the national plans discussed above, as well as the EU's plans to achieve carbon neutrality, are schematic and emerging. This means that in the future, they will be refined and modified. Nevertheless, in the plans of the world's largest economies, the following priorities can be identified.

First, the main task is the decarbonization of the energy sector, which is the largest emitter of greenhouse gases in most countries. The decarbonization of the electric power industry is already proceeding at a fairly fast pace, with heating and transport sectors lagging behind, especially in such difficult niches in terms of reducing greenhouse gas emissions as aviation, shipping, and road freight transport. Critical elements of the energy transition also comprise the development of energy storage facilities and new low-carbon energy carriers such as green hydrogen. Special attention is paid to green construction and energy-efficient buildings. Second, it is necessary to decarbonize industry on a large scale and reduce the negative environmental impact of the manufacturing sector by introducing the principles of a circular economy, in particular, through the use of renewable raw materials (including the replacement of oil, gas, and coal with such raw materials in chemical processes) and minimizing waste volumes. It is necessary to transfer industrial processes to renewable energy sources in order to reduce the energy and resource intensity of industries. Third, several strategic documents outline plans to transition to sustainable agriculture, forestry, and fisheries in order to reduce emissions in these sectors, as well as to preserve and restore forests and natural ecosystems that can absorb carbon dioxide from the atmosphere. Some programmes for the transition to carbon neutrality pay special attention to R&D, the development of new low-carbon technologies, and the introduction of innovations.

In the coming decades, these areas will receive the greatest development in the largest economies of the world that are planning a transition to carbon neutrality. Also, these areas, including research, will be especially promising for international cooperation. Through the timely development of low-carbon industries and participation in the creation of new low-carbon technologies, countries that are highly dependent on fossil fuels, including Russia, can reduce the risks of a global transition to net-zero emissions, diversify their economies, and open new economic opportunities.

Based on national plans to achieve carbon neutrality, some countries intend to decarbonize the energy sector using nuclear energy, in particular the U.S., France, and Japan. That is, they at least do not plan to abandon nuclear energy until 2050. This intention is erroneous because nuclear power plants pose a threat to the environment and public health due to the risk of accidents, the fact that the by-product of their operation is hazardous radioactive waste that cannot be recycled or permanently stored, and because the costs of generating electricity for new nuclear power plants exceed the costs of generating electricity from both fossil fuels and renewable energy sources [Lazard, 2020]. In addition, the necessity and expediency of the development of nuclear energy is currently being questioned in many significant economies. In particular, Germany has decided to abandon nuclear energy by the end of 2022. In Japan, after the accident at the Fukushima-1 nuclear power plant in 2011, there has been significant resistance to the development of nuclear power from the population and non-profit organizations. Before the accident, 30% of Japanese electricity was produced at nuclear power plants, and the plan was to increase this share to 40%. However, after the accident, in 2012–15, it decreased to 0–2% given that all reactors were closed for safety checks. In 2019, nuclear power plants in Japan produced only 6.4% of all electricity [IEA, 2021f]. There is also strong opposition to the

development of nuclear energy in the U.S. and France. These factors will significantly limit the development of this industry in the respective countries.

Another misconception is the intention of some countries to develop CCUS. These technologies do not solve the problem of environmental pollution, destruction of natural ecosystems through the extraction of natural gas and coal, greenhouse gas emissions during the extraction (in particular, methane emissions), and transportation of fossil fuels. Taking into account greenhouse gas emissions throughout the entire life cycle, CCUS technologies can reduce emissions from electricity generation by only 10.8% over 20 years of operation of a coal-fired power plant [Jacobson, 2019]. In addition, CCUS technologies stimulate the extraction and combustion of fossil fuels, and the very idea of extracting fossil fuels, combusting them, capturing the carbon emitted, and then storing the carbon in order to combat climate change is highly controversial. This idea is even more controversial when it is considered that electricity generated by coal-fired power plants using CCUS technologies costs up to three times more than solar and wind power [Lazard, 2020].

The Level of Development of Low-Carbon Industries in Russia

Regarding the state of the main low-carbon industries in Russia, such as renewable energy and hydrogen, green buildings, sustainable transport, and the circular economy in the industrial sector, as already noted, these industries will flourish in the coming decades. Consequently, these industries have high potential in terms of the development of the Russian economy and in terms of the implementation of international cooperation and international trade with the participation of Russia. At the same time, it should be noted that the promising areas for the development of the Russian low-carbon economy and international economic cooperation, of course, are not limited to just these four areas, but also include sustainable agriculture, sustainable forest sector management, and household waste management.

Renewable Energy Sources and Hydrogen Energy

RES are resources, "the reserves of which are replenished naturally, primarily due to the flow of solar radiation coming to the Earth's surface, and in the foreseeable future, they are practically inexhaustible" [Popel, 2008]. These sources include solar energy, wind energy, biomass, water flows, and geothermal energy.

Even though the USSR was one of the leaders in the field of renewable energy – in particular, in the field of hydropower and wind energy – in the 2010s, Russia had to start developing renewable energy sources (not counting large hydroelectric power plants that have a negative impact on the environment due to changes in the landscape, flooding of territories, and destruction of natural ecosystems) practically from scratch. In the renewable electric power industry, in the period from 2013 to 2021, a complex system of state support was formed, which now covers all market niches: the wholesale electricity and capacity market (since 2013), retail electricity markets (since 2015), and microgeneration (since 2021). There are no state policies to promote renewables in the heating power industry or in the transport sector, although in the heating power industry there has recently been an increase in demand for heat pumps and pellet boilers due to their economic attractiveness.

Modern utility-scale solar PV and wind power plants (SPP and WPP) began to be built in Russia only after 2015. To date, several dozens of solar power plants and more than 10 wind farms have been built, several modern facilities that manufacture equipment for solar PV and wind energy have been created, including the production of wind turbine blades in Ulyanovsk,

the assembly of nacelles for wind turbines in Dzerzhinsk and in the Gorelovo settlement of Leningrad Region, the production of towers for wind turbines in Taganrog, the production of a generator stator, rotor, and main bearing of a wind turbine, generator, hub, and nacelle in Volgodonsk, the production of solar panels in Podolsk, and the production of solar modules and cells in Novocheboksarsk. Transfer of foreign technologies was carried out and educational programmes for personnel training have been created

However, the development of renewable energy sources is not included in Russia's priorities in the energy sector. The Energy Strategy of Russia for the Period up to 2035, adopted in 2020, presupposes the preservation of the traditional directions for the development of the fuel and energy complex for Russia: an increase in the production of natural gas and coal, with the preservation of the current volumes of oil production. RES, excluding large hydropower plants, are given an insignificant role in the strategy and are assigned only to the task of increasing the efficiency of energy supply in remote and isolated territories. According to the existing official plans for renewable energy, by 2025, the installed capacity of solar PV, wind, and small hydropower plants will reach about 2.5% of the total installed capacity, and the share of these sources in electricity production will comprise about 1%. By 2035, these values may grow to 5.4% and 2.3%, respectively [Lanshina, 2021]. In 2020, 9.4% of global electricity was produced only using solar PV and wind energy. Russia is one of the three Group of G20 (G20) countries, along with Saudi Arabia and Indonesia, whose share of solar PV and wind energy in the electric power production is still close to zero [Ember, 2021].

Unlike RES, hydrogen energy has recently attracted considerable attention in Russia, including within the framework of the updated energy strategy, where it is viewed as a promising direction, including for exports. The strategy sets a goal to increase the export of hydrogen to 0.2 million tons by 2024 and 2 million tons by 2035. However, it mainly envisions hydrogen produced from fossil fuels or using nuclear power, while globally, most attention is now paid to the development of green hydrogen, produced by water electrolysis using electricity from renewable energy sources. Hydrogen from water electrolysis using nuclear energy is already being actively pursued by the state corporation Rosatom. Rosatom is entrusted with the planning and implementation of pilot projects for the production of hydrogen using nuclear energy in Russia and abroad, the development of Russian technologies for the production, storage, and transportation of hydrogen, and the formation of long-term strategic and technological partnerships in this area. The industry integrator of this direction is JSC Rusatom Overseas, whose goal is to expand the foreign portfolio of orders of Rosatom's enterprises and to maintain Russia's leading position in the global nuclear market.

Thus, Russia already has some competencies in the production of equipment for solar PV and wind energy, as well as experience in the construction and operation of solar PV and wind power plants. However, this experience is still insignificant and requires further development in terms of deepening the localization of production operations, replacing outdated thermal power plants with modern SPPs and WPPs, construction of new renewable energy power plants for the production of green hydrogen, development of green hydrogen production, and formation of state policies aimed at stimulating the integration of RES in the heating and cooling sector and in the transport sector.

Green Buildings

Green buildings are defined as buildings that, through their design, construction or operation, reduce or eliminate negative impacts and have a positive impact on the climate and the environment [WGBC, n. d.]. There are several international green building standards, such as the Building Research Establishment's Environmental Assessment Method (BREEAM), the

Leadership in Energy and Environmental Design (LEED), and the German Sustainable Building Council (DGNB), which assess the environmental and energy efficiency of building design.

In Russia, the green building sector is still at the initial stage of development. As of May 2021, the number of certified buildings in the country amounted to only 211 units, of which 46% are offices, 23% are retail real estate, 15% are warehouse and industrial facilities, and the remaining 16% are distributed among other types of buildings [Knight Frank, 2021]. For comparison, in the UK the number of certified green buildings is about 19,000 while in the United States there are about 138,000 [GBIG, n. d.]. However, in Russia, the usual technologies of energy saving are actively deployed, such as LED lamps and motion sensors, thermal insulation of windows and doors, and temperature control. Among the reasons for such a slow development of the green construction industry in Russia is the low cost of energy in Russia, the lack of significant financial incentives for this industry from the state, and the lack of understanding of the importance of introducing green standards, as well as the long payback period of such projects, especially with the use of environmentally friendly building materials, which is a key risk in Russia's unstable macroeconomic environment [Korol, 2017].

Russia has significant potential for the further introduction of energy- and heat-saving technologies, the introduction of environmentally friendly building materials, as well as the certification of buildings in accordance with international green building standards.

Eco-Friendly Vehicles

Eco-friendly, or sustainable, transport is transport that minimizes the negative impact on the environment without compromising the efficiency of the transport system. At the moment, environmentally friendly vehicles include cars, trucks, passenger cars, and buses operating on alternative energy sources such as electricity, hydrogen, and biogas.

In Russia, environmentally friendly vehicles are gaining popularity. For example, from 1 September 2018, within the framework of the Energy of Moscow project, the first electric buses in Moscow began operating; by 2030, state unitary enterprise Mosgortrans plans to completely switch to electric buses. However, successes in the electrification of vehicles are noticeable only in the field of passenger transport, and only in Moscow, where electric buses accounted for 7.1% (or 600 units) of the total vehicle fleet of passenger buses in 2020. In addition, in Moscow, trolleybuses were replaced by electric buses, which is not entirely logical since the trolleybus represents environmentally friendly transport. Within the framework of the State Programme of the City of Moscow "The Development of the Transport System," there are plans to increase the share of electric buses to 14.4% by 2021, and to 23% by 2022. By 2030, the city plans to fully switch from fossil-fuelled buses to electric buses.

In other cities, the transition to electric buses is not a popular trend in the field of transport policy due to their high cost and the need to create charging infrastructure. In St Petersburg, in 2018, the state unitary enterprise Passazhiravtotrans purchased several electric buses that only operate on route number 28. The company is actively developing vehicles using compressed natural gas (methane), and the fleet of buses running on natural gas comprises 163 units. Between 2017–20, the St Petersburg carrier Gorelectrotrans launched nine electric bus routes with dynamic charging, which in fact represent modernized trolleybuses since they depend on the overhead electric network. In 2020, one test route of an electric bus was launched in Samara, but it was suspended a year later. In Naberezhnye Chelny, three electric buses are operated for employees of the research and development centre of the KamAZ auto plant. Instead of electric buses, Russian regions are developing tram and trolleybus networks, which are less expensive.

The number of electric vehicles in Russia is extremely low. As of 1 January 2021, only 10,800 electric vehicles were registered [Avtostat, 2021], which is 71% higher than in 2020. For

comparison, in the U.S. in 2019, more than 800,000 electric cars and about 570,000 hybrid cars were registered. China, which is the leader in the electric car fleet, registered 2,600,000 electric vehicles and 770,000 hybrid vehicles in 2019. There are 970,000 electric vehicles and 780,000 hybrid vehicles in the EU [IEA, 2020g].

To stimulate the demand for electric vehicles, it is necessary to create a modern and extensive infrastructure of charging stations. In Russia, according to various estimates, the number of operating charging stations is about 450 units [Stepanova, Nikitina, 2021]. This is not enough even for the existing number of electric cars, since there should be at least one charging station for 10 electric vehicles, that is, there should be at least 1,000 working stations in Russia. In addition, there is no single system of charging stations and no single set of requirements for power and type of connection. For this reason, it is difficult to assess their real number and capacity, or whether these stations are connected to the network.

The Ministry of Economic Development of the Russian Federation plans to build 20,000 charging stations by 2024 and 150,000 by 2030. In particular, this is due to import substitution plans, since from 2024, imports of the production of electric vehicles will be limited through the introduction of additional tax levies in order to stimulate the production of a Russian electric by KamAZ [Kotlyar, 2021], which is the only Russian automaker with a working prototype of an electric vehicle.

Thus, the electrification of personal and passenger vehicles in Russia is at an early stage of development. The number of electric vehicles and charging stations is small and insufficient to mark a significant development in the industry. In the electrification of passenger transport, Moscow is noticeably leading with a share of electric buses of 7.1%; other Russian cities do not plan to introduce this technology on a large scale due to its high cost and the need to develop the corresponding infrastructure.

Russia needs to create a unified network of electric charging stations, to significantly increase the number of such stations, as well as to introduce policies aimed at the supply of renewable electricity for charging electric vehicles, to develop the production of Russian electric vehicles and to stimulate the transition from internal combustion engines to electric motors (for example, through a ban on the sale of new vehicles with internal combustion engines from a certain year, following the example of the EU).

Circular Economy and Green Technologies in the Industrial Sector

A circular economy is defined as an economic system aimed at achieving zero waste and zero emissions throughout the entire life cycle of a product, including the extraction of raw materials, industrial processing, consumption, and disposal of waste [Nobre, Tavares, 2021]. The essence of the concept of a circular economy is the introduction of value on products, materials, and waste, in contrast to the traditional linear economic model based on the "take-produce-consume-throw away" scheme, and its main principle is to achieve maximum efficiency in the manufacturing of products and waste recycling in order to limit the leakage of resources.

In Russia, the introduction of a circular economy in the industrial sector is at the theoretical stage rather than a current trend. There are several isolated examples of Russian initiatives in this area, such as the GreenTire project in the Green Moscow cluster. Within the framework of the project, the plan is to create a service and production complex of a full cycle for the operation, to extend service life, and to reuse large-sized tires. The leaders and pioneers in the implementation of circular economy models in production are the Russian offices of transnational corporations. IKEA in Russia has followed the resource recovery model and launched several ongoing projects to recycle and reuse chipboard, cardboard, cardboard corners, paper cups, and stretch film. The company says it currently recycles 77% of waste generated in its stores

and has an ambitious target of 100% by 2030 [IKEA, 2021]. It should be noted that the above examples are solely the initiative of companies since in Russia environmental legislation does not oblige companies to recycle, but to process, dispose, and neutralize production waste. In the EU countries, for example, the main beneficiary in the transition to a circular economy is the state, which introduces strict standards for industrial and manufacturing enterprises in the management of industrial waste.

If the introduction of a circular economy in the industry is a systemic and long-term process, then another related area of greening production – the introduction of green technologies – is more accessible to Russian companies. Green technologies are defined in several sources as technologies and methods that help to reduce a negative impact on the environment by emitting fewer harmful substances, removing such substances from emissions before dumping, or through the disposal and recycling of industrial residues [OECD, 1999; UN, 1997]. These technologies include increasing energy efficiency at an enterprise, reducing fuel losses through the introduction of appropriate technologies, recycling waste, and replacing fossil fuels with RES.

Among the largest Russian oil and gas and industrial enterprises, the following priorities in the implementation of green technologies can be identified: increasing the energy efficiency of enterprises and reducing energy consumption (Gazpromneft, Rosneft, Lukoil, GAZ Group, Metalloinvest) and the modernization of production equipment. Green technologies introduced in metallurgy comprise direct iron reduction and steel smelting in electric furnaces (Metalloinvest), greener electrolytic cell technology (RUSAL), and transition to dry gas cleaning units (RUSAL). In the chemical industry, the following green technologies are being introduced in Russia: a complex for deep processing of hydrocarbons into polyolefins (polymers) (ZapSibNeftekhim plant of SIBUR) and the production of polyester polyols based on recycled carbon dioxide (Covestro). These technologies are aimed at reducing greenhouse and harmful gas emissions in the metallurgical and chemical industries. It should be noted that they are mainly implemented by the largest Russian exporters in order to comply with the legislation of the importing countries so as not to lose access to international markets.

The introduction of the best available technologies (BAT) can make a significant contribution to the greening and decarbonization of the industrial sector. In Russia, in the past few years, large-scale work has been carried out on the transition to BAT – in particular, in 2014 amendments to the Federal Law "On Environmental Protection" were adopted to determine the legal basis for state policy in the field of BAT, 51 sectoral and inter-sectoral BAT reference books were developed taking into account Russian and international experience, and the federal project "Implementation of the Best Available Technologies" is being implemented within the framework of the national project "Ecology." In accordance with the updated Law on Environmental Protection, BAT should have the lowest level of environmental impact per unit of time or volume of products produced, be cost-effective, use resource and energy conservation methods, and be applied on an industrial scale for two or more projects in Russia. The purpose of BAT implementation is to reject outdated and ineffective technologies and replace them with more advanced and environmentally friendly analogues. However, while work on the transition to BAT in Russia is not transparent enough, industrial companies exert too much influence on it, and there is no strategy for the implementation of BAT.

Thus, in Russia, there is no single trend for the transition to a circular economy and the introduction of green technologies in the industrial sector. The leaders in the transition to a new green economy are either Russian branches of large transnational corporations, which use operating models already established in other countries, or the largest Russian industrial exporting companies, which are forced to introduce green technologies to maintain their positions in international trade. At the same time, since the circular economy is still an emerging technology cluster globally, Russia has the opportunity to take a leading position in this sphere, subject to

timely (immediate) active involvement in R&D, as well as in the process of commercialization of relevant technologies.

Conclusion

The priority of all the strategic documents discussed in this article regarding the achievement of carbon neutrality by the world's largest economies by the middle of the century is the energy transition, which consists of the most ambitious development of RES in all energy sectors (electricity, heating and cooling, and transport), increasing energy efficiency, and reducing the volume of fossil fuel use, especially coal, since fossil fuel combustion is the main source of greenhouse gas emissions in most countries. Also, important attention in all programmes is paid to the reduction of emissions in the industrial sector (the introduction of circular economy principles, which implies a reduction in waste generation, waste recycling, and the replacement of coal with green hydrogen or other green energy sources in industrial processes), as well as in the agricultural and forestry sectors, through the introduction of the principles of organic farming and sustainable forest management. It is these technologies and industries that will grow rapidly in the near future.

Some countries erroneously plan to decarbonize the energy sector using nuclear power and CCUS technologies. These technologies are too expensive and dangerous for the environment, life, and the health of the population. In addition, some major economies are planning to phase out nuclear power; for instance, Germany will close all nuclear reactors by the end of 2022. In other countries, such as Japan, the U.S., and France, there is significant resistance to the development of nuclear energy from the population and non-profit organizations, which will also limit the development of this industry. Despite these shortcomings, all of the world's leading economies that have set themselves to the goal of carbon neutrality and have developed corresponding strategic documents will face a large-scale low-carbon transformation in the coming decades, which will reshape existing production technologies, supply chains, and product life cycles. This will inevitably have a negative impact on the Russian economy, which is highly dependent on the supply of carbon-intensive products to other countries.

To reduce the negative impact of the global transition to carbon neutrality on the Russian economy, Russia should pay close attention to the development of those technologies that will be most in demand in the coming years. In Russia, these technologies, in particular, RES, green hydrogen, green construction, environmentally friendly vehicles, and elements of a circular economy in the industrial sector, are at the initial stage of development, and many of them, including key low-carbon technologies such as renewable energy, have received little attention to date. Thus, modern renewable energy technologies have been developing in Russia only since 2015 and provide an insignificant contribution – for example, the share of wind and solar energy in electricity production is only 0.3%, while in the world one out of 10 kilowatt-hours is produced from these sources. The number of certified green buildings in Russia is in the hundreds, while in other large economies of the world, there are tens of thousands. Electric transport has received significant development only in Moscow and only in the electric bus sector, due in part to the displacement of trolleybuses, while in general, the country has an extremely low level of development of charging infrastructure. There are few examples of the introduction of the principles of a circular economy in industry; some companies, mainly the largest exporters, are introducing more affordable green technologies, but this practice is also not sufficiently targeted or widespread.

Accelerated development of the listed technologies and industries, and ensuring international cooperation in them, including cooperation in the field of R&D, transfer of foreign

technologies, development of Russian technologies and high-tech products both for supplying the domestic market and for export supplies, can bring benefits to the Russian economy, protect it from the risk of a decrease in global demand for fossil fuels, contribute to its diversification, facilitate its recovery from the crisis after the pandemic, and ensure that Russia has high rates of economic growth in the long term. In particular, Russia needs to deepen the localization of the production of equipment for renewable energy sources, gradually replace the outdated capacity of thermal power plants with modern solar power plants and wind farms, build new renewable energy plants for the production of green hydrogen, master the production of green hydrogen, formulate a state policy aimed at stimulating the implementation of RES in the thermal energy and transport sectors, introduce energy and heat saving technologies, stimulate the use of environmentally friendly building materials (as well as certification of buildings in accordance with international green building standards), create a unified network of electric charging stations, significantly increase the number of such stations, pursue a policy aimed at supplies of renewable electricity for charging electric vehicles, develop the production of Russian electric vehicles, stimulate the transition from internal combustion engines to electric motors (for example, through a ban on the sale of new cars with internal combustion engines from a certain year, following the example of the EU), introduce the best available technologies, develop green technologies, and introduce the principles of a circular economy in industrial sector.

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The Role of Digitalization in the Global Energy Transition[1, 2]

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Abstract

In the context of the COVID-19 pandemic, digitalization has become a popular topic in both practical and theoretical terms. In many areas, for example, education and communications, information and communication technologies began to play a leading role, especially during the period of limited mobility. However, in some other areas that also came under close scrutiny during the pandemic, such as the field of energy transition, digitalization has not yet fully unlocked its potential. Moreover, the digitalization of energy transition has not been researched enough.

The purpose of this article is to fill this gap. The authors investigate the current stage of digitalization of the energy sector and the role of information and communication technologies in the traditional energy complex and in clean energy and identify and analyze the key groups of technologies that will have a decisive impact on the energy transition in the near future. The authors also examine the process of digitalization in the Russian energy sector in order to determine whether it is giving an impetus to the energy transition of Russia.

Key words: energy transition, renewable energy sources (RES), digitalization, Internet of energy (IoE), Internet of things (IoT), big data, blockchain

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Introduction

The Paris Agreement and the United Nations Sustainable Development Goals (SDGs) require fundamental changes in the global energy sector, namely the reduction of greenhouse gas emissions through an energy transition. The use of fossil fuels, mainly for energy, accounts for al-

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most 85% of all global greenhouse gas emissions [Global Carbon Project, 2020]. Because the energy sector is of great geopolitical, economic, social and environmental importance [IRENA, 2019a; Kivimaa, Sivonen, 2021; Sovacool, Hess, Cantoni, 2021], the impact and consequences of energy transition go far beyond this sector and are relevant to global governance in general.

In general terms, the energy transition is defined as a change in the structure of the primary energy supply, which consists of a gradual transition from one state of the energy system to another [Smil, 2010]. There have been several such transformations already. The first energy transition was associated with the replacement of biomass with coal; the second, with an increase in the share of oil in the primary energy supply; and the third, with an increase in the share of natural gas [Smil, 2018]. The modern – fourth – energy transition is characterized by the replacement of fossil fuels with renewable energy sources (RES)[3] excluding large hydroelectric power plants (HPPs). Its fundamental difference from the three previous transitions is that it is based not only on increasing economic efficiency and providing access to new resources, but also on the fight against climate change, which is actually the new driver of this transition [Mitrova, Melnikov, 2019].

The fourth energy transition has already begun and is progressing at a rapid pace, especially in the electric power sector. Modern RES, excluding hydroelectric power plants, accounted for 7.4% of total global final energy consumption in 2018 and 11.7% of global electric power production in 2019 [REN21, 2020]. For comparison, a decade earlier, in 2008, the values of these indicators were respectively 2.8% and 3.0% [REN21, 2010].

The energy transition cannot be reduced to a simple replacement of fossil fuels with RES. In addition to the direct construction of a new generation based on RES, the energy transition requires a radical transformation of individual energy sectors, for example, electrification of transport and heating/cooling, the development of new green energy transport, such as green hydrogen, and the massive use of energy storage devices. Energy transition faces various technical obstacles, such as the difficulty of integrating large shares of RES with variable generation into the network. This category of RES includes the most widespread and rapidly developing solar and wind generation. Another important barrier to the energy transition is the fundamental sophistication of the energy system associated with the introduction of RES. Thus, the spread of RES leads to the emergence of a large number of low-power generators (solar panels on the roofs of households) and prosumers – market participants who are both producers and consumers of energy. Electrification of transport and heating aimed at transferring these sectors to RES contributes to the emergence of a large volume of new loads – electric vehicles, heat pumps, and so on. All this makes centralized energy systems less and less efficient. It is possible to reduce the listed barriers and establish management of the rapidly growing complex energy systems through the introduction of new digital technologies.

In one of the studies by the International Renewable Energy Agency, digitalization, along with electrification and decentralization, is ranked among the three most important innovation trends that are changing the energy paradigm, making the global energy sector more friendly to renewable energy, allowing its participants to change rules and roles, and opening doors to new players [IRENA, 2019c]. Even the concept of "three d" has appeared in renewable energy – decarbonization, decentralization and digitalization [IRENA, 2017]. Moreover, digitalization facilitates electrification and decentralization in the energy sector [IRENA, 2018]. In developing countries, digitalization of the energy sector will help to significantly accelerate electrification, similar to what happened in telephony, when mobile communications began to develop immediately in countries with undeveloped fixed telephony.

[3] Renewable energy sources without traditional biomass, such as firewood.

Digitalization has recently attracted great attention due to the fact that during a pandemic it is important to distinguish between digitization and digitalization. Digitization is usually understood as the transfer of data from analog to digital form, and digitalization or digital transformation is usually understood as the use of digitized data for making decisions in order to improve the performance, safety and sustainability of power systems [Verma et al., 2020].

In 2020, many organizations in almost all countries had to largely switch to remote operation, which is impossible without information and communication technologies. The rapid development of telecommuting in a constrained environment, as well as the replacement of face-to-face meetings and events with teleconferencing, has shown that in a number of activities (including, for example, education), the potential for digitalization is much greater than expected [Dutta, Lanvin, 2020]. And quite logically, the potential for digitalization in other industries, including the energy sector, is no less great and not fully unleashed.

The possibilities of using digital technologies to reduce energy transition barriers have not been sufficiently studied in the world scientific literature [Loock, 2020], although in the modern world digital technologies can become the basis of energy systems management. The study of these possibilities is the purpose of this work. The article is divided into three parts. In the first, the basic characteristics of energy digitalization are considered. The second part is devoted to identifying and analyzing key digital technologies of the energy transition, to identify their potential and the barriers that hinder their development. The third part examines Russia's energy digitalization efforts and analyzes how these efforts are contributing to the energy transition. In this article, answers are offered to the following questions. What digital technologies are most conducive to the energy transition? What exactly is their contribution? Are these technologies developing in the Russian energy sector?

Basic Characteristics of the Energy Sector Digitalization

Historically, the energy sector has been one of the pioneers of digital adoption. In the 1970s, digital technologies were used in the power industry to improve the efficiency of grid management. Oil and gas companies have long used digital technologies in exploration and in pipeline management. The industrial sector, especially heavy industry, has been using digital technologies for decades to improve quality and output while reducing energy consumption [IEA, 2017]. At the same time, it should be noted that in the coal, as well as in the oil and gas industries, it is heavy equipment and not the digital environment that predominates, and the level of digital integration in these industries has so far been relatively low compared to other industries [Verma et al., 2020].

It is believed that digitalization opens up significantly more opportunities for clean energy technologies than for the traditional energy complex. Thus, in a study by P. Verma et al. [2020], in part 18 on the digitalization opportunities for various supply-side actors in the energy sector, only one point was devoted to the coal and oil and gas industries, while the remaining four points are mainly devoted to clean energy technologies. Fossil fuel industries can continue to implement sensors, automate processes and perform remote monitoring, while the renewable energy sector can dramatically increase its efficiency and ability to integrate into the power system. Decentralization of the electric power industry, primarily with the use of RES, creates risks for the traditional business models of electric utilities. With the help of digital technologies, the management of systems consisting mainly of renewable energy and storage facilities will make it possible to respond in a timely manner to fluctuations in the volume of electricity generation. Numerous consumers of energy will also be able to become energy producers without threatening to destabilize the grid. The digitalization of clean energy, encompassing not

only renewable energy but also various related technologies such as electric transport, energy storage and decentralized grids, will create new business models and change the roles of different actors in the power system.

According to A. Booth, N. Patel and M. Smith [2020], traditional energy companies have failed to create tangible commercial value through the introduction of digital technologies due to the inertia of their development, which is difficult to overcome. In particular, traditional energy is dominated by physical assets, investment is huge and profit creation is complex. That is why proposals regarding investment in new technologies are faced with strict selection and the need to prove their feasibility. In addition, engineers play a key role in oil and gas and power companies, and many of the top managers of such companies are former engineers. Consequently, conventional energy companies tend to favour large and complex projects that lack flexibility and resist quick solutions. These characteristics hinder the adoption of digital technologies, which precisely requires high speed decisions, flexibility and willingness to take risks.

Booth, Patel and Smith [Ibid.] also noted that, in traditional energy, the introduction of digital technologies existed more at the level of discussion than in reality. Another study noted that the oil and gas sector has not exploited many of the opportunities associated with data and digital technologies. In addition, many oil and gas companies find it difficult to translate digital performance into improved financial performance and business development [Smart, 2017].

Digitalization can be viewed as a threat to the existing energy system and, in particular, to traditional energy. The large-scale and global digitalization of the energy sector will undoubtedly bring fundamental changes to it. At the same time, the introduction of digital technologies offers tremendous opportunities to overcome the barriers that the energy sector currently faces. In particular, digitalization will enhance energy security, expand universal access to energy and reduce the negative impact of energy on the environment. In addition, since digitalization generally improves efficiency, reductions in energy costs can be expected. Thus, according to the IEA [2017], digitalization can reduce the cost of electricity generation by producers by $80 billion per year in 2016–40, which will be about 5% of the annual gross electricity production costs. This can happen by reducing operating costs and maintenance costs of generating facilities, increasing the efficiency of generating facilities and networks, reducing the number of accidents and idle hours, and extending the life of equipment.

Digital Technologies of Energy Transition

Traditional power systems are not designed to integrate large portions of variable generation or distributed generation. The existing network infrastructure is in most cases too old, inefficient, outdated and unreliable and does not provide sufficient protection against unexpected changes in the amount of electricity generated by power plants [Jha et al., 2017]. The use of digital technologies makes it possible to optimize the functioning of RES facilities in energy systems and, as a result, increases the efficiency and reliability of energy systems with large shares of RES. The International Renewable Energy Agency (IRENA) identified the following key groups of digital technologies promoting the adoption of renewable energy [2019b]:

– Internet of things (IoT),
– artificial intelligence and big data,
– blockchain.

The transformation of energy systems to the Internet of energy (IoE), which is also being discussed, will provide opportunities for the use of all three groups of digital technologies distinguished by IRENA. It is believed [Zhang, 2021] that the term "Internet of energy" was first proposed in the book *The Third Industrial Revolution* by the famous American researcher

J. Rifkin [2013], with the following characteristics: primary energy is being transformed into renewable energy; distributed generation systems and small energy storage systems are interconnected, and the modes of their access to the network are gradually diversifying; different energy sources in different places can be linked using Internet technology; and the Internet of energy supports the development of electrification. Thus, the development of the IoE will facilitate electrification and a gradual transition to renewable sources. At the same time, it should be emphasized that the IoE is still a developing concept, and its very definition causes a lot of controversy.

In the work of Y. Wu et al. [2021], there are two key groups of digital technologies that contribute to the development of the IoE: the IoT and blockchain. At the same time, it is noted that the IoT contributes to the development of such innovative information and communication technologies as artificial intelligence, big data and cloud technologies. Thus, herein, the IoT, artificial intelligence and big data are actually combined into one technology group.

Some authors focus on power supply platformization, which also applies to these three groups of digital technologies. Energy platforms use the digital environment to connect energy consumers and energy suppliers, promoting decentralization and the exchange of energy from distributed sources [Kloppenburg, Boekelo, 2019]. Sharing platforms and the sharing economy have already developed in many industries such as rental housing, cars, and equipment, but their development in the energy sector is just beginning. However, there are already numerous successful projects and business models. For example, the Dutch platform Powerpeers allows households to choose the prosumers from whom they will buy their electricity. Similar services are provided by the German platform SonnenCommunity, but its members are exclusively prosumers with lithium batteries. The American platform SunShare Community Solar allows households that are unable or unwilling to install their own solar panels on the roofs of their homes to acquire shares in solar power plants and thereby reduce their electricity bills [Kloppenburg, Boekelo, 2019].

Next, the features of each of the listed groups of technologies are considered, as well as their potential and limitations.

The Internet of Things

The recent explosive growth in the number of mobile devices used, various communication media, and interest in cloud technologies and big data analytics have raised the question of the interaction between many devices. To solve assigned tasks, objects can automatically exchange information, process it, and create new connections with each other through wireless and wired connections. The IoT refers to this technology. It is estimated that the number of connected IoT devices grew from 8.4 billion in 2017 to 20 billion in 2020 [IEA, 2017].

The IoT offers tremendous opportunities for the energy sector, especially in the renewable energy sector. A smart system based on IoT technology is able to integrate all devices on both the demand side (for example, electrical appliances and electric vehicles) and the supply side (such as solar and wind farms) to manage demand and improve the efficiency of power supply systems.

Currently, the use of IoT technology is possible at various stages of the electricity life cycle, starting at the production planning stage. Various technologies are being tested already, such as tracking the movement of clouds or wind characteristics and using the data obtained to predict the generation of electricity by renewable energy facilities. Also, automated monitoring at each facility allows for more accurate forecasts and the more efficient operation of facilities. The IoT can significantly improve the ability of networks to provide balancing, aggregation and load

dispatch services, as well as to automate the operation of electric substations. This could potentially lead to the creation of fully autonomous energy grids that can independently cope with the unexpected reduction in the generation of renewable energy facilities. As a consequence, it would increase the resilience and stability of the networks. Another equally important application of the technology could be its use for the automated management of energy demand through communication between electrical appliances. The use of technologies of varying complexity, for example, to control room temperature or the energy consumption of an entire building, will significantly save overall energy consumption and reduce loads where energy may not be used at the moment (for example, when there are no people in the premises).

However, the massive expansion of the IoT in the energy sector has not yet begun. Moreover, it can be associated with a number of challenges. In particular, a problem of data security and privacy could occur, as well as the data exchange security. Another issue is the compatibility of different encryption protocols and methods and how quickly they can be brought together.

Artificial Intelligence and Big Data

Artificial intelligence can be understood as technology that uses data, especially in large volumes (big data) for developing models, often using machine learning algorithms that can perform the function of informing, or automating, decision-making [Boza, Evgeniou, 2021]. As the power distribution system is constantly becoming more complex, it is difficult to control it manually. Artificial intelligence helps to make decisions automatically with thousands of households in the power system with installed micro-generating RES and energy storage facilities.

In the field of renewable energy, artificial intelligence is still used mainly for weather forecasts and the projection of the volume of renewable energy produced by facilities with variable generation, as well as for the renewable energy facilities service. However, it can be applied at all stages of the electricity life cycle. In the future, as the share of renewables increases, it is expected that artificial intelligence will become a key technology in forecasting and – most importantly – decision-making processes. Artificial intelligence will allow the automation of operations that are now performed in the manual mode. Thus, even more automation will occur along the entire chain of energy unit creation, from production to distribution and consumption.

In the power generation phase, artificial intelligence is paramount in planning solar and wind power generation. The most accurate forecasting for the short term makes it possible to minimize excess electricity generation and reduce the need for reserve capacities and, consequently, the costs of their maintenance [Zhou et al., 2016]. During the transmission and distribution phases, artificial intelligence maintains the stability of the uninterrupted operation of the network, providing more accurate forecasts of supply and demand. Due to the expected increase in decentralized energy distribution, it is important to manage possible fluctuations and peak loads in the power system. Artificial intelligence algorithms optimize the generation and consumption of electricity and make decisions to moderate the network traffic, and in the future they will also be able to take into account electricity prices in specific areas. Artificial intelligence technologies can also detect possible errors in the system, which makes it possible to respond more effectively to critical situations and thus increase the security of the entire network infrastructure [IRENA, 2019b].

Artificial intelligence technologies can significantly improve consumer energy efficiency. By analyzing the consumer energy behaviour and comparing it, for example, with the temperature in the room, artificial intelligence can predict the required temperature and make recommendations for the use of both the entire heating/cooling system and specific devices. Artifi-

cial intelligence improves the efficiency of energy storage management. For example, artificial intelligence algorithms can make decisions about turning on/off storage facilities during peak loads, as well as predict the working lifespan of storage facilities and, in general, manage the sale and purchase of electricity.

The use of artificial intelligence technologies can significantly increase the economic efficiency of renewable energy. For example, one study found that a 25% improvement in forecast accuracy lowers the cost of solar power generation by $0.33/MWh and $0.5/MWh at 9% and 18% solar penetration rates, respectively [Martinez-Anido et al., 2016].

The development of artificial intelligence technologies in the energy sector is faced with such risks and obstacles as the problem of data quality, a shortage of qualified experts, the risk of data leakage, including personal data, issues of legal protection [Ahmad et al., 2021], risks of cyberattacks, and the need for significant initial investment in improving data management systems [Boza, Evgeniou, 2021]. However, the potential benefit from the development of artificial intelligence technologies in the energy sector justifies the search for solutions to these problems.

Blockchain

In recent years, blockchain technology (distributed ledger) has been actively developing and could have a significant impact, among other things, on the energy transition process. Blockchain is able to facilitate the creation of platforms that work without intermediaries for the distributed networks of the IoE [Cao, 2019], as well as support microgrids. This will contribute to automation and transparency in energy distribution. The use of blockchain can also reduce transaction costs and improve transaction security [IRENA, 2019b]. Thus, it is possible to reduce the likelihood of fraud or data leakage in the face of increasing risks of cyberattacks.

In the development of blockchain technology, three stages can be distinguished [Ahl et al., 2020]: cryptocurrencies, smart contracts and decentralized autonomous organizations (DAOs). The technology is currently in the second stage of development. Smart contracts are algorithms that automatically move digital assets according to predefined rules [Buterin, 2014]. The third stage of development implies long-term smart contracts that will manage assets and code the charters of organizations [Ibid.].

In the energy sector, smart contracts operate on the “if... then...” principle and ensure the automatic fulfilment of obligations under the terms of a contract concluded between electricity producers and consumers. When electrical networks need energy, transactions are automatically initiated with predefined conditions. When generation exceeds consumption, the electricity surplus is sent to storage facilities.

As noted above, RES development leads to the decentralization of the energy sector, as well as to an increase in the number of small energy producers. Smart contracts facilitate the transition from centralized to decentralized energy distribution and provide all network participants with the ability to transact directly with any other participants without intermediaries [IRENA, 2019b]. In the decentralized model, more incentives are created for the widespread introduction of distributed RES, since all members of the network have the opportunity to sell the generated energy. Blockchain technology will introduce automated electricity trading through pre-negotiated smart contracts between households, businesses and suppliers.

Despite the obviously potentially large role of blockchain in the energy transition [Wu, Tran, 2018], the implementation of blockchain technology in the energy sector is still limited and involves many issues, some of which are highlighted in the work of A. Ahl et al. [2020], including the need to access high capacity servers as well as an uninterrupted and reliable Internet connection. Another problem is the lack of a regulatory framework for resolving blockchain-

generated conflicts. The procedure for resolving disputes due to the cancellation of a transaction is not yet defined. The very use of blockchain in the energy sector is widespread only in developed countries, where the necessary infrastructure already exists (distributed electrical networks). In developing countries (for example, in China), where centralized energy supply systems are widespread, blockchain technologies are facing challenges [Wang, Su, 2020].

Over the past few years, blockchain in the renewable energy sector has attracted significant attention from governments as well as private companies. About 200 companies with investments of $466 million are working on the application of blockchain in the energy sector. More than 70 projects are developing at the global level [IRENA, 2019b].

Digital Transformation of the Russian Energy Sector

Russian authorities regard the digital transformation of the energy sector as a serious technological challenge, taking into account Russia's high dependence on imports of high-tech equipment [Mitrova, Melnikov, 2019]. The first step in the development of the agenda for the Russian energy sector's digitalization at the state level was the creation of the EnergyNet working group and the approval of the EnergyNet roadmap of the National Technological Initiative (NTI) in 2016. The goal of Energynet NTI is to achieve the leadership of Russian companies in the global energy markets of the future, in particular, in such segments as distribution networks, intelligent distributed energy, and consumer services. In 2017, by the government order No 1632-r of 28 July [Government of the RF, 2017], the programme "Digital Economy in the Russian Federation" was approved (the order was canceled in 2019 after the release of the Presidential Decree No 204 of 5 July 2018), which affected energy digitalization issues. Taking into account the programme's priorities, a departmental project "Digital Energy" was formed, focused mainly on ensuring the safety of the energy infrastructure, as well as on the digitalization of the electric power industry, the oil and gas sector, and the coal industry. By the Decree of the President of the Russian Federation No 204 of 7 May 2018 "On National Goals and Strategic Objectives of the Development of the Russian Federation for the Period up to 2024," the Government of the Russian Federation was tasked with introducing digital technologies and platform solutions, as well as intelligent control systems in the energy industry [President of the RF, 2018].

In 2020, the Energy Strategy of the Russian Federation up to 2035 was approved [Ministry of Energy of the RF, 2020]. It also focuses on aspects of the energy sector digitalization. In particular, it provides for the improvement of the mechanisms of state support for the implementation of end-to-end digital technologies, including platform solutions, the formation of a management system, coordination and monitoring of the digital transformation of the fuel and energy complex, ensuring the digitalization of public administration, and control and supervision activities in the energy sector.

It should be noted that Russia lags behind many countries in the digitalization of its economy as a whole. According to the Network Readiness Index (NRI), in 2020, Russia was ranked 48th out of 134 in digital economy readiness and 49th in technological readiness. This index characterizes a country's level of development of information and communication technologies. It was developed by the World Economic Forum and the international business school INSEAD in 2002, and since 2019, it has been issued by the Portulans Institute and the World Information Technology and Services Alliance. Sweden, Denmark, Singapore, the Netherlands and Switzerland are among the five leaders of the index in 2020 [Dutta, Lanvin, 2020].

Digitalization in the electric power sector is going faster than in other energy sectors such as heating/cooling and energy for transport. Today, many facilities already use automation, telecontrol and telemechanization systems, and a two-way exchange of information.

PJSC Rosseti has developed the concept "Digital Transformation 2030" [Rosseti, 2018]. Eighty-four digital substations, functioning without the constant presence of personnel, were put into operation, 38 digital areas of electrical networks, 22 digital network control centers, and more than two million smart meters were installed as a result of digital transformation during 2017–20. The digitalization of regional network organizations at the moment is mainly limited to the installation of smart metering devices.

The digital transformation of energy supply companies is focused on modernization of the current billing systems, systems of interaction with consumers, the introduction of personal accounts, and self-service portals. The installation of smart metering devices is the first stage in the application of IoT technologies. Artificial intelligence technologies are not yet used in energy sales activities but could be widely used in tracking the dynamics of production and consumption, data analysis and current trends. The use of blockchain technologies is another trend that is currently being implemented only in pilot projects but would make it possible to increase the efficiency and clarity of electricity trading and accounting.

Implementation of digital technologies in the oil and gas industry, as well as the search for new technological solutions, is driven by the need to reduce costs and improve efficiency in an increasingly competitive environment. In 2008, the Salym group of fields became the first group to be equipped with a completely remote monitoring system. At the beginning of 2019, digital solutions had already been applied at more than 40 Russian fields [Kozlova, Pigarev, 2020].

Digital transformation is now part of the strategies of all major Russian oil and gas companies. And although digital solutions are spreading slowly in this industry, at the moment there are many pilot projects and successful cases.

PJSC Gazprom Neft approved a digital transformation strategy in September 2019. Through the use of new technologies, by 2030, Gazprom Neft plans to halve the time to obtain the first oil from fields, increase the speed of implementation of large oil and natural gas extraction projects by 40%, and cut production management costs by 10% [Gazprom Neft, 2019].

Within the Rosneft-2022 strategy, in 2019, Rosneft developed 24 concepts, 18 prototypes and conducted 28 approbations of digital solutions, some of which were put into commercial operation. Technologies of digital fields, digital twins, and artificial intelligence technologies were introduced for predicting equipment failure and for conducting supply and inventory management of material base; additionally, a prototype of a software package for processing and interpreting geophysical well surveys, a drone monitoring system, and a digital worker were developed [Rosneft, 2021].

The digitalization strategy of PJSC Tatneft is part of its group development strategy up to 2030 [Tatneft, 2018]. PJSC Tatneft, like other oil and gas companies, is focused on the implementation of big data technologies, the IoT, and digital twins. Elements of digital field technology have been successfully tested at the Romashkinskoye field, which resulted in the reduction of production costs by up to 30%. The company also managed to produce an additional 200 thousand tons of oil and increase the flow rate of previously low-profit wells up to 10 times. By the end of 2021, the company planned to introduce models at all oil facilities and to start taking decisions on the basis of models.

The Digital Lukoil 4.0 programme includes the company's work in four main directions: digital twins, digital personnel, robotization and the digital ecosystem. The concept of intelligent fields is also being introduced [Klubkov, Mosojan, 2020]. By the end of 2019, 45 integrated field models were built, with additional hydrocarbon production exceeding seven million

barrels of oil equivalent. Digital technologies are also being implemented in oil refining. For example, a predictive analytics system for the state of dynamic equipment was introduced at the Perm Oil Refinery. At the refinery in Burgas, a system for monitoring and forecasting equipment condition is in operation. The Volgograd Refinery has a video analytics system integrated into an automated process control system.

Thus, a gradual introduction of digital technologies is taking place in the oil industry. Most stakeholders have developed digital strategies and are gradually implementing technologies – digital fields, cloud technologies, big data, artificial intelligence and remote monitoring. But this whole process has a very indirect relationship to the energy transition. It is rather similar to ordinary industrial automation aimed at reducing costs and increasing the efficiency of business processes. The concept of digital energy, including energy transition, implies a new business model formation and a new structure of interaction between the main subjects and new services. The application of digital technologies in the Russian oil and gas sector does not fundamentally change industrial processes, but only automates them. Since the application of technologies in the industry is just beginning, there is no information about the obtained, even preliminary, effects. The companies have only preliminary values of the planned effects based on the completion of all strategy stages.

It should be noted that the digitalization of the RES sector is not included in the list of state tasks for the energy industry's digitalization in Russia. However, the introduction of digital technologies is taking place in this sector as well. The most common practice today is to implement remote management. The first such project was completed in September 2019 by the System Operator and the Hevel company. The use of digital solutions at the Buribayevskaya SPP (installed capacity is 20 MW) made it possible to provide remote control of active and reactive power, as well as to service the solar power plant without personnel constantly on duty. After the success of the remote control project at Buribayevskaya SPP, similar systems were implemented at other solar generation facilities (for example, at Maiminskaya SPP and Staromaryevskaya SPP). Another digital solution is the use of unpiloted aerial vehicles by Hevel for the inspection of solar power plants. Kochubeevskaya and Adygeiskaya wind farms, as well as three solar power plants in the Volgograd region, are already connected to the Internet and digital services. The Ushakovskaya wind farm in the Kaliningrad region is integrated into the first digital region of the electric grid in Russia. Also, most SPPs and WPPs in Russia are equipped with automated control systems and automated measuring and information systems for electric power fiscal accounting, which could become the basis for deeper digital transformations in the future. Artificial intelligence and blockchain technologies in the RES sector in Russia are not yet used, with the exception of isolated cases, such as Sber's blockchain platform for renewable energy certificates trading.

The RES sector's digitalization is proceeding at a slow pace. The introduction of digital technologies in this area is at the pilot project stage and, as in the case of traditional generation, resembles an automation process. Digital solutions mainly help to optimize work and ensure dispatching. The current process of green energy digitalization is not an incentive for RES development in Russia. And even the implementation of digital technologies at a deeper level will not lead to an increase in RES capacities. The restructuring of the entire energy system and the creation of new infrastructure, including digital, could become a tool for RES development. But the main condition is the application of state support mechanisms. At the moment, at the level of state strategic documents, the digital development of the RES sector is not a priority. Thus, the interest of all players in the Russian energy sector, as well as the renewal of the entire energy system from a technological and organizational point of view, could become a driver for the development of green generation and, as a result, microgeneration, distributed generation and energy storage markets in Russia.

In general, the process of energy sector digitalization in Russia is at an initial stage. At the moment, a legislative basis has been created for the introduction of digital technologies and a number of pilot projects are being implemented. However, the application of technologies is not associated with the structural changes in the industry, which implies the energy transition. Energy digitalization in Russia looks more like an automation process. This initial stage could become the basis for further industry digitalization, but this requires, first of all, the will of all participants in the Russian energy system.

Conclusion

Digital technologies were introduced in the traditional energy sector about half a century ago, but their role in the development of the coal, oil, and gas industries is quite modest and is mainly limited to the usual automation of operations and increasing efficiency. This is largely due to the predominance of engineering thinking in these spheres, as well as to the general inertia in traditional energy development. Clean energy, on the other hand, offers much more room for innovation, new business models and quick decisions, which opens up wide horizons for digital adoption. Digital technologies, in turn, create opportunities to manage the challenges of a clean energy transition, such as the difficulty of integrating large volumes of variable generation into the grid and managing distributed grids.

The introduction of RES and the energy transition are driving electrification and leading to a significant increase in the complexity of electric power systems in which new players are emerging, including prosumers, and a large number of different electrical appliances, devices, and sources of electricity generation, as well as new business models, are appearing. It is becoming more and more difficult to control such systems in manual mode, and at some point this could become an obstacle to the energy transition.

This research identified three groups of key digital technologies that are able to overcome barriers to the clean energy development in the coming years – the IoT, artificial intelligence and big data, and blockchain. The possibility and importance of organizing interaction and integration of all these groups of technologies within the framework of digital platforms and the IoE was also noted.

The IoT is able to integrate electrical devices as well as power plants, which will make it possible to control them in an automatic mode. The IoT can significantly improve the ability of networks to provide balancing, aggregation and load dispatch services, as well as to automate the operation of substations. Artificial intelligence in the field of renewable energy is still used mainly to predict the production of solar and wind power plants. However, in the future, its algorithms can be included in decision-making processes. For example, artificial intelligence algorithms can make decisions about turning on/off certain objects. Artificial intelligence technologies can also detect possible errors in processes, which will increase the safety of power systems. Blockchain, in particular through short-term and long-term smart contracts, will allow various participants of the power system to carry out transactions without intermediaries, and that will facilitate the transition from centralized to decentralized energy distribution.

Russia lags significantly behind other countries in the digitalization of the economy in general, as well as in the digitalization of the energy sector in particular, although since 2016, the digitalization of the fuel and energy complex has been one of the state's priorities. Digital transformation has already become part of the strategies of all large Russian oil and gas corporations, as well as many other companies in the energy sector (for example, grid organizations), but so far it has mainly been limited to conventional industrial automation in order to reduce costs and increase the efficiency of business processes. Many promising digital technologies (for example, blockchain) have hardly been developed in the Russian energy sector yet. In gen-

eral, the digitalization of energy so far does not contribute to the energy transition in Russia, mainly due to the limited ambitions of Russia in the renewable energy development and related industries, such as energy storage, electric transport and others.

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Contingent Liabilities of Public-Private Partnerships (PPPs) in Russia and BRICS Countries: Assessment and Risk Mitigation Mechanisms[1]

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Abstract

This article is devoted to the assessment of the conditional liabilities of public-private partnerships (PPPs) and measures to reduce the risks associated with them. First, a quantitative assessment of the contingent liabilities of PPP projects at the federal level is carried out. Contingent liabilities for public-private partnership projects are estimated to amount to 2.3 trillion roubles for the period 2021–52. Second, the experience of creating a system for managing the contingent liabilities of PPPs in Russia and the BRICS countries (Brazil, Russia, India, China and South Africa) is summarized. This analysis shows that each of the BRICS countries has a legislative and technical framework for managing fiscal liabilities but does not use it to the fullest extent. Consequently, to improve functioning it is necessary to regularly update, fill in, and expand the number of available financial indicators for PPP projects. Of the BRICS countries, South Africa is characterized by the most complete and transparent system for managing PPP-related contingent liabilities, but Russia could use some of the measures implemented in other BRICS countries to improve its own system, including the creation of a guarantee fund (Brazil), a system for operational project evaluation (India) and the practice of project approval by the fiscal authority (China).

Keywords: PPPs, fiscal risks, implicit and contingent liabilities, BRICS, monitoring of contingent liabilities

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Introduction

Infrastructure development is a common goal of the BRICS countries of Brazil, Russia, India, China and South Africa, a priority for intra-group cooperation, and simultaneously a major hindrance to their economic growth. According to the Global Infrastructure Hub, the annual gap in Russia's investment into sustainable development infrastructure will constitute 1.9% of the gross domestic product (GDP) in 2020–40 [Global Infrastructure Outlook, n. d.]. The main strategies for resolving this problem involve attracting private investments and developing

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a system of public-private partnerships (PPPs). For Russia, this is particularly relevant in the context of implementing national projects and the need to attract more than 3 trillion roubles in private investments for the construction of infrastructure under the Comprehensive Plan for Modernization and Expansion of Trunk Infrastructure. But a decrease in direct government liabilities achieved by attracting private capital and splitting risks with private partners often comes at the expense of an increase in contingent government liabilities, that is, government liabilities that emerge with the occurrence of certain events.

Contingent liabilities are one of the most important sources of budget risks. They can be explicit liabilities, which are determined by contracts or other agreements, or implicit liabilities, which are not legally binding and "stem from a government's obligations to the society due to a project's public significance" [Andryakov, 2018, p. 61]. The absence of a system that would account for and model contingent liabilities and, consequently, the failure to prepare for their occurrence can lead to a significant increase in national debt and may be instrumental in the onset of a budget crisis.

This issue becomes particularly topical at a time of crisis, when the implementation of projects is postponed, financing opportunities dwindle, and private partners face a higher risk of insolvency. For example, lockdowns and a global slowdown of economic activity affected the financial stability of companies in various sectors, including infrastructure. According to InfraOne, "in 2020, total lost profit of infrastructure companies was 1.93 trillion rubles" (almost 13% of their annual revenue) [InfraOne, 2020b]. Due to lost profit, more than 10 large industrial and infrastructure companies have already cut their investment programmes [Zhundrikov, Yakunina, 2020], which may result in an increase in the share of public spending on infrastructure development.

Russia does not have a comprehensive system for regular assessment of contingent liabilities, including those related to PPP projects, although such system is being actively developed. The experiences of other BRICS countries in various areas of mitigating risks related to contingent liabilities of PPP projects can prove useful in this endeavour.

A focus on BRICS countries is warranted because every BRICS member has experience with simultaneous application of several measures for mitigating risks related to contingent liabilities, which can be used in Russia's domestic practices, and because BRICS countries have well-established patterns of cooperation in infrastructure financing and rather recently created a working group on PPPs, which can be used to share members' experiences.

Thus, the purpose of this study is to assess contingent liabilities of PPPs in Russia and identify main the directions for mitigating related risks based on the experiences of Russia's BRICS partners. It begins with an overview of sources on assessment of contingent liabilities and mitigation of related risks. It then surveys the reasons behind the occurrence of risks related to contingent liabilities, gives an overview of the PPP market in Russia, and discusses sources of data on federal PPP projects. This is followed by a description of the methodology for assessing contingent government liabilities of the federal budget, providing assessment results, and comparing them with assessments of other BRICS members' contingent liabilities. The main mechanisms for the mitigation of risks related to occurrence of contingent liabilities in Russia and other BRICS countries are analyzed. Conclusions and recommendations are then presented on ways to improve the system of managing contingent liabilities of PPPs in Russia.

Literature Review

Researchers have produced extensive analysis of budget risks related to PPP projects, as well as potential mechanisms for their mitigation.

In her foundational work on contingent liabilities, A. Cebotari [2008] provided a comprehensive overview of risks related to contingent liabilities of PPPs, mechanisms for managing them, disclosure, and assessment. In particular, she pointed out that full-scale management of contingent liabilities requires the creation of a wide institutional foundation that would comprise the following elements: assessment of the need to assume contingent liabilities; regular monitoring; a system for charging beneficiaries for budget risks; accounting for contingent liabilities as budgetary expenses wherever possible; and disclosure of information under international standards, as well as a precise plan of action when contingent liabilities occur.

A study conducted by the World Bank [Irwin, Mazraani, Saxena, 2018] considered best practices in efficient management of PPP projects and recommended performing a quantitative assessment of risks and potential contingent government liabilities related to PPP projects, as well publicly disclosing information on costs and risks in PPP projects. Moreover, the study emphasized the importance of developing clear and concise rules for all PPP market participants and reforming the system of budgeting for contingent liabilities to ensure comprehensive accounting for all fiscal expenses. Experts from the World Bank pointed out that governments have more opportunities for managing contingent government liabilities before they move forward with the implementation of a PPP project.

A.D. Andryakov [2018] considered global experience and Russian practices of accounting for and assessing contingent liabilities of PPPs in the budgetary process. Russia uses a cash receipts and disbursements method of accounting, which excludes contingent liabilities (exclusive of government guarantees on private borrowing) from the budgetary process. Andryakov explored international practices in budgeting contingent liabilities of PPP projects and limiting the total volume of liabilities under these projects, which allows for the mitigation of risks arising from the application of cash-based budgetary accounting. He further recommended performing regular assessments of contingent government liabilities, both by project and for all PPP projects in aggregate, and evaluating their effect on Russia's budgetary and debt sustainability.

In its report, the Working Group on Budget Risk Assessment of the Public Council of the Ministry of Finance of the Russian Federation [Ministry of Finance of the RF, 2015] discussed scenarios for adapting to budget shocks and identified the main instruments for mitigating the negative consequences of budget risks. The Working Group recommended improvements to long-term budget forecasting by suggesting the inclusion of a "stress" scenario. The stress scenario must assess potential additional expenses related to an occurrence of contingent government liabilities (including in PPP projects), determine available sources of funding, and prepare budget consolidation options.

In 2020, VEB.RF and the National Center for PPP published a study on international approaches to managing contingent government liabilities in PPP projects [National Center for PPP-VEB.RF, 2020]. Authors of the study pointed out that only at an early stage in the formation of the PPP market can large volumes of private investments be attracted without the need to pursue a systematic state policy on managing contingent government liabilities. At later stages in the formation of the PPP market, most countries use various instruments for managing contingent liabilities. The authors highlighted the following mechanisms for managing contingent liabilities as the most successful practices: using mathematical models for assessing and forecasting the scope of execution as it pertains to contingent liabilities; ranking public partners with the purpose of selecting the most efficient teams to implement PPP projects; establishing caps on the aggregate volume of contingent liabilities both for consolidated and regional budgets; and ensuring the disclosure of information on contingent liabilities assumed by a public party, as well as publishing PPP agreements in the public domain [National Center for PPP-VEB.RF, 2020].

The BRICS PPP Good Practices report, published in 2018 based on the results of South Africa's term as BRICS chair, provided a detailed account of special properties of PPPs in BRICS states [BRICS, 2018]. An International Monetary Fund (IMF) report [2018] also mentioned BRICS countries as being among best with regard to practices for risk mitigation. For example, it gave an extensive description of a Brazilian PPP guarantee fund and South Africa's monitoring of contingent liabilities. A report prepared by the Group of 20 (G20) Trade and Investment Working Group [National Center for PPP-Ministry of Finance of the RF-VEB.RF, 2019] also cited experiences of all BRICS countries.

An IMF study [Bova et al., 2016] contained data on the occurrence of contingent liabilities in 80 developed and developing countries between 1990 and 2014. During this period, these countries on average encountered two occurrences of contingent liabilities. As for Brazil, every five or six years it sees a major occurrence of contingent liabilities that leads to unexpected budget expenses averaging 8.3% of GDP. China reported approximately 10 occurrences of contingent liabilities with an average fiscal cost of 4.7% of GDP for the public party. The IMF database contains a relatively small number of contingent liability occurrences in PPP projects, owing to the fact that only cases with a fiscal cost exceeding 0.2% of GDP were included in the database. Sporadic insolvencies of PPP projects typically result in insignificant budget costs. According to the study, the average cost of the occurrence of contingent liabilities in PPPs is 1.2% of GDP, and in some cases, it is as high as 2.0% of GDP. But the number of PPPs has only recently started to increase noticeably on a global scale, and relevant budget expenses may increase dramatically in the future.

A Eurodad report [Romero, 2018] listed 10 occurrences of contingent liabilities in PPPs, two of them linked to India (a project on increasing the water supply in Khandwa and a project on building power stations in Mundra). In particular, the project targeting the construction of coastal coal-fired power plants at a major Mundra port (the Tata Mundra Ultra Mega Power project) became cost prohibitive[2] due to an increase in the price of imported coal. The project's accumulated losses (as of 31 March 2017) were recorded at $948 million, with an outstanding long-term loan in the amount of $1.49 billion. In 2019, Tata Power made an offer to the government to buy 51% of shares and provide assistance to the project as a private partner. An increase in electricity tariffs was officially approved in April 2019, but that proved insufficient to ensure feasibility for the Tata Power plant in Mundra. In March 2020, the private and public parties signed a consensus statement at a meeting with the minister of power [Singh, 2020]. The government conceded the payment of an indemnity to the private partner and was forced to assume the larger part of responsibility for the project's losses.

Contingent Liabilities of PPP Projects and Related Risks

A state's budget liabilities comprise direct and contingent liabilities. Direct liabilities are budget obligations reflected in an agreement and are not contingent upon the occurrence of any events as long as the private party fulfils contractual obligations [National Center for PPP-VEB.RF, 2020, p. 5]. Direct government liabilities related to PPP projects include financing capital grants to a private partner, as well as remitting the availability payment once the project is operational.

Contingent liabilities are obligations that do not arise unless particular, discrete events occur in the future [IMF, 2011]. As noted above, contingent liabilities can be explicit and implicit. Explicit government liabilities are defined by the terms and conditions of a contract. Such lia-

[2] The project was supposed to run on Indonesian coal, but in 2010 the Indonesian government decreed that coal could be exported only at prices linked to global rates. As the Supreme Court effectively struck down the compensatory tariff, Tata Power sustained great losses.

bilities on PPP projects include compensatory payments to a private partner upon the termination of a contract and obligations on various types of guarantees in PPP infrastructure projects (for example, guarantees of a private partner's minimum income, guarantees against the risk of a drop in demand for services, or guaranteeing a private partner's debt). Implicit contingent liabilities are not legally mandated and come instead from government obligations based on the significance of the project to the public. Implicit liabilities on PPP projects include financing a private party's debt that is not guaranteed by the government, providing an additional loan for the repayment of obligations, or executing a total buyout of a private partner in case of default.

Typically, occurrences of contingent liabilities happen during a crisis and lead to a significant deterioration of the general fiscal balance and an increase in the debt-to-GDP ratio [Bova et al., 2016]. A detailed study of factors that trigger the occurrence of contingent liabilities indicates that even when systemic crises are controlled, business cycles play a major part in determining the occurrence of contingent liabilities. The IMF study [Bova et al., 2016] concluded that occurrences of contingent liabilities typically follow periods of high growth and coincide with periods of low growth. Consequently, they exert a negative effect on state finances precisely when the budget is already experiencing considerable pressure. Thus, the study emphasized the importance of measures on mitigating budget risks and ensuring efficient management of implicit government liabilities during inter-crisis periods.

Even though occurrences of contingent liabilities tend to surface predominantly during economic crises, they can be also observed in other instances. Sometimes contractual obligations need to be revised, and this leads to the occurrence of government liabilities in PPP projects. Reasons behind the need for such revisions include unsatisfactory terms of the original contract (terms and conditions that are too favourable for or too disadvantageous (such as an expensive project design) for a private investor), incorrect assessment of demand on the result of project implementation (particularly relevant for toll roads), and opportunistic behaviour (contractor proclivity for underestimating the price of services at the auction stage and low quality of services rendered).

A rather wide array of instruments is used to mitigate risks related to the occurrence of contingent liabilities. These are considered below.

The Current State of Public-Private Partnerships in Russia

As of the end of 2020, Russia had 3,459 PPP projects (at different stages in their implementation) with the total volume of public and private investments reported at approximately 4.5 trillion roubles (4.2% of GDP) [Rosinfra, 2020]. The structure of existing agreements is as follows: the majority of contracts are made at the municipal level (94%), and the largest contracts are signed at the federal level (42% of investments go to federal projects) [Ministry of Economic Development of the RF, 2020]. Indeed, Russia currently has 1,324 active contracts with investments under 1 million roubles due to a large number of concessionary agreements in the utilities and public amenities segment.

These indicators are on par with some other developing countries (for example, they are commensurate with Brazil in terms of the number of projects and GDP ratio) or lower. In China and India, the ratio between investments into PPP projects and GDP exceeds 10% (Table 1). China demonstrates the highest volume of investments in PPPs due to the fact that regional and municipal authorities are actively using this mechanism to reduce the debt load on respective budgets.

Table 1. PPP Development in BRICS, 2019

	Brazil	**India**	**China**	**Russia**	**South Africa**
Number of Projects	2,240	1,824	9,440	3,601	121[3]
Total Investment ($ Billions)	32	350	2,229	53	28
Memo					
% of GDP	*2.5*	*12.2*	*14.3*	*3.5*	*7.8*

Source: Brazil [RadarPPP, 2019]; China [CPPPC, 2019]; Russia [Rosinfra, 2019]; India [Infrastructure India, n. d.]; South Africa [PPP Knowledge Lab, n. d.].

Note. The data given in the table are for 2019 for comparison purposes, despite the availability of 2020 data for some countries.

Since federal projects account for the bulk of investments and government liabilities in Russia, this study predominantly focuses on assessing risks related to such projects. Moreover, according to Andryakov [2018], analysis of issues with accounting for contingent liabilities of PPP projects is rather telling, particularly at the federal level, because "in methodology, especially budget methodology, subfederal authorities replicate the federal level." Russia is currently implementing 32 federal projects that employ the public-private partnership mechanism: 25 in transportation (Figure 1), four in social services, two in information technology (IT) infrastructure, and one in national security and defence. The largest share of transportation projects (21 projects) is in the automotive segment, and railroad infrastructure is in second place with four projects. The total implementation cost of these projects is 1.8 trillion roubles: 1.2 trillion roubles for construction of highway infrastructure, 0.6 trillion roubles for railroad infrastructure, and 34.7 billion roubles for information systems on motorways.

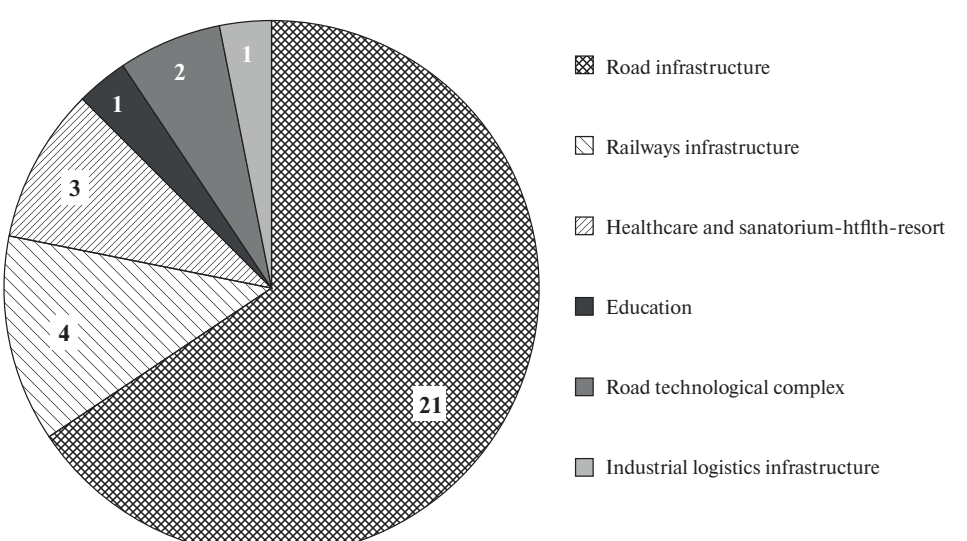

Fig. 1. Federal PPP Projects by Sector, Number of Projects

Source: [Ministry of Transport of the RF, n. d.; Rosinfra, n. d.].

[3] This includes 87 active [GTAC, 2019] and 34 closed [National Treasury of the RSA, 2019e] projects.

In the public domain, on the websites of Rosavtodor Federal Road Agency, the Government of the Russian Federation, and the Unified Information System in the Field of Procurement, texts of agreements are available containing information on parties' fiscal obligations, which allow for an assessment of contingent government liabilities on 21 projects: 14 motorway projects, three projects in railroad construction, two in healthcare, one in manufacturing and logistics, and one project on technological complexes for motorway facilities. Total investment into these projects during the construction stage is an estimated 1.2 trillion roubles (prices for the year concerned), or approximately 25% of total investment into ongoing PPP projects. At the operational stage, total concession grantor payment on these projects will be 547 billion roubles (prices for the year concerned). Thus, the total cost of 21 PPP projects under consideration will be 1.7 trillion roubles over the entire period of their implementation.

Quantitative Assessment of Contingent Government Liabilities on Federal PPP Projects

This study assesses direct and explicit contingent government liabilities on 21 projects. Analysis of available statistical data on Russia's federal PPP projects considered herein indicates that information for many projects is either unavailable or incomplete. For example, tender documentation, concessionary agreements, or long-term investment contracts for PPP projects in the operational stage are often not available in the public domain, which complicates the collection of data on such direct government liabilities as concession grantor payments. It is also necessary to point out the fragmented nature of available data on government guarantees provided by the Russian Federation to private parties under the umbrella of PPP project implementation. That is why it can be assumed that the actual volume of direct and contingent government liabilities dramatically exceeds estimates.

Aggregate government liabilities on federal PPP projects are assessed in three stages. At the first stage, direct government liabilities for each project under consideration are analyzed. Direct government liabilities comprise subsidies from the federal budget (capital grants and concession grantor payments) and investments of the National Wealth Fund (NWF). The following assumptions were made during the assessment of direct liabilities: first, equal distribution of investments in the absence of capital investment splits by year;[4] second, in calculations of operational and investment payments, inflation over the projection period was set to the target rate established by the Bank of Russia (4%).

At the second stage, contingent government liabilities are assessed for each project. For the purposes of this study, only the volume of explicit liabilities is calculated, which includes Russia's guarantees and the guarantee of minimum income. Assessment of the scope of implicit contingent liabilities warrants a separate approach with the application of methods of mathematical modelling. For the majority of projects under consideration, this is impossible due to the absence or fragmented nature of data available in the public domain. Assessments of government liabilities on all projects are subsequently consolidated. Over the period from 2021 to 2052, the total volume of government liabilities related to the implementation of public-private partnership projects will constitute an estimated 3.1 trillion roubles, whereas direct liabilities (capital grants and concession grantor payments, as well as NWF funding) will account for

[4] Assumptions were used in the following projects: Concessionary Agreement Regarding Healthcare Facility "Eye Microsurgery Center in Ekaterinburg" [Government of the RF, 2017], Concessionary Agreement Regarding Railway Transport Facilities 79 KS, and Concessionary Agreement Regarding Healthcare Facility [Government of the RF, 2015b].

0.8 trillion roubles, and contingent liabilities (Russia's guarantees and guarantee of minimum income) will amount to 2.3 trillion roubles (Table 2).

Table 2. PPP Liabilities of the Federal Budget, 2019–52, ₽ Billions

Liabilities	2019	2020	Total 2021–52
Total budget liabilities	*130*	*123*	*3,080*
Direct liabilities	81	86	810
Federal subsidies	41	50	769
Capital grant	5	12	2
Concession grantor payments	36	38	766
National wealth fund	40	36	215
Contingent liabilities	49	50	2,270
Guarantee of minimum income (maximum volume in case of the absence of the traffic)	12	13	2,233
Public guarantee of the Russian Federation	37	37	37

Source: Authors' calculations based on 21 federal agreements (concessional agreements, long-term investment treaties).

Assessment of contingent government liabilities on federal PPP projects accounts for state guarantees on bond loans for two motorway projects and guarantees of minimum income (reimbursement of lost income) in two railroad projects. For example, Russia's government guarantee secures bonds with par value of 25.5 billion roubles. These bonds were issued to implement the project on building the kilometre 15–58 segment of the M-11 Moscow-St Petersburg highway. The state guarantee is also stipulated for the issuance of bonds related to the implementation of the New Exit onto the Moscow Ring Road from M-1 Belarus Highway project. The entire bond issue in the amount of 8.2 billion roubles is currently in circulation.

Guarantees of minimum income are provided to concessionaires in two federal PPP projects: Financing, Construction, and Operation of Public Railway Transport Line "Obskaya-Salekhard-Nadym"; and Financing, Creation, and Operation of Railway Transport Infrastructure Facilities of Public Railway Line "Elegest-Kyzyl-Kuragino".[5] In these two projects, reimbursement comprises load-based and tariff components. But the first contract ("Obskaya-Salekhard-Nadym") stipulates a cap on the public partner's guarantee in the amount of 12.8 billion roubles [Government of the RF, 2018a]. Given that the term of project implementation is 35 years, and the term of construction is five years, the total maximum government guarantee (assuming the absence of traffic) for the entire project term constitutes 383.7 billion roubles. The second contract ("Elegest-Kyzyl-Kuragino") [Government of the RF, 2018b] does not specify a cap on the guarantee, so the maximum guarantee was calculated as the concessionaire's total revenue from freight services over the entire term of project implementation. Thus, assuming the absence of traffic, the maximum government guarantee of minimum income for this project is 972 billion roubles.

[5] Even though on 29 March 2021 the Russian government put the concession for the construction of Kyzyl-Kuragino railway line on hold for up to five years, assessments on this project are included because contingent liabilities until 2052 are considered.

The overall estimate of all government liabilities on projects under consideration constitutes 4 trillion roubles over the period from 2009 to 2052 and 3 trillion roubles over the projection period from 2021 to 2052, whereas contingent liabilities account for almost three quarters of all liabilities. According to InfraOne, in 2019, off-balance sheet liabilities on PPPs and concessions were 560 billion roubles for budgets of all levels [InfraOne, 2020a]. In this study, federal contingent liabilities amounted to 49 billion roubles (Table 2). Such discrepancy in assessments is related to calculation methodology and project selection. First, InfraOne does not specify what liabilities it considers as off-balance sheet liabilities; and, perhaps, it does not include all contingent liabilities and accounts only for state guarantees. Second, InfraOne includes state guarantees for budgets of all levels as opposed to the federal level considered herein, which results in a major discrepancy in assessments.

In general, the level of contingent liabilities on federal PPP projects in Russia (0.1% of GDP) does not exceed the level of other large developing countries. For example, in South Africa, according to its national treasury assessments, the volume of contingent liabilities related to PPP projects for budgets of all levels varied from 0.1% to 0.2% of GDP in the fiscal year 2019/2020. According to assessments of the IMF, Brazil's contingent liabilities on PPP projects constituted 1.1% of GDP in 2014, and liabilities of budgets of all levels on PPP projects in China amounted to 0.5% of GDP in 2019. Presently, Brazil has the highest level of contingent liabilities related to PPP projects, while South Africa has the lowest due to, first and foremost, the small number of implemented projects compared with other BRICS countries.

Mechanisms for Mitigating Budget Risks Related to Implementation of PPP Projects

International practice suggests 10 instruments for monitoring and mitigating budget risks related to PPPs [National Center for PPP-VEB.RF, 2020], and Russia has the regulatory and technical framework for implementing seven of them (Table 3).

Russia, China, South Africa and India stipulate *project approval by fiscal authorities*. In Russia, approval is done in accordance with Federal Law No 224-FZ, Article 10.5: "If funds of the budgetary system of the Russian Federation are planned to be used in the course of project implementation, the decision on project implementation shall only be taken on condition that the use of such funds complies with federal laws and/or other regulatory legal acts of the Russian Federation, laws and/or other regulatory legal acts of the Russian Federation's constituent entities or municipal legal acts" [Federal Law of 13 July 2015 No 224-FZ], which de facto requires the approval of the federal or regional ministry of finance.

In China, project approval is the main mechanism for mitigating risks related to PPPs. All PPP projects in China are accumulated, considered, and approved by ministries of finance of different levels [Ministry of Finance of the PRC, 2014]. In South Africa, PPP projects go through a multi-tiered approval process with the national treasury [National Treasury of the RSA, 2019]. The treasury's Financial and Fiscal Commission also partakes in project approval by assessing a project's contingent liabilities. In India, the ministry of finance is almost exclusively responsible for approving PPP projects, but some projects are also considered by the committee on infrastructure. The Public Private Partnership Appraisal Committee (PPPAC) performs additional screenings for PPP projects valued over 1 billion rupees [Comptroller and Auditor General of the ROI, 2009].

Russia, China, South Africa and, to some extent, Brazil *assess fiscal consequences of project implementation*. Such assessment may involve not only an evaluation of required investment and size of liabilities (Russia, China, South Africa) but also an assessment of potential

Table 3. Risk Reduction Instruments Related to the Contingent Liabilities of PPPs in BRICS

Instrument	Country	Implementation
Project approval by fiscal authorities	China	Operational Guidelines for Public-Private Partnership Mode
	Russia	224-FZ, p. 10.5
	South Africa	Treasury Regulation 16 to the Public Finance Management Act, 1999
	India	Public Private Partnerships (PPP) in Infrastructure Projects. Public Auditing Guidelines
Assessment of fiscal consequences of project implementation	China	Guidelines for the Financial Affordability Assessment of the PPP Projects
	Russia	Resolution No 1514 of the Government of the Russian Federation of 30 December 2015
	Brazil	The Brazilian Fiscal Responsibility Law
	South Africa	Public Private Partnership Manual (National Treasury)
Methodological recommendations on managing contingent liabilities and PPP risk	China	Guidelines for the Financial Affordability Assessment of the PPP (2015) Operational Guidelines for Public-Private Partnership Mode (2015) Implementation Opinions on Promoting Regulated Development of Public Private Partnerships (2019) Operation Guideline for Performance Management of PPP Projects (2020)
	Russia	Sample agreement forms
	South Africa	Public Private Partnership Manual (National Treasury)
	India	Estimation of Contingent Liabilities from PPP- User Manual for Online Toolkit
Disclosure of information on the size of contingent liabilities in fiscal reports and analytical publications	Brazil	The Brazilian Fiscal Responsibility Law
	Russia	Monitoring of the Ministry of Economic Development
	South Africa	Budget Review (National Treasury)
Monitoring of contingent government liabilities of PPPs	Brazil	The Brazilian Fiscal Responsibility Law
	China	China Private Public Partnerships Center
	Russia	Rosinfra database, State Automated Information System “Management” (GASU)
	South Africa	Government Technical Advisory Centre (GTAC) National Treasury
	India	Public Private Partnerships (PPP) in Infrastructure Projects. Public Auditing Guidelines
Guarantee funds	Brazil	Infrastructure Guarantee Fund

Instrument	Country	Implementation
Reporting contingent liabilities as a separate budget entry	South Africa	Budget Review (National Treasury)
Caps on contingent liabilities	Brazil	PPP Law (No 11, 709, 2004)
	China	Guidelines for the Financial Affordability Assessment of the Public-Private Partnership Projects
	India	Public Private Partnerships (PPP) in Infrastructure Projects. Public Auditing Guidelines
Publishing of the PPP agreements in the public domain	Russia	Russian highways website, Russian government website, Russian public procurement website
	Brazil	Websites of public partners: Planning and Logistics Company (EPL), National Agency of Ground Transport (ANTT), Investment Partnership Programmes, Fund of Support and Structuring of Concessions and PPP Projects (FEP CAIXA)
	China	China Private Public Partnerships Center
	South Africa	E-Tender website, National Treasury
	India	Infrastructure India database

Source: Compiled by the authors.

revenue (Brazil), as well as credit risk assessment (China, South Africa). Russia's assessment of liabilities accounts for the size of liabilities assumed by a public partner if risks emerge during project implementation and execution of a government (municipal) contract [Government of the RF, 2015a]. Still, the risk assessment methodology approved by Order No 894 of the Ministry of Economic Development of the Russian Federation of 30 November 2015 [2015a] applies only to PPP projects that are implemented based on 224-FZ. It does not officially apply to concessionary agreements, even though in 2016 the Ministry of Economic Development of the Russian Federation planned to approve recommendations on such assessments [2018]. The methodology also does not apply to other existing agreement formats (long-term investment agreements, owner-operator contracts, life cycle contracts).

In China, assessing expenses for budgets of all levels includes the following types of direct and contingent liabilities: investments, operational subsidies, risks, and supporting investments (such as for land purchase) [Ministry of Finance of the PRC, 2015]. In South Africa, assessment of fiscal consequences of PPP projects, including payments and liabilities (comprising contingent liabilities), is part of the annual budget review, which has an appendix on PPP projects (Annexure E). The Annexure contains the following information on PPP projects [National Treasury of the RSA, 2019]:

– updates on completed PPP projects[6] and the list of PPP projects under review;[7]

[6] Published information includes information on the financing department, private partner, type of the project, financing, and present value for the government.

[7] In addition to the list of the projects, there is a detailed description of each project and its perspectives.

– estimated unitary payments on PPPs in operation over the Medium Term Expenditure Framework (MTEF) period by sector (transport, accommodation, health, and correctional services facilities);

– level of potential government contribution to contingent liabilities on PPPs in operation for the preceding fiscal year and the next fiscal year.

It seems fair to say that, of all BRICS countries, South Africa publishes the broadest data on PPP projects in the public domain.

China, South Africa, India and Russia have published *methodological recommendations on managing contingent liabilities and PPP risks*. These recommendations vary among BRICS members by type and content from best practices (South Africa) to sample agreement forms (Russia) and an instrument for voluntary assessment of contingent liabilities (India). For example, Russia provides recommendations in the form of sample concessionary agreements. Indeed, sample texts, albeit not mandatory, contain recommendations on splitting risks between public and private partners, so they may be deemed an instrument for mitigating risks, along with best practices on splitting risks [Global Infrastructure Hub, 2016]. Sample agreements have the same structure and contain the same concession grantor liabilities and risks, but they do reflect the main risks and liabilities of a concession grantor that are typical of PPP projects. In China, methodological recommendations are effectively mandatory and target project standardization, tighter control over project implementation, and mitigation of risks related to PPPs. For example, its ministry of finance issued the Implementation Opinions on Promoting Regulated Development of Public Private Partnerships, which impose limitations on the implementation of user charge projects where the share of the charge is below 10% [Ministry of Finance of the PRC, 2018], and the operational guidelines for the evaluation of PPP projects regulate the full life cycle of projects [Ministry of Finance of the PRC, 2020]. In South Africa, methodological recommendations cite best practices for every stage of a project's cycle [National Treasury of the RSA, n. d., a].

India developed a web-based application tool, entitled the Contingent Liability Management System (CLMS), designed to estimate contingent liabilities in PPP projects at various stages of their implementation. The tool comes with a user manual [Government of India, n. d.], which serves as a guide for ministries, governments, and project authorities in measurement, recognition, and disclosure of contingent liabilities arising from their respective PPPs. The tool is a browser-based application. It uses an inbuilt system that is aligned to various provisions relating to termination risks and termination payments under concession agreements.

Brazil, Russia and South Africa *mandate disclosure of information on the size of contingent liabilities in fiscal reports and analytical publications*. Under Brazil's Fiscal Responsibility Law [2020], the Budgetary Guidelines Law must include an assessment of contingent liabilities. At the same time, the latter document does not contain a detailed assessment of liabilities related to PPP projects due to the absence of such liabilities at the federal level. For example, the 2020 budget indicates that administration has only one PPP project at the federal level, and "since the companies involved are not affiliated with the federal government, and no guarantee was provided under the contract by the concession grantor to the concessionaire, there are no risks transferred to the federal budget" [Ibid.].

The National Treasury of South Africa publishes an annual budget review, which contains an annexure on public-private partnerships [National Treasury of the RSA, 2019]. It provides an overview of contingent government liabilities on PPP projects at the following levels: federal government, provinces, municipalities, and public entities. Contingent liabilities on PPP projects are categorized depending on whether a contract is terminated as a result of private sector default, government default, or force majeure (an event beyond either party's control).

Russia stipulates disclosure of information on the size of contingent liabilities in analytical publications. According to the Order of the Ministry of Economic Development of the Russian Federation [2015b], consolidated results of PPP project monitoring should be published annually. The first monitoring results were published in February 2020 and contained information on the total number of ongoing projects, the list of largest projects, total investments, and off-balance sheet liabilities. Moreover, the Accounts Chamber of the Russian Federation publishes the results of some projects' audits.

Officially, all BRICS countries are supposed to *monitor contingent government liabilities of PPPs*. But the only BRICS member that ensures comprehensive and regular monitoring is South Africa, where monitoring and consulting support for PPP projects is provided by the Government Technical Advisory Centre (GTAC). The South African Government closely monitors each party's performance against their contractual obligations and enforces tight regulatory requirements [National Treasury of the RSA, 2019]. The GTAC regularly publishes information on PPP projects under review and completed projects.

In Russia, Federal Law 224-FZ has a clause that mandates that the government agency duly authorized to carry out the assessment must publish assessment results on the agency's official website in the form of a report on project efficiency and its comparative advantage. For federal PPP projects, the duly authorized government agency is the Ministry of Economic Development. Russia currently lacks a comprehensive system for monitoring government liabilities related to PPPs, albeit there are several platform solutions. For example, according to statutes and regulations (Order No 888) [Ministry of Economic Development of the RF, 2015b], information on ongoing PPP contracts must be submitted to the State Automated Information System "Management" (GASU). But GASU is not available to the public, so it is impossible to assess the quality and quantity of information contained therein. Public information on PPP projects is available in the Rosinfra database on PPP projects [Rosinfra, n. d.], but this resource cannot be used to assess contingent liabilities related to PPP projects because the only financial indicator provided for each project is the total investment in project implementation.

As for China, the website of the China Private Public Partnerships Center publishes daily reports on the number of ongoing projects. These reports provide information on the total investment and assess fiscal responsibility of regional and municipal budgets. Fiscal responsibility comprises both direct expenses of respective budgets (investments, operational subsidies) and contingent liabilities (risks and additional expenses). Thus, China assesses contingent liabilities, but does not publish a separate assessment in the public domain. According to this estimate, total (direct and contingent) government liabilities constitute 503 billion yuan ($78 billion) [CPPPC, 2019], or 0.5% of China's GDP.

Brazil, as already noted, stipulates mandatory publication of the size of contingent government obligations in an appendix to the national budget, which can be also regarded as monitoring.

Brazil created a special *guarantee fund*. The government contributes to the fund up to 11 billion reais as its guarantee against risks related to the implementation of infrastructure projects [ABGF, n. d.]. Moreover, in 2016 Brazil launched an investment partnership programme, which provides public partners with an opportunity to receive technical assistance with the structuring of PPP projects [Federal Government of Brazil, n. d.]. The fund is managed by the Brazilian Development Bank (BNDES). In 2017, Federal Law No 13.529 decreed the creation of the Federal Fund for Concessions and PPPs (FEP CAIXA) [Caixa, n. d.]), which allows for obtaining additional funding for technical assistance. This fund is administered by state-owned Brazilian bank Caixa Econômica Federal. Its focus is geared toward facilitating the development of municipal projects, while the BNDES fund targets concessions at the federal level.

South Africa's budget pre-emptively allocates funds to cover its contingent liabilities *as a separate budget entry* (contingency reserves). Such mechanism for securing contingent liabilities is one of the most advanced practices for managing contingent liabilities in the budgetary process.

Brazil, China and India introduced *caps on contingent liabilities*. In Brazil, payments from the federal budget are capped at 1% of its revenue, and the cap is set to 5% of revenue at the regional level [IMF, 2017].

In China, the share of PPP-related liabilities cannot exceed 10% of the national budget's expenses in any given year. China identifies public partner liabilities, estimates related expenses, and then assesses budget capacity, that is, total budget expenses at the respective level. The latter assessment uses mean values and average growth rates over the past five years [Ministry of Finance of the PRC, 2015].

For India's PPP projects, the aggregate of total annuity liabilities on a grant for the next five years shall not exceed 25% of operating expenses stipulated under the Five Year Plan for the grant. Such a cap ensures control over budget expenses related to the execution of contingent liabilities.

All BRICS countries *publish executed PPP agreements in the public domain*. They can be published on tender websites (Russia, South Africa [National Treasury of the RSA, n. d., b]), websites of specialized companies (such as Avtodor in Russia), websites of government agencies working in infrastructure (Russia [Government of the RF, n. d.], Brazil), and websites of support funds (Brazil), as well as websites dedicated exclusively to PPPs (China [CPPPC, n. d.], India [Infrastructure India, n. d.]).

In Russia, the most comprehensive publicly available information is provided for projects on road infrastructure, such as the construction of the Central Ring Road that is posted on the website of Avtodor [n. d.]. The investment projects page lists projects at various stages of implementation (initial planning, tender, construction, and operational activity). The investment tenders page provides tender documentation of relevant projects, including information memoranda and results of public technological and pricing audits.

Still, most countries provide fragmented information and do not have a unified database that contains all agreements and data on executed contracts.

Conclusions and Recommendations

The PPP market is actively developing in Russia and worldwide. In Russia, the cumulative number of projects has increased from 2,800 to 4,600 since 2016, and investment volume went from 2.3 billion roubles in 2016 to 4.6 billion roubles in 2020. Due to the urgency of implementing national projects and creating a structure for financing them (for example, the Comprehensive Plan for Modernization and Expansion of Trunk Infrastructure intends to attract more than half of the total 6.3 trillion rouble investment from non-government sources[8] [Government of the RF, 2018c]), in the near future we can expect an increase in financial spending and risks related to PPP projects for budgets of all levels. Simultaneous increases in risks and liabilities requires a systematic state policy on managing contingent government liabilities [Andryakov, 2018].

This study suggests an assessment of contingent liabilities on 21 federal PPP projects that account for approximately 25% of total investments into PPP projects in Russia. The volume of contingent liabilities in 2021–52 (the period for project implementation) is 2.3 trillion roubles, which is less than in other developing countries. But this volume can increase dramatically

[8] Without energy as part of the plan.

as Russia proceeds with the implementation of its national projects, including infrastructure projects. Further studies can be scaled up by incorporating the assessment of regional projects, as well as the assessment of implicit government liabilities with the application of methods of mathematical modelling.

Even though Russia currently has the foundation for using seven tools from those suggested by international best practices for monitoring and mitigating budget risks related to PPP projects (exclusive of a guarantee fund and having a separate line on contingent liabilities in the national budget), we need to improve on all existing tools in order to secure comprehensive management of budgetary risks. First, we must ensure information transparency, which stipulates regular updating, uploading, and expanding the number of available financial indicators for PPP projects. In the process of improving its systems for managing contingent liabilities and related budget risks, Russia can draw on the experiences of other developing countries that face similar issues, including its BRICS partners.

The peculiarity of the Russian PPP market lies in the large number of small regional projects and a small number of large federal projects, the latter of which bear the highest budget risks. That is why Russia is interested in various aspects of every BRICS member's experiences. For example, India is a leader in operational assessment of projects, which will facilitate the assessment of the many small PPPs. China has a well-organized system for project approval by fiscal authorities, which can be also actively used in getting approvals for regional PPPs. The Brazilian experience with a guarantee fund can be useful for reducing the load on regional budgets, and the South African system for managing contingent liabilities that works well for a small number of projects can be used at the federal level for large PPPs. Thus, given the established foundation and other countries' experiences, Russia has an opportunity to deploy a comprehensive system for monitoring and managing contingent PPP liabilities before the growth of the public-private partnership market engenders major budget risks.

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BRICS and Civil Society: Challenges and Future Perspectives in a Multipolar World[1]

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Abstract

This paper investigates the role of civil society (CS) in relation to issues of global concern, such as the current COVID-19 pandemic. In particular, it focuses on the role of CS in the BRICS countries (Brazil, Russia, India, China and South Africa). Western CS has, over time, shown certain limitations that have exposed it to a number of criticisms, while in BRICS, CS could begin to play a decisive role as a "historical bloc," using Gramsci's expression. In fact, BRICS has repeatedly reiterated that it wants to reshape global governance (GG), and indeed its current growth has shown that it could effectively do so. Therefore, it is worth analyzing what role CS plays in this process. This analysis leads to an understanding of the many advances, and also the diverse limitations, that characterize the effectiveness of the work of CS in the BRICS countries. Thus, CS's ability to be decisive in policymaking remains unclear. The argument in this paper proceeds as follows: some classical theories on CS are analyzed, highlighting t he ethical tasks in which CS should be engaged; then, criticisms directed toward western CS are debated. Finally, the limitations and potential that CS has in the BRICS countries is considered, above all in light of the recent response to COVID-19. The conclusions highlight the fact that, if the BRICS countries want to play a leading role in GG and, broadly speaking, in future multilateralism, CS must play a decisive role within them. Specifically, a solid cooperation, or even a stable alliance, is needed between the civil societies of BRICS countries in order to address pressing issues and demands coming from the Global South.

Keywords: BRICS, civil society, global governance, international cooperation, COVID-19

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Introduction

The world is passing through precarious and turbulent times. In addition to the previous economic crises, the COVID-19 pandemic has had devastating effects. Apart from the lockdown phases, the emerging problems are mostly linked to the possibility of an even deeper global economic recession, an exponential increase in unemployment, and an ever-greater distance between people in every sense.

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In particular, among these many problems, which are having increasingly dramatic effects, an ever-greater awareness is emerging of the extent to which inequality characterizes societies. Specifically, the gap between the "haves" and the "have nots" is steadily increasing. COVID-19 has highlighted that there is a greater distance between those people that Z. Baumann [1998] defined as the "tourists" and the others that he described as the "vagabonds" of globalization. With the former, he was referring to the world's elites, who have benefited most from neoliberal globalization. With the latter, he spoke instead of the "victims" of globalization: that is, those who are forced to follow the unpredictable and sometimes deadly flows of migration in order to have a job and be able to survive.

In short, the pandemic has increasingly highlighted the distance between the rich and the poor, between the winners and the losers of globalization. It is therefore logical to ask whether this situation will have repercussions and to what extent. Certainly, what can be highlighted is the need to address the most pressing issues that we are facing today: in addition to the pandemic, this includes climate change, migration, conflicts (including economic ones) on a global scale, and so on. However, to address these issues, we need to rely on multilateralism – which currently does not seem up to scratch, and which some scholars have defined as being in a state of gridlock [Hale, Held, Young, 2013]. More than ever, we need to break this gridlock and put in place a functioning multilateralism and governance with a "human" face [Falk, 1995].

In addition to the social consequences, the consequences of this situation at the global level, especially in terms of relations between North and South, are considered in this article. Specifically, the focus is on what role civil society (CS) could play in shaping these relations in the future, considering that this historical moment most certainly represents a watershed that will create future challenges. Moreover, CS should give voice to those who suffer most from inequalities within societies given that it represents the link between the private and public spheres of peoples' interests. Thus, CS could be the most important place for the expansion of democracy and rights [Arato, Cohen, 1992].

Furthermore, the possible role of CS in the BRICS countries (Brazil, Russia, India, China and South Africa), that is, those emerging powers that for some years have been demanding their right to have greater say at a global level in shaping global governance (GG) [BRIC, 2009; BRICS, 2018; 2019], must be contemplated. Economically, geographically and demographically, this bloc is becoming increasingly important globally.[2] Its institutionalization as a forum that plays a parallel role to those of the Bretton Woods system, such as is the case of the New Development Bank (NDB), in addition to its strengthened cooperation and integration, has given increased impetus to BRICS' ambitions of elevating its members' international status and power [Abdenur, Folly, 2015; Esteves, Torres, Zoccal, 2016; Gao, Sergunin, 2018]. In this sense, BRICS' "collaborative interaction" has been the key to strengthening its members' positions on the world stage [Lesage, Zhao, 2020].

However, it remains unclear what the role of CS has within the major decision-making processes that characterize the group. For this reason, precisely because BRICS could truly represent a moment of transition toward what has been called a "post-western" world [Stuenkel, 2016], it is necessary examine the role CS has within the group, especially in light of recent events.

[2] "BRICS brings together five major emerging economies, having 23 per cent of the global GDP and around 17 per cent of the share in world trade (they have a combined nominal GDP of USD 16.6 trillion). The five nations account for 50 per cent of the world economic growth, 42.58 per cent of the world population (over 3.6 billion people), 26.6 of the world land area and 13.24 per cent of World Bank voting power" [Times of India, 2019].

Structure and Methodology

This article proceeds in the following way: after defining the role of CS, highlighting its strengths and weaknesses, the sphere of CS in the BRICS countries is examined. Then, its evolution and limitations are analyzed, especially in relation to the COVID-19 pandemic. Finally, the role that CS should play in the future is highlighted, especially with respect to the possibility that it can make a decisive contribution in designing a future GG that is truly committed to providing faster responses to global issues. The methodology outlined above is entirely based on bibliographic research, taking into consideration the literature concerning some of the major interpretations of CS. Subsequently, a consideration of selected literature on BRICS, both from western thinkers and from the BRICS states themselves, will illustrate the challenges that CS faces in BRICS. Regarding the role of some initiatives from BRICS' CS, such as the BRICS Civil Forum or the BRICS From Below initiative, their official publications and the critical readings of them will be examined.

While an exhaustive analysis of the existing literature on the subject is not possible in this article, the data and texts consulted confirm that we need to give greater voice to CS (globally) and also that BRICS will have to face this challenge if it wants to be more accountable within the global framework and within the GG system.

In fact, the idea informing this article is that GG can only be effectively reshaped if CS begins to take on an increasingly active role within it. Since BRICS has always claimed its commitment to reshaping GG [BRIC, 2009], it is clear that, within this group as well, CS must play a fundamental role.

BRICS is demonstrating that it has grown in power and its ability to reshape international institutions such as the United Nations (UN), the World Bank, the International Monetary Fund (IMF) [Stuenkel, 2020] and, broadly speaking, GG. Moreover, even if its weight is still lacking [Petrone, 2020], it seems that it is already beginning to play a decisive role in the promotion of multilateralism, as well as in the implementation of new values within the context of global regulation [Barabanov, 2012]. For this reason, the role of CS becomes increasingly important in promoting and/or maintaining multilateralism.

The conclusions will highlight the fact that there is still much to be done to achieve a more effective role for CS in the context of the BRICS states (as in many other countries, including those in the West). However, CS can nevertheless be the means by which decision-making processes can be made more democratic, injecting a new impetus to change GG. The pandemic crisis we are experiencing has increasingly highlighted the need to promote greater participation of CS in view of future global challenges.

What Is Civil Society? A Theoretical Debate

Over the years, the debate on the meaning and role of CS has been very intense. However, its definition remains vague and poorly defined, as M. Merle [2002] has highlighted. It is useful to trace the origins and evolution of the concept through a selective reading of the classics on political thought regarding this term. Classical views about CS include some of the most important political and philosophical thinkers, such as Friedrich Hegel and Karl Marx.

For Hegel [2010], CS is distinct from the state, and represents the moment in which the unitary system of the family is shattered into an "atomistic" system, which is essentially characterized by the economic-social and juridical-administrative spheres of living in a community. It is the meeting place of confrontation between particular and independent interests, which are placed in the position of having to coexist. In practice, it is the moment in which the particular

interests of individuals converge, in the sense that they come together and confront each other. However, while representing a negative dialectical moment (antithesis), it is also a moment in which these particular needs coexist and learn to exist side by side.

Marx [2010], like Hegel, took up the distinction between CS and the state, but he radically diverged from Hegel in his interpretation: while Hegel considered CS as a pre-state sphere or a sub-structure of the state, Marx interpreted CS as a *structure* that contains within it the juridical and political *superstructure* and is consequently a sort of emanation of this. For Marx, CS emerges essentially from the sphere of needs, that is, from the economy (material needs).

One of the major readers of Marx was Antonio Gramsci. For Gramsci [1971], CS includes all ideological-cultural relations and not only the complex of material relations, as Marx believed. Hence, the whole complex of spiritual and intellectual relations converges in CS, not just the complex of commercial and industrial relations.

For Gramsci, CS is distinct from the state since these two spheres act on the basis of two different regulatory mechanisms that generate two different logics of action. The state represents the place from which coercive force emanates, which uses methods of legitimate use of force to minimize conflict (social and economic) of a specific territorial community. While the state therefore represents political power, which uses coercive force to manage conflicts, CS instead represents the place of consensus.

Gramsci's most original contribution was the introduction of the concept of hegemony. Its conception has also had a fundamental influence on globally recognized scholars of international relations such as Robert Cox and Immanuel Wallerstein. The term "hegemony" should be understood as an intellectual and spiritual reform that radically transforms the habits and customs of a given society [Fonseca, 2016; Gramsci, 1971]. It is therefore a sort of ability to define new cultural contents within which, with a new cultural production, economic relations must be conceived, and the actions of the political actors who act within it must be interpreted. In Gramsci's view, the subject called to influence the sphere of CS was the factory proletariat, in line with the Marxist tradition. This historical subject is called to influence CS because this is the sphere in which the meaning of cultural values must be changed in terms of cultural hegemony. The proletariat must create a "historical bloc," that is, a set of social forces (including the peasants), which gravitate toward the proletarian political area, and at the same time toward a group of "organic intellectuals," that is, a group of intellectuals who place themselves within the working class by supporting its hegemonic struggles. In practice, it is in this sphere that the working class, supported by the organic intellectuals, should act to eliminate the hegemony of the dominant group and establish their own hegemony, to be exercised over the rest of society.

It is therefore evident that ideologies play an important role in the scheme developed by Gramsci, since they become autonomous instruments of intellectual and cultural influence. They thus become hegemonic, and within this hegemony the organic intellectuals play an important and central role since they are the intellectuals who choose to place themselves alongside a social class and its political expression in order to achieve hegemony over the whole of society. In this sense, the intellectual speculation of the Italian philosopher is truly interesting because he also defines a new way of collective construction. In practice, through his conception of hegemony, a vision of CS is created that is relevant in terms of current social movements, with of course the necessary contextualization. Even today, we are witnessing attempts by several social movements to undermine the ideological-cultural monopoly that seems oriented toward the subjugation of the masses in order to reproduce the logic of global capital. In this context, Gramsci's position is interesting because it offers some food for thought on the matter. This, in turn, is also useful for understanding how a historical subject is called to affect society. It goes without saying that Gramsci's theory of hegemony is specifically relevant to the historical moment in which it was developed, but it is also relevant in the contemporary world because

it leads us to consider the importance of the movement of the historical bloc against hegemonic powers.

Another important thinker who has studied the concept of CS is Jürgen Habermas. He affirmed the importance of the institutionalization of CS which forms the associative structure that supports the public sphere. Habermas defended the importance of a democracy in which the public sphere is functioning and in which participation is guaranteed, leading, through this rational discursive process, to participation. Habermas elaborated a model of democracy which he defined as "deliberative democracy" [1998]. This democracy describes a moment of formation and legitimation of a decision that is the result of a general deliberation. Deliberative democracy is, in Habermas's version, a discursive democracy (*Diskursbegriff der Demokratie*), that is, the result of a public debate between citizens who confront and reason in conditions of equality. Thus, CS establishes the foundation for public debate. This is made up of those associations, organizations, and movements that at the same time welcome, condense and affect social need and demands, amplifying public debate in the political public space, resonating social problems that occur in the sphere of private life. The heart of CS therefore consists of an associative fabric that institutionalizes, within the framework of organized public spaces, the discussions that aim to solve problems concerning issues of general interest.

The definitions considered so far are central to the discourse that will be established regarding BRICS; they also allow for an understanding of the actions of CS in the process of the democratization of policymaking and reshaping GG. If the BRICS countries have stated that they wish to be the architects of a different type of governance, especially from a financial standpoint [BRIC, 2009], then the role of CS within these countries must be examined. A functioning GG should use CS as its pivot, staying precisely in line with deliberative discourse, but should also be hegemonic in the Gramscian sense. This is so that it can give voice to demands from parts of the world thus far neglected.

In any case, a more recent definition, formulated by the Commission on Global Governance [1995] in 1995, describes the scope of CS' action in practical terms. According to the Commission, the term in question:

covers a multitude of institutions, voluntary associations, and networks – women's groups, trade unions, chambers of commerce, farming or housing co-operatives, neighbourhood watch associations, religion-based organizations, and so on. Such groups channel the interests and energies of many communities outside government, from business and the professions to individuals working for the welfare of children or a healthier planet... citizens' movements and NGOs now make important contributions in many fields, both nationally and internationally. They can offer knowledge, skills, enthusiasm, a non-bureaucratic approach, and grassroots perspectives, attributes that complement the resources of official agencies.

Departing from the theories of previous authors, this article draws on this definition of CS. However, in this discussion the business sector is not considered on the grounds that the economic power of certain organizations has often represented a limitation to more widespread and deliberative participation. Indeed, organizations with greater economic power have, on many occasions, played a predominant role in policymaking, thus reducing the ability of NGOs and other humanitarian associations to influence common decisions. This is the case for the European Union's institutions, where there is a massive predominance of powerful private and economic lobbies, whose interests prevail over CS, influencing policymaking in a more decisive way [Kroger, 2008].

To conclude, a CS base that works honestly, advocates for citizen needs, and mobilizes civic virtues [Schmitter, 2000] is the key component in a governance that is also "ethical." In fact, the correct functioning of CS could lead to a more accountable GG given that it would bring into the centre of the public sphere the demands and needs of those who do not have an

decisive voice in issues of common interest. In fact, as J. A. Scholte stated [2011, p. 6], "efforts by citizen groups can – and, as the case studies show, often do – induce global authorities to be more answerable to various constituencies. In particular, civil society inputs can in some instances increase global governance accountability to disadvantaged and marginalized circles, including countries of the global south, impoverished people, women, and other social groups that experience silencing and exclusion."

Before discussing the possible impact that CS in the BRICS countries may have on the context of GG, the roles and limitations CS has in western countries, and in the BRICS countries themselves, must be analyzed. This will not be a definitive and exhaustive analysis; the aim is primarily to propose questions and provide some possible answers in light of the current situation. At the same time, questions and answers are always open to continuous improvements and insights.

Limitations and Criticisms of Western CS and the Role of the BRICS

The concept of CS has been subject to many criticisms, especially when it comes to western CS. Among these, the one that draws the most attention argues that there is a hegemony project hatched by a transatlantic CS [Friedrichs, 2005], which acts to prop up the strong political and/or economic powers [Hermet, 2008; Polman, 2011]. According to this critique, western CS acts in a functional way such that its governments can impose their influence on the rest of the world. Although this is open to debate, it is a fact that in the Global South many associations and NGOs have been seen as instruments through which northern countries impose their views and interests [Abdenur, Marques da Fonseca, 2013]. This vision has also defined relations between the BRICS countries and segments of their CS. In fact, oftentimes governments of BRICS countries have seen the *longa manus* of western governments operating in their national NGOs, associations, and foundations [Poskitt, Shankland, Taela, 2016].

However, it is worth questioning whether CS plays an important role in BRICS. As already mentioned, BRICS is not only beginning to have an increasingly decisive role at the global level, but it has also experienced a considerable increase in its weight in terms of cooperation and development assistance [Guo, Sun, Demidov, 2020], as well as increasing its presence in the Global South [Nayyar, 2016; Petrone, 2020; Thakur, 2014]. Given this tremendous growth at the global level and the decisive role BRICS is playing in the transition to a multipolar world, what effective role does BRICS' CS play? Can CS in the BRICS countries play the "historical bloc" role that was theorized by Gramsci on a global level?

Indeed, the BRICS countries are increasingly providing an alternative to the global leadership of western, industrial countries [Moilwa, 2015; Poskitt, Shankland, Taela, 2016]. Therefore, CS in BRICS countries, riding this rise in power, will more than likely increase their own global voice "as vehicles of alternative ideas, models and leadership to the industrial country global consensus" [Tandon, Bandyopadhyay, 2013].

If BRICS is able to provide an alternative to the current global system, it is worth asking whether it is also capable of giving greater voice to an organized CS (CSO) that can promote alternative and innovative global issues and thus re-establish the very value of CS, so often criticized in western countries.

Other criticisms directed toward western CS focus on certain contradictions, such as CS's principal interest in obtaining private or public funds for projects instead of pursuing ethical and humanitarian behaviours [Polman, 2011]. Moreover, dependence on these funds contributes to the perception that CS is a means by which the western/northern public/private sector has been able to establish its influence in the Global South [Abdenur, Marques da Fonseca, 2013].

BRICS and Civil Society: Evolution and Limitations

Within the international context, the role of CS appears to be increasingly compromised. As mentioned above, in western countries the limitations related to the nature and the scope of CS, as well as its participation capacities, are still relevant and prevent a decisive contribution in shaping policymaking. In the rest of the world, the role and the importance of CS also faces major limitations. For example, in the specific case of BRICS, there are several indicators that these countries are still struggling to build a concrete dialogue with CS. If CS is called to defend private interests in the public sphere, and consequently to play a greater ethical role, it should have all the necessary means by which to provide a new impetus to democratic processes.

In the BRICS countries, some progress has been made lately regarding the inclusion of CS in decision-making processes. However, despite this progress (which is of some interest in terms of giving adequate responses to global problems), it also seems that there are contradictions, deriving not only from the inability to create networks but also from the presence of elites in BRICS countries who play a central role within CS [Poskitt, Shankland, Taela, 2016].

The BRICS Civil Forum (discussed below) undoubtedly shows that there is tendency among the various representatives of CS to have a common dialogue, and as such, to seek greater cooperation. However, there are still many limits to be overcome. First among these is that of achieving greater influence, and following from that, to create greater cohesion between the various members of CS. Not surprisingly, the on-going pandemic has highlighted several limitations in this sense.

CS in BRICS could play an important role in fostering participatory democracy. At the same time, it could represent a stronger voice for the peoples of the Global South. In fact, BRICS could become a true representative of the Global South in the international arena, a role it has repeatedly claimed, because BRICS countries share a common history with the Global South with respect to the processes of colonization, imperialism, and therefore, of subjugation, especially by western countries [Petrone, 2019; Rodney, 1972]. Moreover, the growing presence (in terms of investments, cooperation, strategic partnerships, and so on) of the BRICS countries in the Global South (as in the example of Africa), which has steadily grown in recent decades, is an important key point that demonstrates that the strengthening of relations may lead to greater development in these countries [Petrone, 2020].

In short, new pathways are opening up for the BRICS countries that could truly represent new possibilities to redirect global problems. In this sense, CS could play a very important role as a new "historical bloc" and could act as a bridge to the Global South. The question that remains is whether CS in BRICS can also play that ethical role to bring the Global South's issues to the centre of the global agenda, and therefore position them as central topics for GG for the future.

There are many limitations in this sense, both internal and external – internal because the governments of the BRICS countries have often achieved uncertain outcomes regarding the initiation of greater participatory processes with CS, and external because this mission should be accompanied by a strengthening of cooperation, or even an alliance, between the CS in each BRICS country [MacKenzie, 2012].

Another limitation is linked to the fact that CS in the BRICS countries and, in general, in the Global South, has often been seen as an instrument of the governments of the North, as already mentioned. In practice, through their advocacy and monitoring skills, CS associations that operate in the BRICS have played a part in implementing policies of the governments of the North. The humanitarian case that they often make in developing countries has become a form of parachuting the political priorities and interests of northern governments into the

southern hemisphere. In this sense, the concept of "good governance" has formed the basis of the liberal imposition coming from the North. As scholars have observed [Hermet, 2008; Weiss, 2000], good governance represents the entire set of practices that the international institutions of Bretton Woods – the IMF *in primis* [Stiglitz, 2002] – require the countries of the South to follow in order to receive funds and to attain greater participation in the globalized world more generally. This aspect, criticized not infrequently [Stiglitz, 2002], has over time increased the mistrust on the part of these countries toward western (or northern) CS. Consequently, even in the BRICS countries, this aspect has represented a limitation for CS. Through their monitoring, CS associations have been seen as a means of interference by the western countries.

Yet, it should be noted that even in BRICS the primary limitations concern precisely the participation and weight that the various components of CS have. In fact, in their report on CS in BRICS, A. Poskitt, A. Shankland and K. Taela [2016, p. 22] noted that "even when an officially recognised permanent space for policy engagement is established, CSOs must still grapple with issues of power, voice and representation. Several interviewees commented that the space that exists to discuss and contribute to foreign policy and SSDC debates across all the BRICS is dominated by elite groups in civil society."

The report also notes that "meetings with government officials and sherpas, and events organised at the BRICS summits, and attendance at international conferences such as those held around the BRICS Summit or G20, have primarily been restricted to international NGOs, thinktanks, academics and small elite organizations that usually receive foreign funding. National and community-based organizations are often absent from these debates and arenas" [2016, p. 22].

Thus, the perception has been that only a small elite group has any influence on decision-making. The almost non-existent ability of CS to influence foreign policy has been highlighted, as in the cases of India [PRIA, 2013] and South Africa [Pressend, 2013]. It therefore appears that CS in the BRICS countries suffers from this lack of influence at the international level. In fact, discussions related to foreign policy and international relations are dominated by "an elite group of thinktanks, experts, international NGOs and representatives from business forums" [Pressend, 2013].

Other limitations identified in the report by Poskitt, Shankland and Taela [2016] include the fact that CS in BRICS has often suffered from deficits linked to its limited ability to have an active role in policy debates that could have given it greater participation and decision-making weight. However, over the years, there have been initiatives like the Brazilian International Relations Reflection Group (GR-RI), founded in 2012, which is a discussion forum to promote CS participation and interest in public debates. South Africa established the South African Forum for International Solidarity (SAFIS) in 2011 to increase debate within society about South Africa's role internationally. Additionally, since 2007 Russia has developed an important international development assistance programme. By doing so, and with a significant inclusion of CS stakeholders, Russia has become an active global development cooperation partner and has expanded considerably its development assistance sector [Larionova, Rakhmangulov, Berenson, 2016].

Although these initiatives sought to give a major impulse to CS, the results are, as of yet, quite unsatisfactory. In fact, it seems that despite efforts to significantly develop the role of CS, CS in BRICS remains fragmented. Above all, due to unprecedented issues and challenges related to the ongoing pandemic, BRICS should provide a new direction in strengthening and developing the inclusion of CS in policymaking processes.

In any case, if, on the one hand, there have been limitations, on the other, various initiatives have been taken to respond to this deficit. One of these stands out – the BRICS Civil Forum. This was launched in 2015 as a discussion platform for CS in the BRICS countries.

The aim of this forum is to consolidate citizens' priorities for the BRICS agenda and to act as a platform from which a series of civil initiatives can be proposed, with the prospect of including them in the agenda of the BRICS leaders' summits. This is an important initiative that involves BRICS' CS with the aim of providing "the leaders with an opportunity to look at the problems from the viewpoints of different groups of the population, [and] put[ting] the peoples' needs at the heart of the BRICS agenda" [Civil BRICS, 2020].

From 2015 to 2020, the BRICS Civil Forum contributed to important achievements during the annual BRICS summits. The signs are that a progressive effort has been made to include BRICS' CS in decision-making processes. For instance, during the first Civil Forum, held in Moscow in 2015, many stakeholders from CS discussed common public policies and social issues. The second meeting, held in New Delhi in 2016, continued the effort to build a space for CS engagement within BRICS. In 2016, among other things, the participants "deliberated on effective implementation of SDGs and the need to develop a robust monitoring and evaluation framework as well as follow-up and review" [Ibid.]. During the Chinese presidency, the third BRICS Civil Forum was hosted in Fuzhou on 10–12 June 2017 (where the theme of the BRICS summit was "BRICS: Stronger Partnership for a Brighter Future"), and CS was invited to "pool wisdom and strength for common development and a brighter future" [Ibid.]. In the subsequent meeting in Johannesburg, proposals from BRICS' CS covered different areas ranging from land, mining, agriculture, inclusive economic development, climate change, gender and inequality, peace and security, youth, and the NDB.

During the 2020 meeting in Moscow, several propositions were presented in a final document, Advancing BRICS People2People Cooperation for Sustainable Future. These recommendations were the result of both the recent experiences at prior summits and of the COVID-19 pandemic. In fact, the document states that the work of the Civil Forum is dedicated "to the key topics of BRICS development in the light of the new challenges of the post-COVID era. These topics include food security, healthcare, education and science, human capital development, labor legislation during digital transformation, sustainable development, climate change, agriculture, women's agenda, and the struggle to ensure the quality of information in the era of fake news and post-truth" [Civil BRICS, 2020].

This period seems also to be a great test case with regard to the issue of COVID-19 – have the BRICS governments been able to accommodate the demands of CS? In the document cited above, references are made to the fact that "in the BRICS countries, CSOs, NGOs and individual activists have been highly engaged in programs to help the most vulnerable groups, in assisting medical volunteers to support patients and health workers in hospitals, in research and testing of vaccines and in supporting citizens in other countries who remained abroad during the border closure. Nonprofit organizations, media and scientists participated in information and prevention campaigns and timely information notification. Under the most challenging conditions, these combined efforts of the civil society helped to slow down the spread of the virus in the BRICS countries and significantly consolidated government measures to combat the pandemic and its consequences" [Civil BRICS, 2020].

However, both positive signs and shortcomings have been shown during the COVID-19 pandemic to date.

BRICS' Responses to COVID-19

During the pandemic emergency, some positive responses have emerged from the BRICS countries. For example, a speedy bureaucracy has worked to provide loans to members of the NDB. Thanks to the establishment of an Emergency Assistance Facility (EAF), BRICS coun-

tries adopted a quick tool to receive financial aid in order to manage the COVID-19 crisis [Financial Express, 2020; NDB, 2020].

However, despite these initial responses and this rapid injection of funds, infection rates from the pandemic remain high (as indeed is the case in the rest of the world). In any case, it is also important to consider what the response of local people in the BRICS countries has been; the way these countries have listened to CS during the pandemic allows for an assessment of gaps with regard to how effective they have been in initiating the processes of democratization and governance reform. Also, it would be interesting to understand if CS and social movements have attempted to work with governments or instead to challenge them.

There has been growing inequality and precarity worldwide, and indeed, the BRICS countries have been characterized by increasing social protests due to this very situation. In reality, however, even before the COVID-19 pandemic the BRICS countries had started to exhibit a wide range of popular responses aimed at protesting diverse social injustices. In fact, even though the group has made strong efforts to overcome social issues like extreme poverty, strong social inequalities remain [Lobato, 2018]. The pandemic crisis has highlighted the many social discrepancies beyond those in BRICS; criticism has arisen around the world of the political measures taken by governments to deal with the crisis, and protests have erupted almost everywhere. However, these protests have been characterized by a lack of coordination and the inability of CS to create a solid network. This was especially due to lockdown measures, which prevented adequate organization. For example, in Italy many voices were raised against the measures taken by the government, accusing it of having created a "state of exception" [Agamben, 2020] to permit the restriction of the fundamental rights of freedom of individuals through measures which were, in certain cases, repressive. These signs of discord were followed by protests by many social groups affected by the drastic measures taken by the government, but which were characterized as being one-off and isolated from one another. Similar developments can be seen in many other countries, raising the question of to what extent these restrictions exercised real social control [Amadeo, 2020]. Sometimes, these were repressive but could probably fall within the logic of coping with such an unprecedented situation. In general, all this has led to a loss of capacity on the part of CS at a global level to maintain and strengthen its network.

Even in the case of BRICS, during the pandemic strong measures have been used to try to deal with the contagion. These measures have also inevitably weakened the organizational capacities of CS. In fact, in India the lockdown has prevented large, organized protests. However, a number of protests have come from migrant workers and from some activist and CS networks. In South Africa, there have been more protests and mobilizations at the local level but they have not been able to achieve coordination at a national level, which activists have aspired to. Also, Russia has witnessed a number of protests "ranging from online live-streams to mass gatherings," above all directed against the way in which government has been dealing with the pandemic [Nilsen, von Holdt, 2020]. In Brazil, much criticism has been directed toward Bolsonaro's handling of the pandemic – at the beginning, he even denied its importance. Civil society networks have organized activities ranging from mutual solidarity to food supplies, demanding healthcare, and talks against the government's actions in dealing with COVID-19. However, it also seems that in Brazil a lack of coordination has characterized these actions by CS. Moreover, the large number of infections has weakened the ability of organized CS to get better results. In China, the majority of protests have been held in Hong Kong, which is undergoing a period of turbulence and political dissent. The coronavirus first appeared in China, and after a severe lockdown to try to contain it, the Chinese government has worked to establish global leadership in dealing with the virus [Larsen, Gramer, 2020; Ninio, 2020].

The situation in the BRICS countries remains quite mixed, as in many other parts of the world. In each country there have been different protest reactions. In some cases, more vehe-

ment, in others less so. The common denominator of these protests, on first reading, seems to show that there has been little coordination at the level of CS. In part, this is because lockdown conditions have not allowed for effective organization and also because one of the most important gaps at the level of CS organizations is precisely the fact that an organizational network is missing. However, the problem seems to become even more acute with respect to relations between the CSs of the five countries. In practice, despite a whole series of initiatives in conjunction with the summits that have thus far been held, it is important in the future to seek greater cooperation and build networks between CS in the various countries.

Therefore, it seems, the pandemic may be weakening those achievements earned by CS in recent years. In short, with COVID-19 it seems that some issues have arisen that highlight certain cracks in the relationship between CS and governments in the BRICS countries. However, at the same time, this crisis may open up new scenarios for CS organizations in these countries.

The Future of Civil Society Within Global Governance: A New Opportunity for the BRICS?

CS in BRICS countries could play a fundamental role in bringing to the centre of the global agenda, with particular reference to the 2030 Agenda, the problems that concern the Global South. However, CS must be included in decision-making processes, something which for now does not seem to take place in full, despite multiple requests for inclusion. In the BRICS countries, this issue has several limitations. In fact, the leadership role of BRICS countries is open to question precisely because of the limited role they give CS, even while China and Russia have claimed world leadership in dealing with the virus, and the institutions created by them (such as the NDB) have responded more quickly to the crisis than those of the western countries [Financial Express, 2020].

In fact, CS still has innumerable shortfalls, as mentioned above. Also, during past summits CS also directed criticism toward BRICS governments. As an example, a People's Forum on BRICS was held in Goa, at the same time as the seventh annual BRICS meeting was also being held there. The aim of the People's Forum was to create a debate between CS, social movements, and academia of the five states. The final declaration of the forum contained many criticisms regarding transparency and accountability of BRICS, regarding its members' extractive policies, and the environmental degradation they have been responsible for instigating [BRICS Policy Center, 2016].

Another initiative has tried many times to warn BRICS of the possible fallout from the way it acts. This is the so-called BRICS From Below. Founded in 2018, this initiative has played, and continues to play, an important role in discussing the possible limitations in different areas of BRICS policymaking [Bond, 2018]: "social justice versus the diplomacy game"; finance, trade and climate negotiations; the work of the NDB and its relations with civil society; discussion about the "subimperial" projection that BRICS may have in its growth, especially in the Global South, and the way in which BRICS operates domestically. In fact, "it is useful to indicate overlapping interests of western and BRICS powers, or ways that BRICS firms penetrate their societies and hinterlands in a manner comparable to Western Multinational Corporations" [Bond, 2018, p. 9].

In practice, this initiative, like others such as the BRICS Think Tank Council (BTCC) and the BRICS Academic Forums, which have regularly gathered since 2009, undoubtedly expresses important issues that BRICS governments should take into account to open up a constructive dialogue. Unfortunately, not all BRICS CS initiatives can be analyzed in this article. However, the importance of all of them lies in the fact that in order to offer greater democratiza-

tion in governance processes, these initiatives should have an important weight in the dialogue between the BRICS and CS.

If BRICS countries really want to provide greater impetus to GG, this can only come about by also giving greater weight to CS. In fact, as stated by H. MacKenzie [2012, p. 165], "CSOs in the BRICS countries must increase their participation in GG by building sustainable relationships with the BRICS multilateral grouping. Large, richer transnational NGOs can contribute to strengthening indigenous CSO capacities to shape their own destinies. Transferring their experience and knowledge on monitoring and advocacy, along with providing needed financial resources will serve to build the free and independent (global) civil society required to further the democratization of global governance in a shifting world."

In recent decades, GG has been subject to several criticisms. Above all, in the view of many scholars, it has reflected the western imprint which has been imposed in the international arena. It has given greater hegemony to western countries in several frameworks: in international trade, international institutions, and also in the field of international cooperation. The structure of GG as it currently exists has been somewhat rejected by those who would like to reshape it, such as BRICS. This bloc has stated in several arenas its desire to provide a new impetus to the international order, so as to reflect the changed world and its commitment to multilateralism. For instance, apart from the UN, the World Bank, and the IMF, BRICS wishes to provide new input within the context of the Group of 20 (G20) framework [Larionova, Shelepov, 2019]. And even though there still exist some contradictions between their stated intentions and what they put into practice [Cooper, 2020], it seems that the objective of their complaints is "leveraging their position inside the G20 for great fairness and equality of the system" [Cooper, 2014, p. 106]. Moreover, BRICS has strengthened policy coordination, the promotion of growth in the world economy, and the development of cooperation among its members, and has become a representative of the emerging world in GG [Xiujun, 2020]. Thus, broadly speaking, its strengthened involvement in the system of GG has resulted in benefits that it can provide by promoting multilateralism within the current world order [Larionova, Kirton, 2018; Stuenkel, 2020]. At the same time, alongside the context of the G20, BRICS can play an important role in the future of global infrastructure [Qureshi, 2017] and in the implementation of the trade-related UN Sustainable Development Goals (SDGs) to international trade [Sakharov, Andronova, 2019].

However, it is still not clear which direction BRICS would like to take in a reformed GG. Indeed, it stated [BRIC, 2009] that it has to reflect the international multipolar order that is already in place, as mentioned above. However, there remain many limitations that need to be overcome by BRICS. One of the most interesting issues to work out is the role that CS has to play in the reshaping of GG. If BRICS really wants to give a major impulse in this field, CS has to play a key role. Several questions arise in this context. First, will it be possible for BRICS to overcome these limitations? Given that the presence of joint projects and greater cooperation between the CS of the BRICS states does not necessarily imply the existence of a strong and established network among them, how can this be managed in the future? Will it be possible to overcome both the internal and external limitations in BRICS' CS? Also, in the future of GG, will BRICS promote democracy and human rights, or is it likely to use political repression [Bond, Garcia, 2015]?

These are key questions (without doubt among many others) that have to be answered in order to give a clearer vision in terms of what kind of GG the BRICS wants to build in the future, above all within a post-pandemic perspective [Petrone, 2021].

Conclusions

If the disastrous global response to the coronavirus pandemic reveals anything, it is that government officials should draw on the knowledge and participation of experts from CS to inform policy decisions. Sometimes government policy has shown interest in dealing with global issues by giving more importance to economic problems (see, for example, the European Stability Mechanism) than in giving importance to those of individuals or society. The economy prevails over humanity; this is not a new thing, but the pandemic crisis has shown more than ever the importance of taking action by taking care of human beings.

In this context, the role of CS is fundamental, because "civil society activities are an enactment of citizenship, that is, they are practices through which people claim rights and fulfill obligations as members of a given polity" [Scholte, 2011, p. 34].

Within the BRICS framework, CS plays an important role for the future. Even though there is still much to do, "civil society organizations within BRICS must pool their resources, campaigns and ideas. They have to form strategic alliances across the BRICS countries. Strategic alliances among BRICS civil society organizations will give them the critical mass not only to influence the BRICS agenda but also give them critical mass to influence the global agenda, debates and priorities of global multilateral organizations" [Gumede, 2018].

The decline of the West [Acharya, 2017; Mandelbaum, 2016] could also have important repercussions in the context of CS. In fact, western CS may have lost sight of its struggles, falling into capitalist schemes, or trying to act as an arm of western, capitalist governments, in order to dominate emerging countries [Petrone, 2013], thereby frustrating more inclusive dialogue.

Thus, if on the one hand, in western countries CS associations often show weak institutional significance and a fragmentation of intentions, in BRICS societies a new scenario may unfold. Although the group is heterogeneous and geographically disadvantaged by the physical distance between member countries, it must be said that there is an effective possibility for it to provide a new impulse to GG in different directions. First, this can be done by giving voice through CS to those who still have little access to democratic dialogue and, therefore, giving a greater impulse to, and increasing participation in, democratic processes. Second, this can be achieved by ensuring that CS acts as a voice for the Global South, raising awareness of the problems faced by people in this part of the world. In this way it can also find a greater voice for CS in the Global North.

In short, distinct scenarios are opening up for BRICS that may require a different approach to issues of a general nature. And these issues could see an increasingly decisive recognition of CS. "BRICS will remain an important factor of international life in the foreseeable future" [Toloraya, Chukov, 2016, p. 81], and if it wants to achieve and maintain a core role in reforming the system of GG, the challenge of achieving a more inclusive CS is key.

Will BRICS be able to meet this challenge? At the moment, it seems that its ability to respond still suffers from several deficits. As discussed in this article, not only are there limitations within the CS of every BRICS country, but also in terms of creating a stronger, cooperative BRICS-level CS network. However, it could be a decisive moment to lay the foundations for new forms of interaction, those which see CS recognized as important and necessary in the tasks that must be carried out in the future of these countries and, in general, in international relations. For example, states could seek to include more CS representatives through practices of dialogue and more active participation. Above all, each BRICS country could try to give more tangible answers to the social issues that CS represents. Initiatives such as the BRICS Civil Forum are very important in this sense and certainly lead to a greater dialogue between institutions and CS. However, the pandemic has given rise to new and major challenges. This

period may be taken as a keystone in the development of new responses to social challenges and therefore, in giving greater weight to the voice of CS. At the same time, the function of CS is important for the correct functioning of governance and for its progressive democratization since "governance is not the sole responsibility of the state, but something in which people participate to decide what is good for them" [Rajesh, Ranjita, 2016, p. 19]. Therefore, we are faced with a two-fold path which involves, on the one hand, the various countries that need to grant greater space for inclusion and participation, and on the other, the members of CS who must act as critical and proactive subjects in order to provoke a greater democratization of governance processes.

A functioning CS in BRICS could also play an important role in the development of multilateralism. Perhaps COVID-19 could be a starting point for reflection on how to create deeper bonds and cooperation for the future. Above all, this should be aimed at trying to avoid what could become a "complex multilateralism" [Woodward, 2008], creating instead a multilateralism that can decisively contribute to providing an ethical and positive boost to GG and the international order.

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