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BRICS: BUILDING *for* RESILIENCE, INNOVATION, COOPERATION, *and* SUSTAINABILITY

Heena Makhija and Jhanvi Tripathi

Editors

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Editors' Note

Heena Makhija and Jhanvi Tripathi

THE YEAR 2026 MARKS TWO DECADES since BRICS was conceived as a platform for strengthening cooperation among emerging economies. In recent years, as structures of global governance have ruptured due to escalating regional tensions, plurilateral forums have emerged as alternative, issue-based agglomerations.

India took over the BRICS presidency in 2026, at a time when geopolitical strife, economic disruptions, energy crises, and supply chain disruptions were escalating, posing a serious challenge to the rules-based international order. Indeed, in the post-pandemic world, this year is proving to be the most disruptive yet in terms of energy costs and trade route disruptions. The shock to the multilateral system and the threat of adverse impacts on efforts at sustainability, climate action, and economic growth, have informed India's BRICS theme for 2026—"Building for Resilience, Innovation, Cooperation, and Sustainability." It is also the theme of this publication.

BRICS, with its expanded membership and mandate, is focusing on navigating discord through sustained dialogue and a realignment of its normative focus towards building a more representative global order. Fast-growing economies across regions seem to have a tacit understanding that addressing pressing development needs is a crucial policy imperative even amidst a turbulent global order.

This compendium has been designed keeping in mind these competing imperatives of navigating international disruptions and the pursuit of economic development and sustainable growth. These essays reflect a genuine meeting of minds, with each being a product of collaboration between experts from the BRICS academic community. Most of the articles in this volume have been co-authored by two experts from different member countries who offer a collaborative and cross-country perspective on the issues in their domain. The volume consists of five sections, each one based on a thematic pillar of the BRICS Think Tanks Council. It also contains shorter think pieces written by the representative heads of the BRICS Think Tanks Council, with the original members contributing reflections on the theme, 'BRICS@20', and the new ones outlining their thoughts on 'The Future of BRICS'.

The essays examine a wide range of areas, including development partnerships, resilient economic systems, technological collaboration, sustainable infrastructure, and people-centric approaches to development. They offer insightful analyses and forward-looking ideas to strengthen cooperation on these issues within the BRICS framework.

The reflections in the 'BRICS@20' section tell us the story so far: BRICS has survived economic crises, fiscal turmoil, regional conflicts (including between members), and a global pandemic. The maturity of the grouping is seen in its recognition of the need for dialogue.

Section 1 deals with various aspects of 'Investing in Resilience' as a systemic imperative. The authors cover issues of financing development, growth, and sectoral focus for such financing. The diversity of BRICS members in terms of economic and social capital means unique solutions are required for similar problems. De-risking investments is a key and recurring thread.

In Section 2—'Innovation for People, Planet and Enterprise'—the authors tackle issues at the crossroads of sustainable and technological innovation and their importance for Small and Medium Enterprises (SMEs). They bring out how the diverse innovation pathways for different members have created an opportunity for a variety of experiences to be shared in a structured manner.

Section 3 then highlights the goal of 'Scaling Sustainability', with the contributors emphasising how BRICS members now account for some of the largest consumers and producers of energy, including both traditional sources like oil and non-traditional sources such as solar energy. They reflect on bilateral examples and their potential to translate into models for collective governance.

'Emerging Technologies' is the theme of the articles in Section 4, taking us through a more forward-looking view of aligning the aspirations of BRICS members on technological growth. From AI to digital currencies, the essays in this section aim to provide a base for policymakers in BRICS countries to attempt a first-mover advantage on effective cooperation in technological governance.

The compendium closes with the section, 'The Future of BRICS', where the new members reflect on what the next few years of BRICS could look like to ensure effective and efficient cooperation that is complementary to the existing BRICS agenda.

As BRICS enters its next decade, the relevance of the grouping will depend on its capability to translate shared aspirations of the emerging economies into meaningful policy outcomes. It is our hope that this compendium will contribute meaningfully to the current academic conversations on BRICS, stimulate a forward-looking approach to cooperation, and serve as a useful resource for policy practitioners working on BRICS and the evolving contours of global governance.

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BRICS@20

BRICS@20

Samir Saran

INDIA'S BRICS (BRAZIL, RUSSIA, INDIA, CHINA, AND SOUTH AFRICA) presidency in 2026 coincides with heightened geopolitical uncertainty, as escalating contestation in West Asia has disrupted global cooperation on connectivity, energy, and trade. Compounded by regional conflicts, the world today faces pressing challenges in global governance, food security, resource security, and the stability of global supply chains. It is against this backdrop, not despite it, that BRICS marks two decades of its existence this year. What began as a nomenclature for economic cooperation has evolved into a formidable voice for emerging economies, one that has had to manage competing interests within the bloc while carrying rising expectations outside it.

India takes the helm of BRICS for the fourth time, and the grouping finds itself intact in its twentieth year. That is worth pausing on before looking ahead. The essays in this volume trace different paths to this same anniversary: a Brazilian account rooted in the India, Brazil and South Africa Forum (IBSA), a Russian analysis rooted in the Russia–India–China (RIC) trilateral, a Chinese case for innovation-led Global South solidarity, a South African reflection on resilience and inclusive development. Read together, they confirm something no single-origin story could: BRICS was never one country's idea. It was a convergence, and convergences are harder to break than inventions.

India's priorities for this presidency, "Building for Resilience, Innovation, Cooperation and Sustainability," reflect the evolving aspirations of emerging economies in an increasingly multipolar world. BRICS today represents over 40 percent of the world's population. That weight is no longer merely symbolic; it has become a catalyst for structural change in global governance and development. The theme of this presidency is a vision for a future where the global arena is finally responsive to a demographic it has underserved for too long.

BRICS has shown that a plurilateral initiative led by emerging economies can build durable structures for issue-based cooperation. At the heart of its agenda lies a long-standing commitment to a more equitable, inclusive, and representative international order, advanced through the reform of global institutions. Over the past decade, BRICS has delivered more than a vision: it has built establishments, expanded sources of development finance, strengthened economic coordination, and amplified the voice of emerging economies. The New Development Bank and the Contingent Reserve Arrangement remain the clearest evidence that collective aspiration, in this grouping, tends to end in concrete architecture rather than communique language. As BRICS enters its next decade, this anniversary is the right moment to take stock of that evolution and chart a more progressive agenda.

At the time of its creation, BRICS' mandate was to bring a plural, democratic lens to a transatlantic-centred system, complementing rather than replacing the institutions already in place. Its recent expansion is a recommitment to that vision, not a departure from it. Its agenda has grown well beyond the original mandate, now spanning development finance and trade, technology governance, climate action, and institutional reform, with active coordination with ministries covering finance, trade, health, science and technology, education, agriculture, counterterrorism, disaster management, and the digital economy, alongside the Leaders' Summit itself.

BRICS and its partners now sit on the front lines of climate action, technological innovation, and the search for sustainable growth models. This is not a regional concern. Some of the world's largest producers and consumers of energy and technology are part of this bloc, which means that cooperation on these themes has global implications by default. Equally, the aspirations of young populations across BRICS geographies— responsive governance, real opportunity, and frameworks built for the future rather than the past—cannot be met by a government acting alone. As the 2030 Agenda winds down, a serious push is needed to help these economies grow through investment in the sectors that will define the next decade.

Four priorities follow from this. On resilience, competition and conflict along critical supply chains must be addressed directly, through a coherent mandate for cooperation and better connectivity between partners. On innovation, enterprise should be encouraged, but not at the cost of people or the planet; India's own experience in building public digital infrastructure at population scale is a working answer to what innovation with guardrails can look like. On sustainability, BRICS can help ideate future approaches to growth by directing finance towards the areas that actually need it. Today, roughly 80 percent of global finance remains locked in the Global North, an inverted structure in which the geographies with the most growth potential are the ones starved of capital to realise it. And on cooperation, the grouping must return to its foundational values: mutual respect, equal sovereignty, inclusiveness, and a genuine faith in multilateralism, not a rhetorical one.

BRICS countries have found common purpose in promoting inclusive growth, strengthening South–South cooperation, and advocating for a more representative international order. Since the bloc's expansion to include partners from Africa, the Middle East, and Southeast Asia, that purpose has only broadened, as has the responsibility to accommodate the growing ambition of emerging markets to shape global outcomes rather than simply respond to them.

The essays in this volume serve as testament to the deep engagement on diverse policy issues that has enabled BRICS to persevere. The ideas presented here resonate across geographies and present a road map for cooperation in a fragmented world. The essays reflect the persistence of what might have been an audacious experiment: to find compromise and cooperate for mutual benefit, regardless of personal rivalries.

Looking ahead, BRICS has both an opportunity and a responsibility to help shape a more resilient, inclusive, and representative global order. Multilateralism remains under strain, and BRICS, now two decades old, carries the experience needed to strengthen cooperation issue by issue rather than wait for a consensus on everything at once. Its strength was never going to lie in speaking with one voice; it is in demonstrating that diversity, anchored in mutual respect and shared purpose, can itself be a durable source of global cooperation, 20 years on and, on the evidence of this volume, still building.

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The Origins of BRICS: A Brazilian Perspective

Luciana Mendes Servo and Walter Desiderá

THE ORIGINS OF BRICS have been examined from multiple angles. For some analysts, the grouping emerged from the convergence of Goldman Sachs' economic projections and pre-existing diplomatic networks among emerging powers.[1] Others emphasise the structural demand for a more representative international order as the key driver, with BRICS serving as an instrument of soft balancing vis-à-vis established powers.[2] South African scholarship has highlighted Pretoria's broader diplomatic strategy, linking BRICS accession to initiatives such as the African Renaissance and the New Partnership for Africa's Development (NEPAD).[3] Russian contributions have stressed the importance of the pre-existing RIC trilateral mechanism and Moscow's initiative to expand it.[4]

Within this plural landscape, Brazil's trajectory offers a unique vantage point. Brazilian diplomacy played a dual role: it helped create the institutional precursors of BRICS—notably the India-Brazil-South Africa Dialogue Forum (IBSA)—and expand the grouping's agenda from political consultation to economic governance.[5] Drawing on diplomatic recollections, official declarations, and the broader scholarly record, this article reconstructs the

Brazilian perspective on the inception of BRICS in 2006. It takes former Ambassador Celso Amorim's account as a primary thread, given his direct participation in the diplomatic efforts that led to the first BRIC foreign ministers' meeting 20 years ago, while situating his perspective alongside the documentary record and complementary scholarship.

This narration highlights a gradual diplomatic process rather than a single founding event, with successive South–South initiatives laying the foundations for new mechanisms of political coordination among major developing countries. Within this trajectory, the IBSA represented, from Brazil's perspective, the principal institutional and conceptual precursor to BRICS.

IBSA: Foreign Policy Coordination and Development Cooperation

The diplomatic trajectory that led to Brazil's engagement with BRICS began in the early days of President Lula da Silva's first administration in January 2003, when South Africa's Minister of Foreign Affairs proposed creating a forum that would bring together major developing countries.[6] The proposal was shaped by South Africa's earlier exclusion from the G-15. Although the G-15 was regarded as an important initiative in South–South cooperation, its relatively large membership limited its effectiveness, and it had not yet embraced the stronger commitment to multipolarity that would later characterise IBSA.[7]

While South Africa initially envisioned a group of seven or eight countries, Brazil proposed a more focused arrangement comprising Brazil, India, and South Africa—three large, multicultural, multiracial democracies located on different continents. Such a configuration would combine geographical diversity with institutional agility and political legitimacy. The proposal advanced quickly: on 6 June 2003, the foreign ministers of the three countries signed the Brasília Declaration, formally establishing the forum.[8]

IBSA rapidly became an important instrument of Brazilian foreign policy. Its combination of political dialogue and technical cooperation in areas including education, science, technology, healthcare, culture, and development assistance became one of the forum's defining characteristics.[9] The initiative also attracted considerable international attention. Javier Solana, then European High Representative for Foreign Affairs and Security Policy, repeatedly expressed interest in holding dialogue with the group.[10] Russian Foreign Minister Igor Ivanov asked why Russia had not been included, while Chinese Premier Wen Jiabao praised the initiative on another occasion.[11] These reactions suggested that IBSA had acquired diplomatic interest beyond its membership and that closer coordination among major developing countries was becoming politically significant.[12]

BRIC: Russia's Initiative and Political Institutionalisation

The political viability of cooperation among Brazil, India, and South Africa attracted interest in sustained dialogue among influential developing countries.[13] The immediate initiative to transform British economist Jim O'Neill's economic acronym into a political forum came from Russia. During the United Nations General Assembly in 2006, Foreign Minister Sergei Lavrov proposed that Brazil, Russia, India, and China begin meeting as a political group.[14]

The idea drew on the pre-existing RIC trilateral—a flexible dialogue format established among Russia, India, and China in 2001—and sought to incorporate Brazil as the fourth pole of an emerging-power coalition. Further meetings in 2007 established a regular diplomatic consultation that has endured for two decades. Another milestone occurred in May 2008, when the foreign ministers met in Yekaterinburg for the first stand-alone ministerial meeting held specifically under the BRIC framework. By moving beyond meetings held on the margins of the United Nations, the four governments strengthened the group's institutional identity, continuity, and public visibility.

Brazil also contributed by proposing, during the 2006 consultations, meetings of finance ministers, thereby extending cooperation beyond political consultation to systematic coordination on global economic governance.[15] The 2008 global financial crisis accelerated this process. As weaknesses in existing institutions became increasingly evident, BRIC assumed a more visible role in discussions concerning the G-20, the International Monetary Fund, and the World Bank. The crisis demonstrated that the four countries represented more than an analytical investment category: they had become political actors capable of coordinating positions on reforming international economic governance.[16]

These developments culminated in the first BRIC Summit in Yekaterinburg in 2009, elevating cooperation to the level of heads of state and government and confirming the coalition as an established diplomatic mechanism. The group emerged through diplomatic interaction rather than through a predetermined design: Russia initiated the political process, Brazil expanded its agenda, India and China sustained the dialogue, and the global financial crisis reinforced the strategic importance of closer coordination among the four emerging powers.

South Africa's Accession: from IBSA to BRICS

South Africa's accession resulted from a gradual process of political convergence. Longstanding cooperation within IBSA, alongside the country's growing engagement with BRIC, created favourable conditions for membership.[17] There was a turning point in 2010, when Brasília hosted the IBSA and BRIC summits in close succession. A dinner involving BRIC leaders and the South African delegation created an opportunity for informal interaction that resembled a preliminary invitation. Although South Africa did not formally participate in the BRIC summit itself, the episode demonstrated the growing political compatibility between the two initiatives.

South Africa's interest also reflected its broader diplomatic strategy under President Thabo Mbeki, aimed at strengthening Africa's international role. In this context, BRIC's commitment to a more representative international order closely aligned with South African foreign policy objectives.[18] Formal accession in 2011 transformed BRIC into BRICS, broadening the grouping's geographical representation while reinforcing its claim to represent major emerging regions of the developing world.

Nevertheless, the expansion did not blur the institutional distinction between IBSA and BRICS. IBSA continued to focus on political coordination, technical cooperation, and development partnerships among three major democratic developing countries, whereas BRICS evolved into a broader platform for coordinating positions on international political and economic issues and advocating reforms of global governance institutions.[19] The two organisations therefore developed as complementary rather than competing initiatives.

Conclusion

Two broader ideas emerge from these accounts. First, the central intellectual thread connecting the successive stages of this diplomatic trajectory is the pursuit of a non-hegemonic, multipolar international order. Rather than reproducing existing hegemonic arrangements, BRICS seeks to broaden developing countries' participation in international decision-making and promote a more representative distribution of influence within global governance institutions. This objective has remained sufficiently flexible to accommodate members with different political systems, geopolitical interests, and diplomatic traditions.[20]

Second, the origins of BRICS are necessarily multiple. The acronym gave international visibility to Brazil, Russia, India, and China as major emerging economies, but the coalition emerged from distinct diplomatic efforts by its members. These narratives are complementary rather than contradictory: Russia's initiative to institutionalise the BRIC format converged with Brazil's prior experience in IBSA, India's and China's sustained engagement in multilateral reform, and South Africa's strategic interest in a broader emerging-power platform.[21] Appreciating these multiple origins highlights one of the coalition's defining characteristics: its ability to accommodate diverse national perspectives while constructing a common framework for cooperation in pursuit of a fairer international order.

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The authors used Claude Sonnet 5 (Anthropic) to review the English-language phrasing of this article. All analysis, arguments, and conclusions are the authors' own.

Endnotes

1 O. Stuenkel, *BRICS and the Future of Global Governance* (London: Routledge, 2014).

2 G. Fonseca Jr., "BRICS: notas e questões," in *O Brasil, os BRICS e a agenda internacional*, ed. J. A. Pimentel (Brasília: FUNAG, 2013); M. R. Lima and J. Castelan, "A institucionalização do conflito: BRICS e a reconfiguração da ordem internacional," in *O Brasil, os BRICS e a agenda internacional*, ed. J. A. Pimentel (Brasília: FUNAG, 2013).

3 A. Sooklal, "BRICS Is the Future" (New Delhi: BRICS Expert Council - Russia, 2026), YouTube video, https://youtu.be/tXggkWCWa84.

4 M. Skak, "Russia and the BRICS," in *The International Political Economy of the BRICS*, ed. L. Xing (London: Routledge, 2019).

5 Celso Amorim, "Fala sobre os BRICS — Aula 1" (Santo André: OPEB/UFABC, 2021), YouTube video, https://www.youtube.com/live/O0ITTKuSxG0?si=nSX6quo62fd0_gu8.

6 Amorim, "Fala sobre os BRICS."

7 Celso Amorim, "Brasil no BRICS — Celso Amorim, assessor especial da Presidência da República" (Brasília: CanalGOV, 2025), YouTube video, https://youtu.be/MXrJWsBMNN4?si=5tDbewUrKAw3APFg.

8 K. Medeiros, *O grupo BRICS em sua trajetória* (Porto Alegre: Evangraf, 2023).

9 T. Vigevani and G. Cepaluni, *Brazilian Foreign Policy in Changing Times* (Lanham: Lexington Books, 2009).

10 Celso Amorim, "Conversas sobre o BRICS — Embaixador Celso Amorim" (Brasília: FUNAG, 2025), YouTube video, https://youtu.be/mwwdbbX1ckI?si=ab_Q_JE4N3ibsJUv.

11 Amorim, "Conversas sobre o BRICS".

12 Lima and Castelan, "A institucionalização do conflito."

13 Stuenkel, *BRICS and the Future of Global Governance.*

14 Amorim, "Brasil no BRICS."

15 Lima and Castelan, "A institucionalização do conflito."

16 A. C. Ouro-Preto, "Nova confirmação de poder," in *O Brasil, os BRICS e a agenda internacional*, ed. J. A. Pimentel (Brasília: FUNAG, 2013).

17 Amorim, "Brasil no BRICS."; Sooklal, "BRICS Is the Future."

18 Sooklal, "BRICS Is the Future."

19 Fonseca Jr., "BRICS: notas e questões."

20 Fonseca Jr., "BRICS: notas e questões."; Stuenkel, *BRICS and the Future of Global Governance.*

21 Amorim, "Os BRICS e a reorganização do mundo."; Lima and Castelan, "A institucionalização do conflito."; Sooklal, "BRICS Is the Future."

BRICS@20: Beacon of Hope for Some, A Threat to Others

Victoria V. Panova

DESPITE THE SIGNING OF the MoU between the United States (US) and Iran on 17 June 2026[1] and the possible avenue for much-wanted peace in the Middle East—at least the Gulf region of it—the situation remains precarious at the time of writing this article, as evidenced by the resumed US strikes against the Islamic Republic. This development has contributed to higher global risks and instabilities. Global governance continues to evolve in unpredictable ways, with the US having ambitions to be the principal or even sole rule-maker. Instead, it offers multiple avenues for the breach of international law or even rules once established,[a] but no longer satisfying the hegemon.

The G7 this year tried to reconsolidate, but its time has irreversibly passed, as the words on global responsibility, often used by the grouping in its half-a-century-long history, no longer hide the intention to weaken every non-

a Speaking of the "rules-based order" of which the West is talking in abundance, often supplementing the international law with rules based order per se.

Western country seen as outsider and keep its ruling space intact. The G20 compromised its relevance after the current US chair ousted South Africa;[2] however, the grouping only had limited powers, mostly confined to economic and social issues.

The BRICS grouping seemed to have suffered, as the aforementioned conflict placed its newest members on opposite sides of the war.[b] Observers often see crisis bringing a fresh wave of renewal and opportunity; however, this would be a simplistic reading of the BRICS scenario. The conflict loomed over the grouping at a precarious initial stage, soon after it expanded with six new member states and 10 partners, yet with no clear definitions or understanding of commonality among them.

This situation unfolded as India assumed chairmanship of the grouping in 2026 and navigated the aforementioned developments by widening its scope. However, the non-contested priorities of resilience, innovation, cooperation, and sustainability allowed the grouping to continue working for a broader cause and setting the scene for a fair global model of international relations, despite ongoing divisions of bilateral tracks. Thus, despite the lack of a joint communique at the closing of the foreign ministers' meeting in mid-May, it is evident that none of the parties opted to leave the grouping and continued work despite pressing bilateral issues.

Although it is quite certain that this conflict will cast a shadow on BRICS' ability to maintain a unified stance on the most acute challenges confronting the grouping—e.g., the approach to regional conflicts, or the speed of connectivity projects—BRICS has demonstrated that it can weather the storms as the rationale to preserve its unity runs deeper. This article will examine how BRICS was perceived over the past couple of decades and what principles facilitate deeper bonds and cement its foundational principles. In BRICS' infancy, it received attention from officials and experts of the core G7 countries who regarded the grouping negatively; more recently, some leaders had made alarmist calls to stop what they referred to as a threat

b While Iran was attacked by the US and Israel, it had to strike back and its response caused harm to regional powers, including new fellow BRICS members, such as UAE, which houses American military bases on its territory.

c Jim O'Neil is often mistakenly presented as the inventor of BRICS mechanism.

to Western dominance.[3] The most neutral researchers, like Jim O'Neil[c] and his colleagues had numerous approaches to the matter, and one of their most alarming articles, which foresaw BRICs[d] surpassing the G7 countries not earlier than 2032, proved modest and underestimated the former over time.[4] What is important, though, is that hopes of bilateral possibilities offered to most pro-American BRICS members with the US or EU and generalised threats of tariffs from Trump did not serve the purpose. BRICS still has reason to be. None is going to reject bilateral benefits with the US, or EU, or Japan or any other country or bloc, but those are not tradable, and BRICS remains a benefit in itself.

Over two decades since its inception, BRICS has cemented its status as the world's most reputable multilateral institution. Today the Western bloc acknowledges that its earlier approach to BRICS should be revisited to ensure better chances for what Rubio has called the need to embrace a shared "civilizational union".[5] BRICS, despite initial neglect and later stages of fury and denial on the part of the West, as well as the difficult road to its expansion, appears to be the only grouping fit for the daunting task of global governance reform and creating a new formula for cooperation.

The grouping now stands at the turning point of becoming a metaphorical young adult: one with responsibilities, basic education and skills, and a fresh look at the world. What it lacks, though, is a maximalist approach to right and wrong, and a readiness to fight tooth-and-nail against injustice. Yet, this very same non-maximalist nature allows the young leader to retain wisdom and sometimes the overly cautious nature of the older generations.

Chronicling the exact starting point of this ambitious endeavour is immaterial: whether it be the first BRICS Summit in Yekaterinburg in 2009 or the countdown with the Four Ministers' Meeting on the sidelines of the UN in 2006. The year 2006 notably saw Russia still maintaining good relations with the West and presiding over the G8 grouping for the first and last time in such a capacity for that mechanism. Importantly, the meaning of this presidency

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d Small 's' is preserved as in the Goldman Sachs report, with only four countries featured for comparison with the Western world.

e The priorities of the Russia's G8 Presidency in 2006 comprised energy security, education, and health, which were important to tackle not just for the G8 countries, but for the whole world.

ran well beyond the fact of a globally relevant chosen agenda.[e] The key strategic decision was to ensure that the then Outreach Five, comprising all the current BRICS members, were well informed and consulted to ensure that there was a real reflection of member countries' interests in the documents prepared for the G8 St. Petersburg Summit. It also laid the ground for intense cooperation between Russia and the Outreach Five not just on priority topics of the G8 presidency, but on key development issues of technological exchange, economic and trade cooperation, global governance, and social advancement.

Moreover, the Russian view on the grouping was ahead of its time, as evidenced by renowned Russian politician and academic Eugene Primakov's concept of a strategic triangle of Russia-India-China (RIC), with outreach to Latin America as a strategic region of the Global South, as early as in 1998.[f] This was the first such wake-up call for the new Russia to witness how the world has transformed and to revisit its true national interests on the global stage.

Today the world is a fundamentally different place: BRICS is now the key mover in international politics; the heavyweight has moved to the Global South; globalisation, once seen as the biggest achievement of the international community, has led to fragmentation and an open statement of an egoistic power stand-off; and the geriatric world has opted for conflict over true dialogue and mutual respect. The G7, while continuing to lose its real power[g] and trying to retain it through aggressive preservation of the status quo, has come to realise, if not fully understand, the changed realities of our time.

France, as G7 chair, continued efforts to co-opt—even if under its proper terms—the BRICS members with its invitation to India, Brazil, Egypt, and

f Although his first public statement mentioning the "strategic triangle" concept came out only in 1998, during Primakov's visit to India, he launched efforts to promote multi-vector diplomacy with a bigger role for Asia, Latin America, and Africa, moving away from over-reliance on the West starting from 1996, when he was appointed Minister of Foreign Affairs of Russia.

g Comparisons on basic figures of GDP PPP of BRICS countries, as well as G7 countries can be found in the website of the BRICS Expert Council-Russia. See: https://bricscouncil.ru/en/analytics/monitoring-effektivnosti-sotrudnichestva-stran-briks-2025-2026.

the United Arab Emirates (UAE) to the Summit in Evian this year.[6] It did not yield the desired outcome as the Indian chair did not side with the G7 documents, be it on geopolitical issues, or the G7 vision on more balanced, durable and resilient growth, but with those on the fight against cancer and Ebola.[7] This was a clear indication that none of the BRICS members is ready to compromise on their interests and would remain in the realm of pragmatic cooperation despite any threat. Indeed, the pushiness of Western stakeholders binds BRICS together much better than any of the existing projects within the grouping.

At the same time, Western fears surrounding BRICS' mere existence do not shape its relevance. The initial stages of BRICS' operations may have fallen on hard times vis-à-vis the global economic and financial crisis, the demise of the unipolar moment, and the start of the ever-growing geopolitical confrontation. Despite fears, or in some instances, hopes, this only made the grouping more resilient and allowed it to mature faster than any other known international mechanism.

It boldly launched its own institutions in the most daring area of financial and development cooperation. It demonstrated civilisational wisdom in offering the third way instead of direct confrontation with detractors, as was the case with the creation of the New Development Bank in 2014.[h] The grouping has been characterised by positive agendas and result-oriented decision-making, and mutual respect and consideration of each other's red-lines, allowing for durable, but not necessarily fast solutions. The BTTC Indicator System[8] and Monitoring report,[9] together with the Portfolio of BRICS initiatives, track all progress and check for possible bottlenecks in the group's cooperation.

BRICS is indeed a highly diverse grouping, as pointed out by external observers. Each country stands firm to protect its national interests. Unlike the G7, it is much less of a monolith, offering more divergence and a more

h BRICS has been fighting for the reform of IFIs since its inception, and one of its first victories could be seen in the agreed change of quota within IMF in 2010, offering a slightly more fair share to developing countries. Nevertheless, further negotiations stalled and while talks were ongoing to introduce necessary reforms to the functioning of the IMF and World Bank group, BRICS started filling the gaps by creating institutions and instruments of their own, such as the New Development Bank (NDB) and the Contingency Reserve Arrangement (CRA).

difficult field for interpretation, while ensuring that domination and the quest for unification are unanimously rejected. None of the members is strong enough to push others in a predetermined direction, and outcomes continue to be subject to extensive negotiations and controversies. However, none of the member states is ready or strong enough to lead without its partners.

The grouping fits well as a collective leader within the realm of multipolarity, as pure unipolarity or even multi-unipolarity is no longer adequate to manage and mitigate global challenges. The question remains as to whether they are ready to lead, instead of hiding behind rhetoric and false modesty. It is not enough that BRICS fronts appealing principles; the desire to be non-conflictual, and sweeten the pill of lost primacy for the West, in good faith.

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Endnotes

1 Arab Center Washington DC, "The Full Text of the Memorandum of Understanding Between the United States and Iran," June 17, 2026, https://arabcenterdc.org/resource/memorandum-of-understanding-between-the-united-states-of-america-and-the-islamic-republic-of-iran/

2 TRT Afrika, Trump Removes All South Africa Traces from G20 Website as US Assumes Presidency," December 2, 2025, https://www.trtafrika.com/english/article/05db5334b4b3

3 Andrea Shalal, "Trump Says BRICS Would End Quickly If They Ever Form in a Meaningful Way," *Reuters*, July 19, 2025, https://www.reuters.com/world/africa/trump-says-brics-would-end-quickly-if-they-ever-form-meaningful-way-2025-07-18/

4 Jim O'Neill and Anna Stupnytska, "The Long-Term Outlook for the BRICs and N-11 Post Crisis," *Global Economics Paper No: 192*, Goldman Sachs, December 4, 2009, https://www.goldmansachs.com/insights/goldman-sachs-research/long-term-outlook

5 Office of the Spokesperson, US Department of State, "Secretary of State Calls on European Leaders to Defend Western Civilization in Munich Security Conference Speech," February 14, 2026, https://www.state.gov/releases/office-of-the-spokesperson/2026/02/secretary-of-state-calls-on-european-leaders-to-defend-western-civilization-in-munich-security-conference-speech-2

6 Elysee, "2026 G7 Summit in Evian," June 2026, https://www.elysee.fr/en/emmanuel-macron/2026-g7-summit-in-evian

7 Rajiv Bhatia, "G7 Evian Summit Matters," Gateway House, June 25, 2026, https://www.gatewayhouse.in/g7-evian-summit-matters/

8 BRICS Think Tank Council, "Recommendations of the 16th BRICS Academic Forum 2024 to the Leaders of BRICS Countries," May 2024, https://bricsthinktankscouncil.org/knowledge-base/recommendations-of-the-16th-brics-academic-forum-2024-to-the-leaders-of-brics-countries/

9 BRICS Expert Council - Russia, "BRICS Cooperation Progress According to the BTTC Indicator System 2025/2026," June 1, 2026, https://bricscouncil.ru/en/analytics/monitoring-effektivnosti-sotrudnichestva-stran-briks-2025-2026

Deepening Greater-BRICS Cooperation for Global Governance Reform

Zhibing Yuan

BRICS COOPERATION HAS UNDERGONE a remarkable transformation over the past two decades. During this period, BRICS countries have aligned with broader trends of multipolarity and economic globalisation, upheld the spirit of openness, inclusiveness, and mutually beneficial cooperation, and steadily advanced practical cooperation across a wide range of fields. BRICS has become an important platform for solidarity and cooperation among emerging markets and developing countries, as well as an important force driving the global governance system towards greater fairness and equity.

The vitality of BRICS cooperation derives from a shared pursuit of development, an open and inclusive vision, and a strong spirit of solidarity and collaboration. BRICS countries respect one another's national conditions, development paths, and civilisational traditions. BRICS countries build consensus through engagement on an equal footing, expand common interests through practical cooperation, and strengthen institutional resilience by jointly responding to common challenges. BRICS is neither an exclusive grouping nor one that engages in bloc confrontation or targets third parties. Instead, it is built on the three pillars of political and security cooperation; economic, trade, and financial cooperation; and people-to-people exchanges.

BRICS is committed to promoting world peace and stability, common development, and mutual learning among civilisations.

The latest round of BRICS expansion has ushered in a new stage of Greater-BRICS cooperation. More emerging markets and developing countries have joined the BRICS family, reflecting the shared aspirations of the Global South to participate more actively in international affairs, safeguard its legitimate rights and interests, and promote institutional reform. A 'Greater BRICS' enjoys broader representation, more diverse development experience and stronger potential for cooperation, while also shouldering greater responsibilities in our times.

The world today is undergoing accelerating changes unseen in a century. The international landscape is marked by intertwined instability and transformation, while global economic recovery remains sluggish. Protectionism and unilateralism are on the rise, the stability of industrial and supply chains is under strain, and challenges concerning food security, energy security, climate change, the technological divide and debt pressures are increasingly interconnected. Countries of the Global South face even more arduous development tasks and increasingly urgent demands for equitable, inclusive and sustainable development. At the same time, the collective rise of the Global South is profoundly reshaping the international balance of power and the landscape of global governance.

At this critical juncture, BRICS countries should continue to uphold the spirit of openness, inclusiveness, and mutually beneficial cooperation, promote the high-quality development of Greater-BRICS cooperation, and enable the BRICS mechanism to better pool the strength of the Global South, reflect the voices of the Global South, and safeguard the interests of the Global South. BRICS should actively participate in the reform and development of the global governance system and make more meaningful contributions to building a community with a shared future for humanity.

Strengthening development resilience is a key priority for Greater-BRICS cooperation. As global challenges intensify, the global development deficit has become more pronounced. For the Global South, resilience extends beyond restoring previous conditions; it requires strengthening the capacity for independent development, consolidating industrial foundations, safeguarding food and energy security, improving public health systems, and enhancing risk response capabilities. BRICS countries should deepen practical cooperation in trade, finance, infrastructure, agriculture, health, and industrial and supply chains, and work together with the broader Global South to firmly keep the initiative for development in their own hands.

Innovation-driven development is the fundamental driver for Greater-BRICS cooperation. As the new phase of scientific and technological revolution and industrial transformation continues to deepen, emerging technologies such as in the areas of the digital economy, artificial intelligence, clean energy, biotechnology, space, and advanced manufacturing, are reshaping the global competitive landscape. Scientific and technological innovation should serve development, benefit people, and promote greater equity. BRICS countries should strengthen cooperation in digital public goods, artificial intelligence, technology transfer, talent development, open science, and innovation networks, while working to bridge both the digital and technological divides. Emerging technologies should become new opportunities for countries of the Global South to achieve leapfrog development, rather than new barriers to equality.

Deepening practical cooperation is the fundamental guarantee for the steady and sustained development of Greater-BRICS cooperation. In an international environment marked by growing uncertainty, instability, and insecurity, countries need dialogue rather than confrontation, openness rather than isolation, and cooperation rather than decoupling. BRICS countries should uphold genuine multilateralism, actively support the United Nations in playing its role, advance reforms in the international financial architecture, and enhance the representation and voice of the Global South. Institutions such as the New Development Bank should play a greater role in infrastructure development, green transition, and sustainable development financing, thereby providing practical support for improving global governance.

Promoting green development is an important growth area for Greater-BRICS cooperation. Building a green BRICS and creating a “golden future” are important choices for BRICS countries to align with the trends of the times and advance global sustainable development. There is vast scope for cooperation among BRICS countries in renewable energy, green finance, sustainable agriculture, climate-resilient infrastructure, biodiversity conservation, and low-carbon technologies. They should strengthen policy coordination on green development, deepen cooperation on green technologies, promote linkages among green industries, and enhance green financial support, so as to advance the global green and low-carbon transition towards a path that is more equitable, sustainable, and responsive to the needs of the Global South.

Think tank cooperation is an integral part of the BRICS cooperation mechanism. The BRICS Think Tank Council should play its due role in providing intellectual guidance, policy recommendations, channels for public communication, and knowledge support. It should help jointly assess global trends, answer the questions of our time, develop practical solutions, and tell the BRICS story effectively.

We should strengthen joint research on key issues such as global governance, development financing, green transition, scientific and technological innovation, food security, and people-to-people and cultural exchanges and produce more substantial, valuable, and policy-relevant research outcomes. The China Council for BRICS Think Tank Cooperation stands ready to work with the leading think tank institutions of all BRICS member countries to build consensus through ideas, foster cooperation through knowledge, and strengthen mutual trust through exchanges, thereby contributing wisdom and strength to building a more resilient, innovative, cooperative, and sustainable future for BRICS.

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BRICS@20: Building for Resilience, Innovation, Cooperation and Sustainability

Mogomme A. Masoga

TWENTY YEARS SINCE ITS INCEPTION, BRICS stands at an important historical and geopolitical moment. What began as a partnership seeking greater participation for emerging economies within global governance has evolved into a valuable platform for political dialogue, developmental cooperation, intellectual exchange, and strategic engagement amongst countries of the Global South. As BRICS reflects on two decades of cooperation, this moment invites not only a celebration of its achievements but also a deeper reflection on the responsibilities and possibilities that lie ahead for the grouping and the broader international community.

The BRICS journey has unfolded during a period of profound global transformation. Over the past two decades, the international system has experienced recurring economic crises, geopolitical tensions, climate emergencies, technological disruptions, weakened confidence in multilateral institutions, and widening developmental inequalities. From the devastating floods experienced across parts of Africa and Asia to the lingering social and economic consequences of the COVID-19 pandemic, recent years have revealed the profound vulnerability of societies to interconnected global crises. These realities have exposed the limitations of existing global governance arrangements and reinforced the urgent need for more inclusive, representative, and equitable forms of international cooperation. In many respects, the evolution of BRICS has been shaped by a shared recognition that the voices, experiences, and developmental aspirations of the Global South must occupy a more central place in global decision-making.

For South Africa, BRICS has represented far more than an economic or diplomatic platform. It has become an important space for advancing solidarity between developing nations, strengthening South-South cooperation, and promoting sustainable development, peace, social justice, and human-centred progress. South Africa's participation in BRICS has consistently been informed by a broader Pan-African and Global South outlook rooted in partnership, mutual respect, shared development, and the pursuit of a more balanced international order.

BRICS has also demonstrated the growing significance of intellectual cooperation and knowledge diplomacy in shaping international relations. Through platforms such as the BRICS Think Tank Council (BTTC) and BRICS Academic Forum, as well as research collaborations and other people-to-people engagements, the grouping recognises that sustainable cooperation cannot rest on economic interests alone. It must equally be anchored in dialogue, shared knowledge production, mutual learning, cultural understanding, and collaborative problem-solving. The strengthening of intellectual and academic cooperation between BRICS countries therefore remains essential in fostering long-term institutional resilience and strategic cohesion.

As BRICS enters its third decade, the themes of resilience, innovation, cooperation, and sustainability carry particular relevance. These themes speak directly to the lived realities of many societies across the Global South. They remind us that development in the twenty-first century can no longer be understood purely in economic terms. Rather, development must also encompass social inclusion, environmental responsibility, institutional adaptability, technological equity, cultural dignity, and the protection of human livelihoods.

Resilience has emerged as one of the defining imperatives of our time. Recent global developments have demonstrated the vulnerability of societies to economic shocks, pandemics, conflict, climate-related disasters, food insecurity, and energy instability. Yet, across communities confronting rising costs of living, unemployment, environmental degradation, and deepening inequality, the Global South continues to demonstrate remarkable resilience through innovation, solidarity, community-centred knowledge systems, and adaptive forms of development. These realities have reinforced the importance of cooperation that is not only strategic in orientation, but humane in purpose.

The future of BRICS will therefore not be determined solely by economic strength, but by the collective capacity of its members to build systems of cooperation rooted in dignity, solidarity, sustainability, and shared humanity. In this regard, the future strength of BRICS will depend not only on institutional expansion, but on the grouping's ability to transform solidarity into practical cooperation capable of improving the lives of ordinary people. This includes strengthening collaboration in areas such as climate finance, industrial transformation, sustainable infrastructure, food security, health systems, digital innovation, biodiversity conservation, and inclusive economic growth. Institutions such as the New Development Bank, alongside collaborative policy and academic platforms, will continue to play an important role in supporting these objectives.

Equally important is the recognition that sustainable development cannot be separated from questions of knowledge, identity, and cultural heritage. The BRICS countries collectively represent some of the world's richest civilisational histories, cultural traditions, and Indigenous Knowledge Systems. These knowledge traditions continue to offer important perspectives on environmental stewardship, social cohesion, community resilience, and sustainable living. At a time when communities across the world are confronting biodiversity loss, water insecurity, and the erosion of traditional ecological systems, there is a growing need to ensure that Indigenous Knowledge Systems and community-centred approaches are meaningfully incorporated into policy discourse and development frameworks.

The expansion of BRICS membership marks an important new chapter in the evolution of the grouping. The inclusion of new member states reflects BRICS' growing relevance and appeal as a platform for cooperation amongst countries seeking a greater role in global governance. However, expansion also carries important responsibilities. It calls for deeper institutional coordination, strengthened trust, mutual respect, and sustained commitment towards collective developmental objectives. The future credibility of BRICS will ultimately depend on its ability to maintain cohesion while embracing diversity across political systems, regions, cultures, and developmental experiences.

At BRICS@20, there is an opportunity to renew the foundational spirit that has guided cooperation over the years—a spirit grounded in dialogue, partnership, mutual benefit, and shared aspirations for a more just and balanced world order. This requires moving beyond symbolic cooperation towards practical implementation, measurable impact, and people-centred development outcomes. It equally requires strengthening institutional mechanisms capable of supporting long-term cooperation across sectors including education, research, innovation, trade, energy, technology, governance reform, and sustainable development.

This compendium is being published at a particularly important moment in the BRICS journey. By bringing together perspectives from across member countries, it contributes to the ongoing intellectual and policy conversation on the future of BRICS cooperation in a rapidly changing global environment. These essays reflect a shared understanding that resilience, innovation, cooperation, and sustainability are deeply interconnected and will remain central to shaping the future of global development and multilateral engagement.

As South Africa reflects on BRICS@20, it does so with appreciation for the progress achieved while recognising the work that remains. In an era increasingly marked by fragmentation and uncertainty, BRICS carries a responsibility to contribute towards building a more humane, equitable, and resilient global order anchored in partnership, dignity, cooperation, and shared progress for present and future generations.

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I.

Investing in Resilience: A Systemic Imperative

Investing in Systemic Resilience within BRICS: Policy Pathways for Sustainable and Inclusive Growth

Vladimir Zuev and Marianne Youssef

Abstract

AMIDST RISING INTERCONNECTEDNESS and cascading global shocks, systemic resilience has become a strategic framework for sustainable development rather than a purely defensive response to crises. For BRICS economies, resilience requires continuous strengthening of economic systems to remain robust, adaptive, and able to capture opportunities in multipolar payments, energy transition, artificial intelligence, and regional industrial cooperation. This article examines nine interconnected structural challenges facing the bloc. A Russian–Egyptian case study illustrates how diversified trade, industrial localisation, energy infrastructure, human-capital development, and institutional linkages can address multiple vulnerabilities. Policy priorities centre on regional connectivity, adaptation finance, digital and AI readiness, demographic resilience, and stronger institutional coordination to convert BRICS' collective weight into lasting economic strength.

Introduction

Why Resilience Matters Today

The global economy is characterised by rising interconnectedness. Shocks originating in one domain—an energy-price spike linked to conflict in the Middle East, disruptions to key maritime routes, particularly the Strait of Hormuz, damage to energy infrastructure, or the rapid diffusion of generative artificial intelligence—can propagate through trade, financial, logistical, and labour networks. Conventional resilience strategies focused on individual supply chains or individual national buffers are therefore insufficient. What is required is systemic resilience: the capacity of an interdependent system of systems to anticipate, absorb, adapt to, and transform in the face of shocks while preserving essential functions and development trajectories.[1]

In this environment, resilience is no longer limited to crisis response; it has become a strategic framework for sustaining economic stability, safeguarding development gains, and enhancing long-term competitiveness. According to the Organisation for Economic Co-operation and Development (OECD), 'systemic resilience' refers to the ability of systems to anticipate, absorb, recover from, and adapt to shocks within highly interconnected environments where disruptions can spread rapidly across sectors and borders. This approach emphasises integrated and forward-looking policies.[2]

However, resilience is often perceived mostly as the capacity to mitigate shocks and crises. This article adopts a broader understanding of the concept. Numerous challenges have yet to result in shocks, while opportunities to strengthen national economies exist even in the absence of crises. For instance, the use of the US dollar could remain dominant for decades without causing major shocks to the global economy. However, the dollar-based system could eventually face a challenge, just as the Bretton Woods system of fixed exchange rates and dollar-gold convertibility ended in 1971.[3] A multipolar international payments system that relies not solely on the US dollar but also on other currencies and payment mechanisms could provide greater diversification and resilience.

Systemic resilience therefore requires economic policies that encompass different areas of economic activity to support sustainable development. A resilient economy is built not only in response to shocks or to facilitate adaptation and recovery, but continuously, by strengthening sectors across the economy, improving adaptability to change, and enhancing the capacity to incorporate technological and other developments for societal well-being. The objective of systemic resilience is thus a sustainable economy resistant to shocks, ready for and receptive to changes.

Why Systemic Resilience is Important for BRICS

Systemic resilience holds particular significance for BRICS economies given their expanding role in the global economy and increasing exposure to external shocks. The expanding role of the bloc in the global economy means no less for resilience than exposure to shocks. While resilience is often understood as the ability to recover from or adapt to shocks, systemic resilience extends beyond crisis response. A government that fails to harness opportunities arising from the widespread adoption of Artificial Intelligence (AI) or the environmental benefits of the energy transition cannot be considered fully and systemically resilient.

Over the past two decades, the grouping has emerged as a driver of global economic activity. Collectively, its members account for approximately 49 percent of the world's population, around 40 percent of global GDP measured at purchasing power parity (PPP), and nearly 26 percent of global trade.[4] Their share of global FDI inflows rose from 15.2 percent in 2003 to a peak of 34.9 percent in 2020 before stabilising at 21.9 percent in 2024. At the same time, outward FDI expanded, rising from 2.99 percent to 15.1 percent over the same period.[5] In manufacturing, the bloc contributes more than half of global value added in several strategic sectors, although China alone accounts for most of the medium- and high-technology output.[6] Structural disparities persist: manufacturing value added as a share of GDP ranges from 10–13 percent in Brazil and South Africa to above 24 percent in China,[7] and the Competitive Industrial Performance (CIP) index reveals wide gaps (see Figures 1 and 2 in the Annexes). These differences place members at varying positions within global production networks. Consequently, an exogenous shock affecting a single variable can cascade asymmetrically across the bloc. Without a shared conceptual and institutional architecture for systemic resilience, BRICS risks remaining a collection of individually resilient but collectively fragile economies.

Against this backdrop, the future trajectory of BRICS will depend not only on its aggregate economic weight but also on its collective capacity to strengthen systemic resilience. Strengthening resilience across monetary and financial systems, supply chains, trade and investment patterns, food and energy security, physical and digital infrastructure, climate adaptation—all are central to the bloc's role in promoting a more balanced, sustainable, and inclusive global economic order. Departing from this perspective, the following section examines the key structural and emerging challenges facing BRICS economies. This is followed by a case study on Russian-Egyptian economic cooperation, which illustrates practical bilateral pathways to advance shared sustainability and resilience goals within the BRICS framework.

Identifying the Core Challenges and Its Analysis

BRICS economies represent a significant and growing share of the global economy. However, despite their strong growth potential, they face structural vulnerabilities amplified by external shocks, primary of which are the following:

1. Protectionism and Fragmentation of Trade

Rising geopolitical tensions, trade wars, and protectionism undermine economic resilience. According to the Allianz Trade Global Survey 2026, 65 percent of companies view geopolitical risk as the main threat, prompting 80 percent to diversify trade partners, 63 percent to source from new suppliers, and 57 percent to reroute shipments. Policy pathways include diversifying trade partners, advancing trade liberalisation, supporting the multilateral trade system, concluding bilateral trade agreements, gradually creating a network of RTAs between the BRICS states, and facilitating a favourable climate for trade within BRICS.[8]

2. International Payments

Dependence on the US dollar for international trade, including within BRICS, creates vulnerabilities arising from exchange-rate volatility, US monetary expansion, high levels of US external and domestic debt, and uncertainty surrounding US trade policy. Bilateral payments in national currencies offer only a partial solution because of trade imbalances. An independent system, whether through BRICS Pay, BRICS Clear, or another mechanism, could provide an alternative.

3. Supply Chain Vulnerabilities and Logistics

BRICS remains highly exposed to global supply chain disruptions intensified over the past five years. The Federal Reserve Bank of New York's Global Supply Chain Pressure Index (GSCPI) reached 0.68 in March 2026, its highest level since early 2023. For BRICS, dependence on interconnected logistics increases transmission of localised shocks (conflicts, cyberattacks, trade restrictions). Policy pathways include diversifying supply routes, building strategic stockpiles, developing shorter regional transportation corridors (e.g., Africa-South America for foodstuffs), and using the existing ones to their full capacity to bolster resilience. [9]

4. Financial and Monetary Vulnerabilities

Macroeconomic instability has surfaced amidst energy and food price surges from Middle East conflicts. High inflation in certain regions and public debt burdens for certain economies constrain fiscal space and limit the ability to assure financial support for the national industries. High debt-servicing costs can crowd out productive spending and limit counter-cyclical responses. Conversely, low levels of public debt may reflect limited access to finance, restricting governments' capacity to fund structural reforms and infrastructure development.

Russia provides an illustrative case. High debt levels and inefficient use of financial resources resulted in a default and a devastating economic crisis in 1998. Limited access to financing in the 2000s constrained opportunities for structural reforms and infrastructure development. Pathways forward include choosing an optimal level of debt-to-GDP ratio, developing independent financial infrastructure, optimising the money usage to the benefit of national economies, and leveraging BRICS mechanisms like the New Development Bank to reduce sanctions exposure and external volatility.

5. Energy Security

On the energy front, the situation varies: Russia and Brazil are net oil exporters, while China and India rely heavily on imports (India relies on imports for nearly 87–90 percent of its oil needs, averaging 4.8–5.0 million barrels/day).[10] BRICS holds approximately 72 percent of global rare-earth reserves and nearly 40 percent of oil production, providing leverage but falling into concentration risks.[11] The more diversified the structure is, the more resilient the national economy appears to be. The case from the European Union (EU) is highly relevant. The 2020 EU programme to reach 20 percent of RES in the energy mix by 2020 was launched as far back as 2010, long before sanctions and the crisis in relations with Russia. The consequences for the EU's energy security could have been far more dramatic had it not managed to triple the share of renewables in a decade by the time of the drop in supplies of oil and gas from Russia.

China is in the lead among the BRICS nations to introduce a balanced energy security strategy for the time being. Energy security calls for diversified production and supplies, joint infrastructure, intensified exchange of energy production technologies within the bloc, increasing the role of RES, geothermal, bio, hydrogen or other advanced sources of energy, where possible, and reducing external dependence of the bloc.

6. Food and Other Sectoral Security

Despite contributing approximately 42 percent of global food production, possessing 33 percent of the world's agricultural land, and 39 percent of its freshwater resources,[12] BRICS economies face vulnerabilities as a result of population growth, climate disruptions, and import dependence on fertilisers, seeds, and equipment. A similar situation could be revealed in many other sectors like machinery production, metals, and pharmaceuticals. Strengthening food and other sector-related systems resilience requires higher value-added processing, improved logistics, increased trade within the bloc, sharing technologies, setting up a stock exchange for food (grain) and other products, creating regional hubs, launching mutual projects and supporting investments, multiplying and working on special economic zones.

7. Climate and Sustainability Risks

Climate finance systems are fragmented, debt-heavy, and misaligned with barriers including political resistance from vested interests, foreign exchange volatility, administrative bottlenecks (over 94 green funds globally),[13] and gaps in data, risk assessment, and Monitoring, Reporting, and Verification (MRV) systems.[14] These constraints hinder adaptation and mitigation in developing BRICS members. Energy transition not only could contribute to climate neutrality but also make national energy systems more diversified and thus more resilient. Priorities include developing the BRICS concept on energy transition, scaling concessional finance, enhancing domestic mobilisation, improving transparency, and aligning policies with national development needs.

8. Technological Progress and Digital Transformation

Rapid digitalisation boosts e-commerce, fintech, and smart infrastructure but heightens cybersecurity risks and reliance on foreign technologies. BRICS members face varying preparedness levels against cyberattacks on critical infrastructure.[15] Responses emphasise intensified tech cooperation while respecting digital sovereignty, increased NDB financing for tech-related mutual projects, harmonised cybersecurity and digital trade standards, reduced external dependence with a focus on AI, data storage and processing, health and medicine and other important sectors, bridging urban-rural connectivity gaps to support inclusive technological upgrading.

9. Demographic Transition and the Erosion of the Demographic Dividend

Demographic change is emerging as a structural vulnerability for BRICS economies. As fertility rates decline and life expectancy increases, the demographic dividend is gradually diminishing, potentially constraining labour supply, productivity, and long-term economic growth. While population ageing presents economic and fiscal challenges, its impact can be mitigated through sustained investment in human capital, lifelong learning, skills development, and higher labour-force participation. Strengthening workforce adaptability should therefore be recognised as a pillar of long-term systemic resilience.[16]

These interconnected challenges necessitate coordinated BRICS action. The following case study on Russian-Egyptian cooperation demonstrates practical bilateral pathways that address multiple vulnerabilities through diversified trade, industrial localisation, energy cooperation, and logistical integration.

Case Study: Russian-Egyptian Economic Links as a Step to BRICS Sustainability

Russia and Egypt have expanded their economic partnership, transforming a relationship centred on commodity trade into a broader strategic partnership that supports industrial development, energy security, technology transfer, and regional connectivity. This evolution aligns with Russia's efforts to diversify its economic partnerships and Egypt's ambition to become a regional industrial and logistics hub within the BRICS framework. Bilateral trade exceeded US$10 billion in 2025, making Egypt Russia's largest trading partner in Africa and highlighting the growing strategic importance of the partnership.[17]

Although wheat remains a cornerstone of bilateral trade, economic relations have become increasingly diversified. Egypt imports around 12–13 million tonnes of wheat annually,[18] with Russia supplying approximately 5.45 million tonnes during the first half of the 2024/25 marketing year.[19] Beyond agriculture, cooperation has expanded to industrial materials, manufacturing inputs, energy products, and engineering industries, reducing dependence on a narrow range of commodities and strengthening supply-chain resilience.[20] In 2026, the two countries also discussed establishing a joint grain and energy hub in Egypt to strengthen regional food and energy security while positioning Egypt as a logistics and distribution centre for Africa and the Middle East.[21]

Strategic investment projects further reinforce this partnership. The El Dabaa Nuclear Power Plant, Egypt's first nuclear energy project, will comprise four reactors with a total capacity of 4,800 MW, strengthening long-term energy security while facilitating technology transfer and industrial development.[22] Likewise, the Russian Industrial Zone (RIZ) within the Suez Canal Economic Zone promotes Russian investment, local manufacturing, and export-oriented production, supporting Egypt's industrial diversification and integration into regional value chains.[23]

Beyond infrastructure, cooperation increasingly emphasises human capital development through technical training, professional capacity-building, and technology transfer initiatives. Strategic projects such as the El Dabaa Nuclear Power Plant[24] include specialised training programmes for Egyptian engineers and technical personnel, supporting the development of national expertise in advanced nuclear technologies. These efforts strengthen workforce capabilities, facilitate knowledge transfer, and enhance Egypt's long-term institutional and technological resilience.[25]

Institutional cooperation has also expanded following Egypt's accession to BRICS, the use of national currencies in bilateral trade,[26] and the development of the International North–South Transport Corridor (INSTC),[27] which strengthens regional transport and trade links by reducing shipping time and transportation costs. These developments have created a more supportive framework for trade, investment, and economic cooperation while reducing exposure to external geopolitical and supply-chain disruptions.

The Russia-Egypt partnership illustrates how bilateral cooperation can strengthen systemic resilience by combining trade diversification, strategic infrastructure, technology transfer, human capital development, and institutional cooperation. Rather than representing an isolated bilateral relationship, it demonstrates how targeted partnerships within BRICS can reinforce regional connectivity, strengthen supply-chain resilience, and promote sustainable and inclusive economic growth.

Recommendations

Strengthening systemic resilience within BRICS requires coordinated policy action that addresses immediate vulnerabilities while building long-term economic, institutional, and human capacity. Based on the analysis and the Russian-Egyptian case study, the following policy priorities are recommended:

1. **Strengthen regional connectivity and build more resilient supply chains.**

BRICS members should accelerate investment in regional transport corridors, logistics infrastructure, ports, and customs modernisation to diversify trade routes and reduce dependence on a limited number of global shipping corridors. The bloc should also promote regional production networks and diversify suppliers in strategic sectors such as food, pharmaceuticals, energy equipment, semiconductors, and critical minerals. Coordinated strategic reserves of essential commodities, including grains, fertilisers, and key industrial inputs, should be established to enhance preparedness against future disruptions and improve the resilience of regional supply chains.

2. Scale adaptation finance as a strategic pillar of climate resilience.

Recognising that climate adaptation represents one of the greatest financing gaps facing developing economies, BRICS should prioritise adaptation finance as a distinct policy objective. The New Development Bank could expand concessional and blended financing for climate-resilient infrastructure, water management, sustainable agriculture, and disaster-risk reduction while supporting innovative financing instruments such as resilience bonds and debt-for-adaptation swaps. Strengthening MRV systems and aligning investments with national adaptation plans would improve the effectiveness and transparency of adaptation finance across member countries.

3. Invest in digital resilience, artificial intelligence, and human capital.

As digital transformation accelerates, BRICS countries should strengthen cooperation in digital infrastructure, cybersecurity, and digital governance while investing in education, technical and vocational training, lifelong learning, and workforce reskilling to prepare labour markets for AI-driven transformation. Greater collaboration in research, innovation, technology transfer, and digital skills development would help maximise productivity gains while ensuring that technological progress contributes to inclusive growth and reduces the risks of labour market disruption.

4. Strengthen demographic resilience through long-term human capital development.

With several BRICS economies experiencing population ageing and slowing labour-force growth, greater emphasis should be placed on policies that strengthen human capital throughout the life cycle. Expanding access to quality education, vocational training, healthcare, and lifelong learning, while promoting higher labour-force participation and healthy ageing, will help sustain productivity and long-term economic competitiveness. Enhanced cooperation among BRICS members in education, research, scientific exchange, and professional capacity building can further support workforce adaptability and innovation.

5. Enhance institutional coordination and systemic risk governance.

BRICS should strengthen institutional mechanisms for collective preparedness for future shocks. This includes expanding the use of national currencies in bilateral trade where appropriate, strengthening financial cooperation through the New Development Bank, and establishing a permanent BRICS Systemic Risk Early-Warning Mechanism integrating climate, financial, supply-chain, technological, and demographic indicators. Improving information sharing, policy coordination, and crisis-response mechanisms would enhance the bloc's collective ability to anticipate, mitigate, and respond to increasingly interconnected global risks.

Conclusion

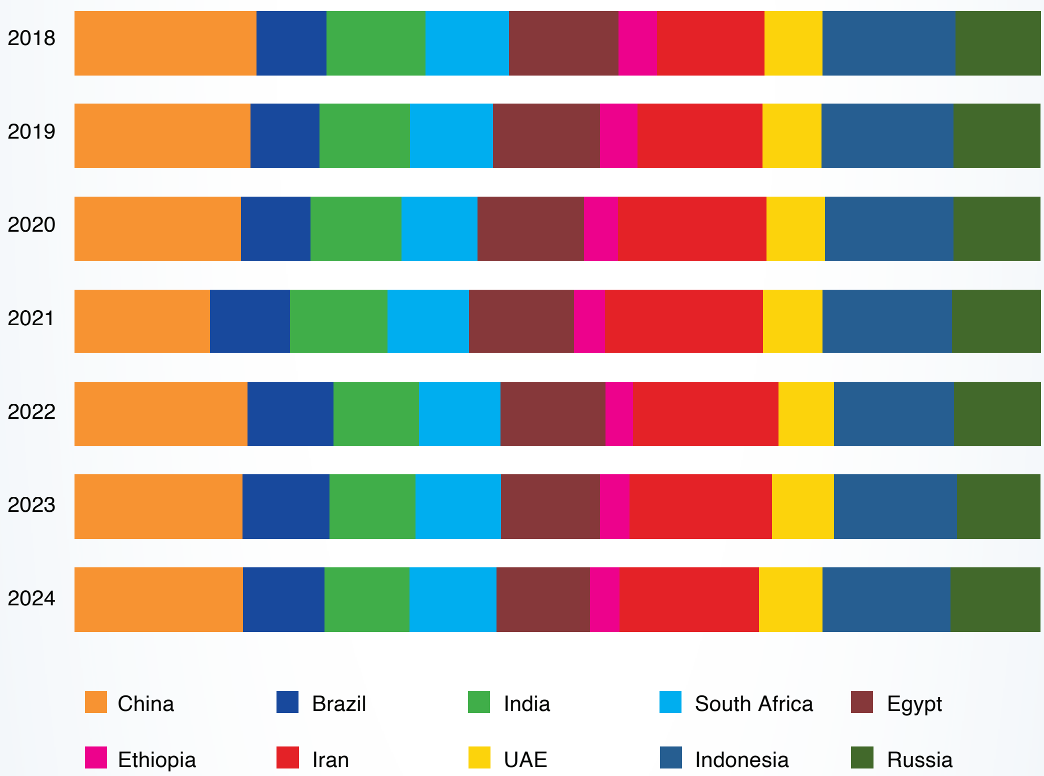
Systemic resilience is not limited to crisis management or the capacity to recover from shocks. As this article has argued, it is a continuous process of building stronger, more diversified, and more adaptive economies, even in periods of relative stability. Just as a resilient human body is trained not only to withstand illness but also to thrive, a resilient economy must be developed across all sectors so that it can both withstand disruptions and capture the benefits of technological progress, energy transition, multipolar financial arrangements, and deeper South–South cooperation. For BRICS, whose members are simultaneously systemically important and systemically exposed, this broader understanding of resilience is essential.

The challenges examined in this article—trade fragmentation, US dollar dependence, concentrated logistics, uneven fiscal space, energy and food vulnerabilities, climate-finance gaps, technological asymmetries, and demographic pressures—are tightly interlinked. Addressing them in isolation leaves residual systemic risk. The Russia–Egypt partnership demonstrates a more integrated pathway: by combining trade diversification, industrial zones, nuclear energy cooperation, logistics hubs, human-capital formation, and institutional frameworks such as national-currency settlements and the International North–South Transport Corridor, bilateral cooperation can reduce external exposures while generating positive spillovers for the wider bloc.

Translating these lessons into collective action requires sustained institutional commitment. Strengthening regional connectivity and strategic stockpiles, scaling adaptation finance, investing in digital sovereignty and AI-ready skills, reinforcing human capital across the life cycle, and building permanent mechanisms for early warning and policy coordination will enable BRICS to move from reactive resilience towards proactive systemic strength. If the bloc succeeds in treating resilience as a permanent development strategy rather than a temporary response to crisis, it can safeguard its members' progress and contribute to a more balanced, sustainable, and inclusive global economic order.

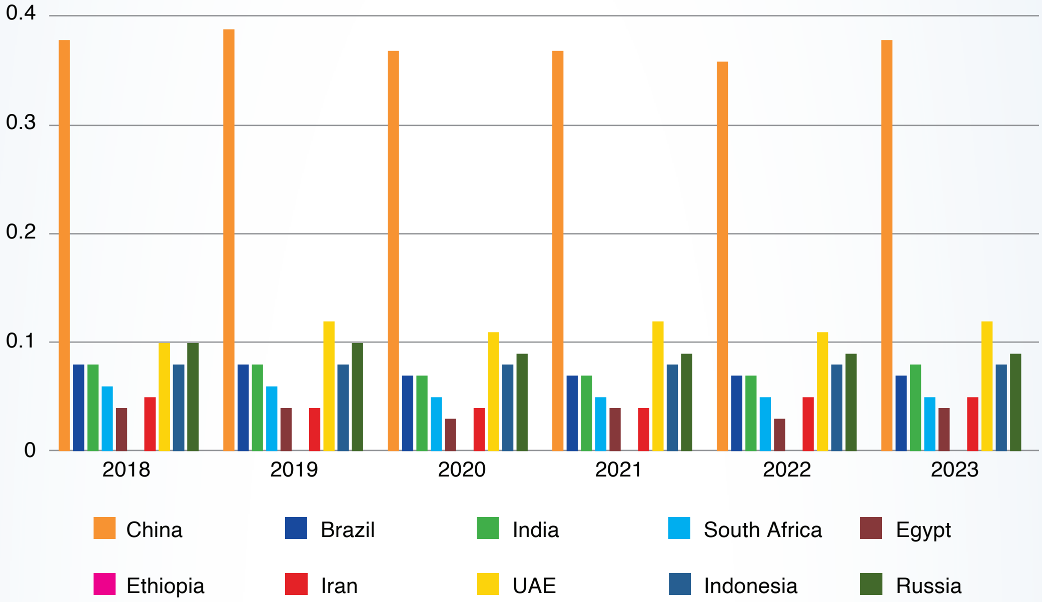
Annexes

Figure 1: Manufacturing Value Added (% of GDP), BRICS Countries (2018-2024)



Source: World Bank Group[28]

Figure 2: Competitive Industrial Performance Index, BRICS Countries (2018-2023)



Source: UNIDO Statistics Portal, 2024.[29]

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Generative AI tools were used for language editing and structural refinements.

Endnotes

1 Organisation for Economic Co-operation and Development (OECD), *OECD Economic Outlook, Interim Report: Testing Resilience,* Paris, OECD Publishing, 2026, https://www.oecd.org/content/dam/oecd/en/publications/reports/2026/03/oecd-economic-outlook-interim-report-march-2026_254a8d56/d4623013-en.pdf.

2 Organisation for Economic Co-operation and Development (OECD), *Net Zero*, Paris, OECD Publishing, https://www.oecd.org/en/publications/net-zero_da477dda-en/full-report/component-9.html.

3 "International Monetary Fund (IMF)" (lecture notes/PDF), Landmark University, https://prog.lmu.edu.ng/colleges_CMS/document/books/IMF.pdf.

4 BRICS, "About BRICS," https://www.brics2026.gov.in/about-us/.

5 United Nations Conference on Trade and Development (UNCTAD), "FDI Flows and Stock Database," UNCTADstat, https://unctadstat.unctad.org/datacentre/dataviewer/US.FdiFlowsStock.

6 UNIDO, *International Yearbook of Industrial Statistics 2024,* Vienna, United Nations Industrial Development Organization, 2024, 54–55, https://www.unido.org/sites/default/files/unido-publications/2024-11/YB-core-2024-yearbook-pdf.pdf.

7 World Bank, "Manufacturing, Value Added (% of GDP)," World Development Indicators, https://data.worldbank.org/indicator/NV.IND.MANF.ZS.

8 "Building Resilient Supply Chains," BRICS+ Analytics, https://brics-plus-analytics.org/building-resilient-supply-chains/.

9 "Building Resilient Supply Chains," BRICS+ Analytics, https://brics-plus-analytics.org/building-resilient-supply-chains/.

10 Grisha Shah, "Oil & Gas Sector 2025: India's 89% Import Challenge," India Macro Indicators, August 13, 2025, https://indiamacroindicators.co.in/resources/blogs/oil-and-gas-sector-2025-indias-89-import-challenge.

11 Erik Solheim, "Rare Earths Crisis: Why the West Depends on China," *Think BRICS*, April 29, 2025, https://thinkbrics.substack.com/p/rare-earths-crisis-why-the-west-depends.

12 Inez Helena Soares Mustafa, "BRICS Shares Solutions to Promote Global Food Security," BRICS Brasil, April 10, 2025, https://brics.br/en/news/brics-shares-solutions-to-promote-global-food-security.

13 Organisation for Economic Co-operation and Development (OECD) and United Nations Development Programme (UNDP), "Structuring NDC Financing or Investment Strategies," in *Investing in Climate for Growth and Development: The Case for Enhanced NDCs* (OECD Publishing, June 10, 2025), https://www.oecd.org/en/publications/investing-in-climate-for-growth-and-development_16b7cbc7-en/full-report/structuring-ndc-financing-or-investment-strategies_15734899.html.

14 Information and Decision Support Center (IDSC), *Advancing Climate Finance in Egypt*, Egyptian Cabinet, 2025, https://idsc.gov.eg/upload/DocumentLibrary/AttachmentA/11130/Advancing%20Climate%20Finance%20in%20Egypt-%20s.pdf.

15 Leandro Molina, “BRICS Strengthens Cooperation on Cybersecurity,” BRICS Brasil, April 11, 2025, https://brics.br/en/news/brics-strengthens-cooperation-on-cybersecurity.

16 Donghyun Park and Kwanho Shin, *Population Aging, Silver Dividend, and Economic Growth*, ADB Economics Working Paper Series No. 678, Manila, Asian Development Bank, March 2023, https://www.adb.org/sites/default/files/publication/864241/ewp-678-population-aging-silver-dividend-economic-growth.pdf.

17 Ministry of Foreign Affairs of the Russian Federation, “News,” https://mid.ru/en/foreign_policy/news/2091150/.

18 InfoBRICS, “Russia-Egypt Relations,” https://infobrics.org/en/post/99750/.

19 Sputnik Africa, “Egypt Becomes Top Importer of Russian Grain in First Half of Agricultural Year 2024/25,” February 5, 2025, https://en.sputniknews.africa/20250205/egypt-becomes-top-importer-of-russian-grain-in-first-half-of-agricultural-year-202425-1070516372.html.

20 Export Genius, “Russia Exports to Egypt,” https://www.exportgenius.in/russia-export-egypt.

21 Mariam Wahba, “Egypt Welcomes ‘Grain and Energy Hub’ Initiative from Russia,” Foundation for Defense of Democracies (FDD), April 6, 2026, https://www.fdd.org/analysis/2026/04/06/egypt-welcomes-grain-and-energy-hub-initiative-from-russia/.

22 President of Russia, “News,” July 2025, http://en.kremlin.ru/events/president/news/78496.

23 Government of the Russian Federation, “News,” http://government.ru/en/news/56228/.

24 Rosatom Service, “Training Program for Personnel of Egypt’s El Dabaa Nuclear Power Plant Started at Rosatom Technical Academy,” September 2021, https://rosatom-service.ru/en/news/v-tekhnicheskoy-akademii-rosatoma-startovalo-obuch/.

25 International Atomic Energy Agency (IAEA), “Integrated Nuclear Infrastructure Review (INIR),” https://www.iaea.org/services/review-missions/integrated-nuclear-infrastructure-review-inir.

26 Nikita Smagin, “Gateway to Africa: The Dynamics of Russian-Egyptian Relations,” Riddle Russia, January 18, 2026, https://ridl.io/gateway-to-africa-the-dynamics-of-russian-egyptian-relations/.

27 Mizuki Chuman, “International North–South Transportation Corridor and Russia–NIS: Growing Interest in and Importance under War and Sanctions,” Middle East Institute of Japan (MEIJ), November 22, 2023, https://www.meij.or.jp/english/research/2023/9.html.

28 World Bank, “Manufacturing, Value Added (% of GDP),” World Development Indicators, https://data.worldbank.org/indicator/NV.IND.MANF.ZS.

29 United Nations Industrial Development Organization (UNIDO), “Competitive Industrial Performance (CIP) Index,” UNIDO Statistics Portal, https://stat.unido.org/analytical-tools/cip.

Resilient Medical Product Supply Chains: An India–Ethiopia Health Security Agenda for BRICS

Haimanot Eshetu and Oommen C. Kurian

Abstract

MEDICAL PRODUCT SUPPLY CHAINS are a pillar of health security. Medicines, vaccines, diagnostics, and other health commodities form part of the infrastructure by which countries protect households, maintain essential services, and withstand shocks. India and Ethiopia present a timely case for bilateral cooperation. India is a leading global supplier of affordable generic medicines, while Ethiopia's industrial base, strategic location, and logistics capacity provide a basis for partnership in pharmaceutical manufacturing, technology transfer, and regional distribution. Ethiopia's membership in BRICS makes this a pathway for South–South cooperation, investment, and development diplomacy. Recent bilateral engagements between the two nations have created a policy opening. This article argues that BRICS can support a practical agenda on regulatory cooperation, diagnostics, procurement, investment, and resilient medical product supply chains between India and Ethiopia.

Introduction: The Challenge

For many countries in the Global South, access to affordable medicines has long been central to health cooperation. India's role as a supplier of generic medicines is partly built on this history. Yet, affordability is only one part of health security: availability of medicines, diagnostic tests, and vaccines is necessary too. Products that depend on fragile supply channels can be unavailable when health systems are under stress.

Recent shocks have highlighted this challenge. The COVID-19 pandemic in 2020–2022 exposed vulnerabilities in medical product supply chains as disruptions in manufacturing, transportation, and trade contributed to shortages of medicines, vaccines, diagnostics, and personal protective equipment.[1] The experience underlined that health system resilience depends not only on healthcare delivery but on reliable supply networks. The role played by Ethiopian Airlines in distributing medical products during the pandemic also reveals the country's wider logistics relevance for regional health security.[2]

Declining official development assistance (ODA) is also constraining health security investment in developing countries. On the Organisation for Economic Co-operation and Development's (OECD) headline ODA measure, calculated on a grant-equivalent basis, ODA from Development Assistance Committee members and associated providers fell by 23.1 percent in 2025 to US$174.3 billion—the largest annual decline on record.[3] Net ODA had already declined by 8.5 percent in 2024.[4] For countries such as Ethiopia, this creates a dual challenge: maintaining access to essential medicines while financing resilient supply chains, regulatory systems, and appropriate domestic manufacturing capacity. This strengthens the case for exploring complementary financing and cooperation through BRICS, without assuming that such mechanisms can substitute for ODA.

A health system is resilient when people can obtain the medicines and tests they need without resorting to unsafe shortcuts or facing unaffordable delays. While many countries are promoting domestic manufacturing of medical products, constraints on technology transfer, skills, and scale can slow progress. Resilient access, therefore, requires flexibility across external supply, domestic capability, and regional production, supported by regulation and public purchasing that keep quality-assured health products available even when systems are under stress.

The Sanya Declaration of the III BRICS Summit in China affirmed the commitment of BRICS leaders to strengthen public health cooperation.[5] The 2023 regulatory memorandum of understanding (MoU), signed by the original five BRICS members, provides an institutional precedent for cooperation on medical product regulation, good manufacturing practices (GMP) inspections, bioequivalence and bioavailability, clinical trials, medical devices and diagnostics, active pharmaceutical ingredients (APIs), biological products, pharmacopoeial standards, quality assurance, and pharmacovigilance.[6] This framework should be extended to or adapted for newer members, including Ethiopia, rather than be assumed to apply to them automatically.

The BRICS health agenda has progressively adopted this framing. The XV BRICS Health Ministers' Meeting in June 2025 called for strengthening local and regional production of medicines, vaccines, diagnostics, and other health products to ensure diversified supply chains and equitable, timely access.[7] Under India's BRICS chairmanship in 2026, the first Health Working Group meeting placed the following within the health track: adaptable and resilient health systems, affordable medicines, collaboration among BRICS medical product regulatory authorities, digital health architecture, early warning systems and public health institutes.[8] Health has thus become an established component of the post-pandemic BRICS agenda.

The India–Ethiopia pairing can help BRICS test whether the language of resilience can be translated into institutions, standards, procurement systems, and development partnerships. It also provides an opportunity to consider how national and regional strategies can support resilient access. In practice, most countries need a layered approach: quality-assured imports may remain essential for many products, while local or regional production may be feasible for a selected basket of medicines, diagnostics, and health commodities that can expand over time. Procurement, regulation, investment, and finance determine which route strengthens access and which merely shifts dependence from one weak point to another.

The choice between these approaches should also be guided by comparative advantage, including manufacturing capability, technological capacity, workforce skills, market size, logistics infrastructure, access to regional markets, and the wider policy environment. Local pharmaceutical producers, particularly in low-income countries, often face constraints that raise production costs and weaken competitiveness against imports.[9] When locally manufactured medicines are significantly more expensive than equivalent imports, local production may not improve access for patients.[10] India's experience in pharmaceutical manufacturing, technology, and regulation could complement Ethiopia's strategic location, industrial infrastructure, and logistics capabilities, subject to evidence on demand, cost, skills, quality systems, and institutional capacity.

A World Bank comparison based on manufacturing firm data reported average monthly labour costs of approximately US$69 per worker in Ethiopia, compared with US$79 in Bangladesh, US$175 in Kenya, US$180 in India, and US$201 in Vietnam. These figures point to a potential nominal labour-cost advantage. However, the study found that lower productivity more than offset this advantage for Ethiopia relative to Kenya, India, and Vietnam, although Ethiopia remained competitive vis-à-vis Bangladesh.[11] Given that the figures are historical and not pharmaceutical-specific, they indicate a potential nominal wage advantage, not pharmaceutical cost competitiveness.

Ethiopia launched a 10-year National Strategy and five-year Plan of Action for Pharmaceutical Manufacturing Development in 2015 to strengthen local production, improve access to essential medicines, and promote industrial growth. The strategy adopts a value-chain approach, envisaging a progression from imported finished products towards more technologically advanced and research-based production. Dedicated pharmaceutical infrastructure, including the Kilinto industrial park, is intended to support this transition.[12] India's trajectory offers a relevant comparison: its established generics base is being encouraged to move towards higher-value manufacturing and innovation through schemes such as Production-Linked Incentive (PLI) and Promotion of Research and Innovation in Pharma-MedTech Sector (PRIP).[13]

Relevance

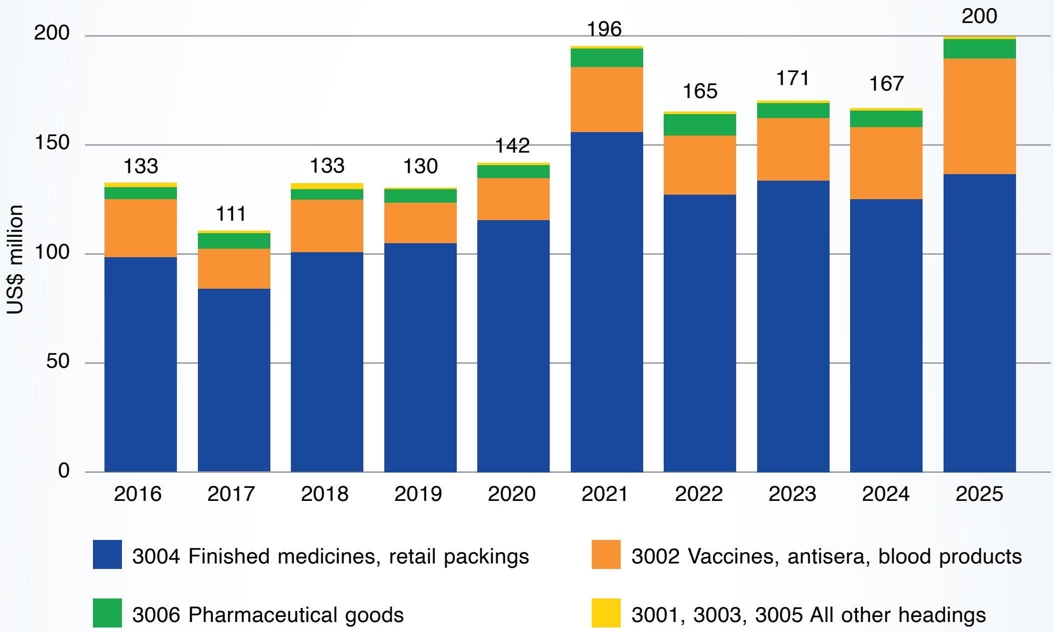
Ethiopia's health supply chain is not only a system for procuring and distributing medicines, it is also relevant to national resilience. Its efforts to expand local manufacturing, diversify supply sources, and strengthen logistics—including Ethiopian Airlines' role as a continental distribution hub—link pharmaceutical access with industrial policy and emergency preparedness. This framing reflects wider BRICS and African debates connecting health security with pharmaceutical sovereignty and foreign policy.[14]

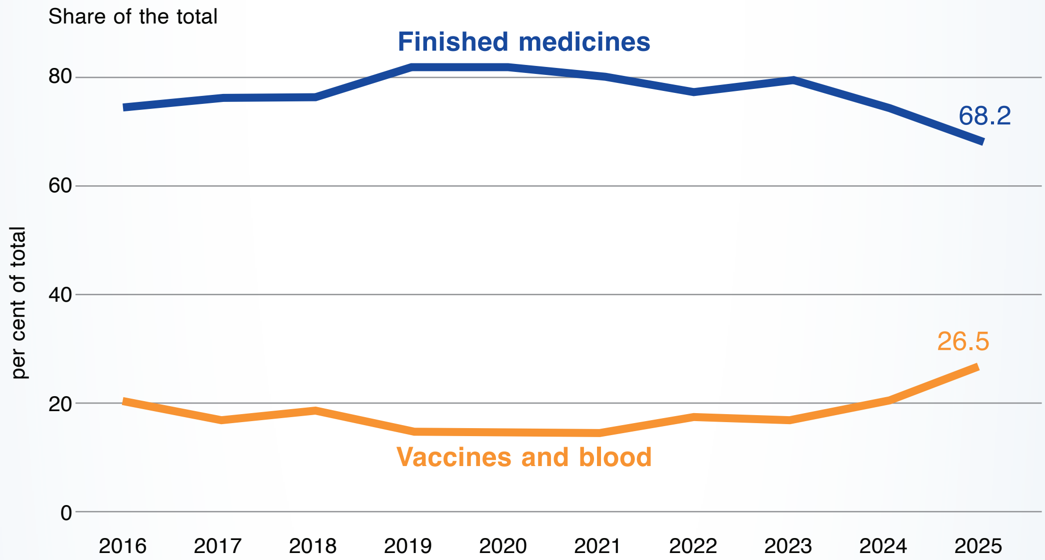
In December 2025, Neena Malhotra, Secretary (South) in the Ministry of External Affairs stated that nearly 40 percent of India's exports to Ethiopia were pharmaceuticals and that bilateral trade totalled about US$550 million.[15] The April 2026 Indian Ministry of External Affairs (MEA) bilateral brief reports India–Ethiopia trade of US$550.19 million in 2024–25, comprising Indian exports worth US$476.81 million and imports of US$73.38 million. It lists pharmaceuticals among India's top exports to Ethiopia.[16]

India-reported pharmaceutical exports to Ethiopia showed an overall increase between 2016 and 2025, despite annual fluctuations, and reached approximately US$200 million in 2025 while it was US$133 million in 2016, an increase of roughly 50 percent. Harmonised System[a] (HS) 3004—medicaments in measured doses or retail packs—remained the largest component (68.2 percent), while the contribution of HS 3002—that includes vaccines, antisera, and other biological products—increased notably after 2021 and accounted for US$52.93 million in 2025. In the same year, exports under HS 3001 (US$0.73), HS 3003 (US$0.83), HS 3005 (US$0.04) and HS 3006 (US$8.92) remained comparatively small. While this demonstrates the importance of finished medicines to the bilateral pharmaceutical relationship, it does not act as a measure of Ethiopia's overall import dependence or underlying demand growth.

a Harmonised System (HS) Code and Product Description: HS 3001 refers to glands, organs, heparin and other substances of human or animal origin for therapeutic use; HS 3002 covers vaccines, antisera, blood fractions and immunological products; HS 3003 includes medicaments not in measured doses or retail packings; HS 3004 covers medicaments in measured doses or retail packings; HS 3005 includes wadding, gauze, bandages, dressings and similar products; HS 3006 covers pharmaceutical goods and other pharmaceutical preparations; and HS 30 represents all pharmaceutical products under HS Chapter 30.

Figures 1a and 1b: India-Reported Pharmaceutical Exports to Ethiopia by HS Headings, 2016–2025 (Current US$ Million)





Source: Authors' calculations based on UN Comtrade with India as reporter and Ethiopia as partner, annual exports under HS Chapter 30 and its four-digit headings, 2016–2025.[17]

A directly relevant development was a November 2025 Ethiopian health sector delegation's visit to India. Led by Frehiwot Abebe, State Minister in Ethiopia's Ministry of Health, it included officials from the Ethiopian Food and Drug Authority, Ethiopian Pharmaceutical Supply Service, Ethiopian Investment Commission, and the Industrial Parks Development Corporation.[18]

Its agenda covered pharmaceutical manufacturing, regulatory collaboration, public procurement, research and development, clinical trials, and industrial infrastructure. The delegation also met India's drugs controller-general and the Indian Pharmacopoeia Commission to discuss regulatory frameworks, pharmaceutical standards, and investment opportunities. Reported next steps included structured business-to-business engagement, follow-up delegations, capacity-building workshops, and a road map for India–Ethiopia pharmaceutical cooperation.[19]

Both nations elevated their relationship to a Strategic Partnership in December 2025, and their official statement identified health security, digital health, traditional medicine, and Jan Aushadhi among the areas for expanded cooperation. The statement also noted more than US$5 billion in Indian investment in Ethiopia, particularly in manufacturing and pharmaceuticals, and over 75,000 local jobs.[20]

The November sectoral engagement and the December 2025 bilateral commitments collectively create a concrete opening for cooperation on regulation, procurement, and investment. They also provide a basis to extend India–Africa health cooperation through a partnership that combines India's pharmaceutical capabilities with Ethiopia's regional role.[21] However, commercial feasibility will depend on demonstrable public health need, cost competitiveness, quality assurance, institutional capacity, and regional demand.

Ethiopia's pharmaceutical sector is gradually moving from import dependence towards more diversified local production. Following its achievement of World Health Organization (WHO) Maturity Level 3—the ninth African country to reach this milestone—local production reportedly accounts for more than 40 percent of medicine supply, supported by stronger regulation, dedicated infrastructure, and investment in research and human capital.[22] At the same time, ongoing capacity-building initiatives aim to address supply-chain management and workforce gaps.[23]

Commodity-level trade data show why medicines are a natural starting point for bilateral engagement. In 2023, Ethiopia imported US$375.69 million under HS 300490 ("other medicaments of mixed or unmixed products"), of which India supplied US$131.83 million. India was the largest individual supplier in this category, ahead of the United States (US), China, Italy, and the Netherlands.[24] This establishes India's importance within a major medicament category, although it does not capture the full pharmaceutical trade relationship.

Diagnostics present a different picture. In 2023, Ethiopia imported US$66.57 million under HS 382200, with India supplying US$2.39 million; the five leading suppliers were the US, China, Sweden, Japan, and Germany.[25] India's role in this test-kit category is, therefore, much smaller than in HS 300490, making diagnostics a potential rather than established frontier. Cooperation in this field should extend beyond kit supply to laboratory networks, quality assurance, training, accreditation, maintenance, digital reporting, and telemedicine-enabled specialist support.

Ethiopia's regional position could make the agenda relevant beyond the bilateral relationship, particularly through the Africa Centres for Disease Control and Prevention's (CDC) African Pooled Procurement Mechanism and the African Continental Free Trade Area (AfCFTA). The African Pooled Procurement Mechanism is intended to pool demand across African Union member states, giving purchasers a larger market from which to negotiate and suppliers more predictable demand. In this context, it could connect bilateral India–Ethiopia cooperation with wider African procurement and manufacturing priorities.[26] A partnership linking Indian manufacturing experience with Ethiopian regulatory, production, and logistics capabilities could support wider access, although the regional benefits will depend on demand, regulatory coordination, and implementation capacity. Priority areas comprise workforce development, technology transfer, and industry–academic partnerships. BRICS cooperation could help develop viable projects, while the New Development Bank[b] could be explored as a financing option subject to clear demand, institutional capacity, quality assurance, and applicable financing criteria.

Recommendations for BRICS

Short-Term Priorities

India and Ethiopia should develop a regulatory cooperation road map building on the November 2025 engagement mentioned earlier. This could cover pharmacopoeial standards, dossier review, good manufacturing practice inspections, testing laboratories, pharmacovigilance, and post-market surveillance. Its purpose should be regulatory strengthening and trusted reliance where appropriate, not regulatory dependence; resilient access depends on quality assurance as much as supply.

Procurement should also be linked to resilience and system strengthening. Beyond controlling costs, public procurement can shape markets, reward quality, create predictable demand, and support local or regional manufacturing where feasible. As production capacity develops, procurement may include proportionate incentives for feasible local or regional production while retaining competition, quality, and value-for-money requirements. This would help avoid overdependence on imports and inefficient local production. BRICS should support an India–Ethiopia Medical Product Resilience Dialogue within its health track that brings together health ministries, regulators, procurement agencies, investment authorities, industry bodies, and public health institutions. The dialogue can identify a limited basket of essential medicines, diagnostics, and health commodities for which cooperation will improve access, reduce vulnerability, or support feasible local production, and should produce a time-bound cooperation plan accordingly.

b The New Development Bank (NDB), established by the BRICS countries in 2015 following an agreement signed at the 2014 Fortaleza Summit, is a multilateral development bank that finances infrastructure and sustainable development projects in emerging and developing economies.

Medium-Term Priorities

Diagnostics should be a medium-term priority for India–Ethiopia cooperation. Both countries should identify priority areas based on service-delivery gaps and disease burden. Test-kit supply may be one component, but higher value lies in laboratory systems, quality assurance, training, accreditation, maintenance, digital reporting, and telemedicine-enabled specialist support. Such cooperation would connect the medical product agenda to primary healthcare, disease surveillance, and emergency preparedness.

Long-Term Priorities

BRICS could support feasibility assessments and, where justified, India–Ethiopia joint manufacturing and technology-transfer partnerships. Such partnerships should proceed only where demand, institutional capacity, quality assurance, and financing are credible; the objective should be resilient access rather than self-sufficiency. Over time, regional distribution and possible New Development Bank or other BRICS-supported financing could be explored for bankable projects.

India–Ethiopia cooperation can provide BRICS with a practical test of whether coordinated regulation, procurement, capacity building, and selective investment can strengthen regional access to affordable, quality-assured medical products.

Conclusion

India–Ethiopia cooperation on medical-product supply chains is unlikely to be strengthened by pursuing self-sufficiency as an end in itself. The more credible objective is to reduce vulnerability while preserving affordability and quality. The immediate opportunity lies in building on the political opening created in 2025 and converting it into sustained regulatory and procurement cooperation.

Diagnostics offer a useful next area because India's commercial role is still relatively small, leaving space for collaboration that strengthens service capacity as well as trade. Manufacturing partnerships should follow where demand, skills, quality systems and financing make them viable. This sequencing would allow the partnership to develop from the existing pharmaceutical relationship rather than attempting to replace it.

For BRICS, the value of the India–Ethiopia case offers a way to test whether South–South cooperation can connect health security with industrial development and regional access. If the approach works, it could provide lessons for other BRICS members seeking greater resilience without retreating from international trade.

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Endnotes

1 National Academies of Sciences, Engineering, and Medicine, *Building Resilience into the Nation's Medical Product Supply Chains* (Washington, DC: National Academies Press, 2022), https://doi.org/10.17226/26420.

2 Ethiopian Airlines, "Ethiopian Airlines Receives Global Recognition and Appreciation Award for Outstanding Role in COVID-19 Response," July 15, 2024, https://corporate.ethiopianairlines.com/Press-release-open-page/ethiopian-airlines-receives-global-recognition-and-appreciation-award-for-outstanding-role-in-covid-19-response.

3 Organisation for Economic Co-operation and Development, "International Aid Fell Sharply in 2025, Says OECD," April 9, 2026, https://www.oecd.org/en/about/news/press-releases/2026/04/international-aid-fell-sharply-in-2025-says-oecd.html.

4 Organisation for Economic Co-operation and Development, *ODA Projections for 2026 and the Near-Term: Implications for Vulnerable Countries and Sectors*, *OECD Policy Briefs*, no. 59 (Paris: OECD Publishing, 2026), https://doi.org/10.1787/d7c74fa2-en.

5 BRICS, "Sanya Declaration," (Sanya, Hainan, April 14, 2011), https://brics.br/pt-br/documentos/acervo-de-presidencias-anteriores/leaders-declarations/2011-iii-bric-summit-sanya-declaration.pdf/@@download/file.

6 BRICS, "Memorandum of Understanding on Cooperation in the Field of Regulation of Medical Products for Human Use among Drug Regulatory Authorities," 2023, https://www.gov.br/anvisa/pt-br/assuntos/relacoes-internacionais/cooperacao/brics-mou-sa-ru-in-cn-br-signed.pdf.

7 BRICS, "Declaration of the XV BRICS Health Ministers' Meeting," June 17, 2025, https://brics.br/en/documents/social-issues/250617_brics_xv-brics-health-declaration.pdf.

8 Ministry of Health and Family Welfare, Government of India, https://www.pib.gov.in/PressReleasePage.aspx?PRID=2252335&lang=1&reg=3.

9 World Health Organization, *Local Production for Access to Medical Products: Developing a Framework to Improve Public Health* (Geneva: World Health Organization, 2011), https://iris.who.int/server/api/core/bitstreams/edf3d38f-8132-4bdf-88b5-3e40ab99b074/content.

10 Warren A. Kaplan and Richard Laing, *Local Production of Pharmaceuticals: Industrial Policy and Access to Medicines—An Overview of Key Concepts, Issues and Opportunities for Future Research*, Health, Nutrition and Population Discussion Paper (Washington, DC: World Bank, 2005), https://documents.worldbank.org/curated/en/551391468330300283/pdf/320360KaplanLocalProductionFinal.pdf.

11 Stefano Caria, "Industrialization on a Knife's Edge: Productivity, Labor Costs, and the Rise of Manufacturing in Ethiopia," *World Bank Policy Research Working Paper 8980* (Washington, DC: World Bank, 2019), https://doi.org/10.1596/1813-9450-8980.

12 World Health Organization, *Ethiopian National Strategy and Plan of Action for Pharmaceutical Manufacturing Development and Improving Access* (2015), https://cdn.who.int/media/docs/default-source/medicines/local-production/ethiopian_national_strategy.pdf?sfvrsn=89b37c7e_1; Ethiopian Investment Commission, "Pharmaceuticals: The Opportunity to Serve a Growing Domestic Pharmaceutical Market," https://investethiopia.gov.et/key-sectors/manufacturing/pharmaceuticals/.

13 Department of Pharmaceuticals, Ministry of Chemicals and Fertilizers, Government of India, https://www.pib.gov.in/PressReleasePage.aspx?PRID=2243248&lang=2&reg=3.

14 Nicholas F. Watt et al., "Global Health in Foreign Policy—and Foreign Policy in Health? Evidence from the BRICS," *Health Policy and Planning* 29, no. 6 (2014): 763–73, https://doi.org/10.1093/heapol/czt063; Moses Mulumba et al., "Decolonizing Global Health: Africa's Pursuit of Pharmaceutical Sovereignty," *BMC Health Services Research* 25, no. 1 (2025): 1015, https://doi.org/10.1186/s12913-025-13211-9.

15 Ministry of External Affairs, Government of India, https://www.mea.gov.in/media-briefings.htm?dtl%2F40471%2FTranscript_of_Special_Briefing_by_MEA_on_Prime_Ministers_visit_to_Jordan_Ethiopia_and_Oman_December_12_2025=.

16 Ministry of External Affairs, Government of India, *India-Ethiopia Bilateral Relations* (April 2026), https://www.mea.gov.in/Portal/ForeignRelation/India-Ethiopia-April-2026.pdf.

17 United Nations Statistics Division, *UN Comtrade Database*, "India-Reported Exports to Ethiopia, HS Chapter 30 (Pharmaceutical Products), Annual Data, 2016–2025,"

https://comtradeplus.un.org/TradeFlow?Frequency=A&Flows=X&CommodityCodes=30&Partners=231& Reporters=699&period=recent&AggregateBy=none&BreakdownMode=plus.

18 Pharmaceuticals Export Promotion Council of India, "India–Ethiopia Pharmaceutical Cooperation in Regulatory, Procurement and Investment," November 11, 2025, https://pharmexcil.com/circulars/viewcirculars/13919/c83a4093848bf72ab0f095db67f820fb.html.

19 Shardul Nautiyal, "Ethiopian Delegation Meets DCGI and IPC to Strengthen Regulatory Frameworks," *Pharmabiz*, November 18, 2025, https://www.pharmabiz.com/NewsDetails.aspx?aid=182494&sid=2.

20 Ministry of External Affairs, Government of India, https://www.mea.gov.in/press-releases.htm?dtl%2F40492%2FPrime_Minister_holds_bilateral_talks_with_the_Prime_Minister_of_Ethiopia_December_16_2025=.

21 Sakthivel Selvaraj, Ensuring Access to Medicines in East Africa: Lessons from India, ORF Occasional Paper No. 201 (New Delhi: Observer Research Foundation, 2019), https://www.orfonline.org/research/ensuring-access-to-medicines-in-east-africa-lessons-from-india.

22 World Health Organization, "Ethiopia Achieves Major Milestone in Medicines Regulation Reaching WHO Maturity Level 3," September 30, 2025, https://www.who.int/news/item/30-09-2025-ethiopia-achieves-major-milestone-in-medicines-regulation-reaching-who-maturity-level-3; World Bank, "Building Ethiopia's Pharmaceutical Future: From Strong Regulation to Local Production," May 26, 2026, https://www.worldbank.org/en/news/feature/2026/05/26/building-ethiopia-s-pharmaceutical-future-from-strong-regulation-to-local-production.

23 World Diabetes Foundation, "Healthcare Supply Chain Management Strengthening and Education in Ethiopia," project WDF21-1855, https://www.worlddiabetesfoundation.org/what-we-do/projects/wdf21-1855/.

24 World Integrated Trade Solution, "Ethiopia Other Medicaments of Mixed or Unmixed Products Imports by Country, 2023," https://wits.worldbank.org/trade/comtrade/en/country/ETH/year/2023/tradeflow/Imports/partner/ALL/product/300490.

25 World Integrated Trade Solution, "Ethiopia Medical Test Kits Imports by Country, 2023," https://wits.worldbank.org/trade/comtrade/en/country/ETH/year/2023/tradeflow/Imports/partner/ALL/nomen/h5/product/382200.

26 Africa Centres for Disease Control and Prevention, "African Pooled Procurement Mechanism," https://appm.africacdc.org/; Ethiopian News Agency, "Africa CDC Launches Pooled Procurement to Bolster Local Pharmaceutical Industry," October 15, 2025, https://www.ena.et/web/eng/w/eng_7524925.

Resilient Higher Education in Iran and South Africa: Student Success, Digital Equity, and Skills Development

Xolani Khohliso and Mohsen Chitsaaz

Abstract

INEQUALITY, UNEQUAL ACCESS to digital infrastructure, limited resources, multiple crises, and changing socioeconomic needs have created tensions for higher education systems in Iran and South Africa. In South Africa, student retention, progression, graduation, and employability are also affected due to persistent inequality, lack of preparedness, and lack of entry-level jobs. In Iran, academic continuity, educational quality, and student resilience are among the factors that must be maintained during the war and digital transformation within educational institutions. This article suggests that, to be effective, a resilient Higher Education Sector (HES) needs to link resources, institutional interventions, and measurable outcomes. Using the theory of change as a conceptual lens, it recommends leveraging the potential for cooperation among the BRICS countries to strengthen Iran's and South Africa's institutional resilience.

Introduction

Education is a strategic enabler of innovation, social mobility, and national resilience, all of which are central to higher education. Beyond producing graduates, universities are expected to reduce inequality, adapt to technological change, increase employability, and handle crisis conditions. Stronger engagement between higher education, development, skills formation, and scientific cooperation is particularly important for the Brazil, Russia, India, China and South Africa (BRICS) grouping that also now includes a few other countries, including Iran.

Iran and South Africa offer comparative examples of building resilience in higher education. South Africa continues to suffer from the legacy of apartheid-era inequalities, poor quality/lack of education, financial insecurity of students, and inadequate school-to-labour market transition. These conditions affect access, retention, progression, and graduation, especially for historically disadvantaged students.[1] Iran's pressure stems from crises, limited resources, digital transition, and the need to continue academic operations in times of uncertainty. Adaptive leadership, organisational readiness, better communication systems, and educator resilience are factors that can strengthen educational institutions in Iran.[2]

Resilience implies more than just weathering disruption; it should involve predicting risks, maintaining the quality of education, supporting well-being of both students and teachers, adapting teaching systems to current circumstances, and equipping graduates with necessary skills. This article links inputs (funding, digital infrastructure, and staff capacity) to interventions (academic support, mental health services, curriculum reform, and digital inclusion).

The Challenge: Higher Education Resilience in Iran and South Africa

'Resilience', Defined

Resilience is a multifaceted and highly debated concept in academic literature. While there is no consensus on a single definition, scholars agree on two elements: exposure to significant stress and demonstration of successful adaptation. While resilience can be conceptualised in various ways at the individual and societal levels, this article defines it primarily as a process that manifests in institutions, educational and research settings in response to exogenous conditions, notably crises and deficiencies. 'Resilience' emphasises the importance of absorbing disruption, recovering from setbacks, and continually adapting to transform challenges into opportunities for growth and advancement.[3]

Iran and South Africa's Similarities and Differences

The higher education systems of Iran and South Africa share certain similarities related to resilience.

Both countries strive to achieve educational justice, particularly by widening the coverage of educational facilities across all regions, and in their responsiveness to the needs of society and the job market. Another commonality is how their respective institutions have adapted to external circumstances: Iran to war and sanctions, and South Africa to the aftermath of apartheid, historical inequality, and social crises. Both countries also have strong public universities and rely heavily on government funding for higher education.[4]

Table 1: Iran and South Africa: Similarities in Higher Education Resilience

Factor	Similarities
Crisis Management	Institutional adaptation to external shocks
Financial Provision	State funded
Digital Education	Expanding
Human Capital	Key role of academics

Source: Mosheim[5]

Iran has faced multiple crises including war, sanctions, restrictions on international academic exchange, regional instability, and resource constraints. Furthermore, its physical and digital infrastructure are direct targets for adversaries, and the survival of their higher education system is threatened by external conflicts. South Africa, meanwhile, struggles with financial instability and polarisation caused by the legacy of apartheid, energy disruptions, inequality, and discontent among students over issues such as funding.[6]

Table 2: Threats and Crisis Pressures

Factors	Iran	South Africa
Threats	• War • International isolation through sanctions • Regional instability • Resource constraints	• Financial crisis • Polarisation due to the apartheid legacy
Primary Pressures	• Economic sanctions • Emergency transitions • Regional instability • Restrictions on international academic exchange	• Student protests • Inequality • Funding pressures • Energy disruptions • Post-apartheid transformation
Nature of the Crisis	• Geopolitical and infrastructural • Physical and digital infrastructure are direct targets. • The system's survival is threatened by external conflict.	• Systemic and fiscal • The crisis is a slow-burn deterioration marked by lack of funding, which fuels student protests, leads to high dropout rates, and threatens quality and transformation of education.

Source: Mosheim[7]

In response to these issues, Iran and South Africa have considered resilience across the institutional, technical, digital, and financial dimensions. Measures and strategies to strengthen resilience have been considered and introduced by their governments. The long-term success of the programmes initiated depends on the continuity and coherence of these measures.[8]

Table 3: Dimensions of Resilience

Institutional Culture of Resilience	Collective Adaptation and Social Capital	Social Justice Orientation and Participatory Governance
Teaching Continuity Mechanisms	Rapid adaptation through institutional networks and informal coordination	Flexible institutional responses with emphasis on communication and support
Digital Resilience	Expansion of remote education and improvement of infrastructure	Strong digital innovation and improvement of infrastructure
Financial Resilience	Reliance on public structures and institutional adaptation with budget limitations	Mixed funding model with recurring debates over affordability

Source: Mosheim[9]

Iran's main strengths are a culture of persistence and continuity amidst disruptions, high capacity for central coordination, and strong adaptability among academic communities.[10] In South Africa, institutional accountability, student-centred support structures, and the development of communication systems during crises are the advantages.[11]

Table 4: Sources of Strength and Vulnerabilities

	Iran	South Africa
Sources of Strength	• Strong continuity culture during disruption • Central coordination capacity • High adaptability among academic communities	• Institutional responsiveness • Student-centered support structures • Development of crisis communication systems
Key Vulnerabilities	• Funding limitations • Technology and infrastructural gaps • Dependence on emergency rather than preventive planning	• Persistent inequality in access • Financial instability for students • Unequal digital readiness across institutions

Source: Mosheim[12]

Learning from the other's valuable experiences can also contribute to improving resilience in higher education for Iran and South Africa. Iran can draw upon South Africa's experiences in fostering higher institutional autonomy, establishing formal student support and welfare systems, promoting participatory governance, and facilitating communication during crises. South Africa can benefit from Iran's experiences in areas such as faster central coordination in times of emergency, using social capital as a resilience asset, and maintaining institutional continuity despite long-standing limitations.[13]

Table 5: Lessons for Iran and South Africa

Iran from South Africa	South Africa from Iran
• Stronger institutional autonomy • Formal student support systems • Participatory governance and crisis communication	• Faster central coordination during emergencies • Use of social capital as a resilience resource • Institutional continuity under prolonged constraints

Source: Mosheim[14]

Equitable Access and Student Success in South Africa

In South Africa, one of the most pressing issues in higher education is access to success. In the post-apartheid era, South Africa has made progress in improving access to university education for historically disadvantaged citizens. However, the increased enrolment has not led to higher graduation numbers. Many students are underprepared for university and have limited access to learning materials or financial security, which contributes to inconsistent retention, slow progression, and the inability to graduate.

Yet, resilience should not be limited to the personal attributes of historically disadvantaged learners, but should consider structural conditions.[15] Students may be determined and adaptable, but their success depends largely on institutional support, inclusive pedagogy, financial assistance, academic development, and a sense of belonging. Resilience, therefore, should not be limited to students' personal resilience, it should also include resilient institutions that recognise student needs early and respond to them in a structured manner.

Academic, social, and economic factors influence the success of students in South Africa. These variables include the level of preparedness, academic literacy, quality transition from school to university, financial resources, and employment prospects. A resilient system must shift from student access to meaningful participation, completion of education, and providing employability.

Digital Inequality and Learning Infrastructure

Digital transformation is a key aspect in the resilience of higher education. Digital teaching now shapes the environment for student learning—student libraries are virtual, and blended teaching is being implemented. Digital transformation, however, can exacerbate inequalities if students lack digital devices, internet access, digital literacy, and conducive learning environments. Inequities in access to education, digital literacy, education costs, and infrastructure affect digital higher education in the Global South. Accessibility in digital higher education entails not just making materials available online,[16] but also inclusive design, affordable access, and institutional readiness. The COVID-19 pandemic demonstrated the potential of e-learning to ensure educational continuity, though it also highlighted disparities. Resilience in e-learning relies on the ability to adapt teaching, assessment, communication, and student support processes.[17] Similarly, educational institutions should be resilient in leadership and organisational learning.[18]

Crisis, Uncertainty, and Academic Continuity in Iran

In Iran, higher education is the primary focus, with an emphasis on crisis responsiveness and continuity planning. Institutional disruptions can affect institutions, including public health emergencies, economic restrictions and sanctions, and other social and political factors. In such situations, resilience means the ability to remain true to teaching and safeguarding standards.

Higher education resilience following the COVID-19 pandemic necessitates organisational learning, adaptive leadership, flexible planning, and institutional coordination. These attributes need to be embedded within the institutional system.[19] This includes crisis planning, communication, digital teaching skills, teacher support, and quality assurance. Educator resilience was a crucial area for maintaining education standards during the COVID-19 pandemic in agricultural higher education in Iran.[20] Educators had to address new requirements and circumstances, and adapt rapidly to digital teaching. Researchers identified leadership, communication, flexibility, preparedness, and community engagement as important factors contributing to resilient educational systems.[21]

The following factors are of concern to universities, as they connect students, staff, administration, employers, and policymakers.

Student Well-being and Mental Health

Mental health and well-being are closely linked to student success. University students increasingly face worry, stress, isolation, and uncertainty about the future. Financial instability, educational competition, digital fatigue, family pressures, and social insecurity exacerbate these pressures.

In South Africa, lack of well-being is connected to structural inequalities and social exclusion. In Iran, crisis and uncertainty may impact academic motivation and stability. Counselling, peer mentoring, inclusive teaching, and crisis-sensitive student services are essential elements of resilient systems. It is also important for institutions to pay attention to students' voices, as this will assist them in understanding the reasons why a student is not learning and help them make curricula responsive and inclusive.[22]

Skill Development and Labour-Market Transitions

Higher education and labour market mismatch is another issue. Universities should be equipped to enable students to participate in economic development, innovation, and the transformation of society. Yet a high number of graduates are unemployed or underemployed or lack the necessary skills for the labour market. This is particularly striking in South Africa, where inequality, weak labour market linkages, and limited economic uptake affect the employability of graduates.

Resilience in higher education should therefore include skill development. Resilience and academic skills align with the requirements of Society 5.0 or 'Super Smart Society', which includes digital literacy, adaptability, critical thinking, and emotional intelligence as its main requirements.[23] Critical thinking is vital to an online learning environment, as online education should impart more than just content; it should foster analytical and reflective learning skills.[24] In Iran, digital teaching skills are important as well, since they are a crucial element in the present university system.[25] Skills development should include digital literacy, communication, problem-solving, entrepreneurship, and green skills.

Theory of Change for Resilient Higher Education

Theory of Change (ToC) offers a realistic tool for understanding how to increase resilience in higher education. It assists policymakers in creating clear pathways for change. ToC is not about what type of resilience universities should adopt; it is about the resources required, the interventions needed, the outputs to be generated and measured, and the long-term impacts to expect.[26]

In the context of Iran and South Africa, the ToC suggests a link between inputs, interventions, and outcomes for resilient higher education. The inputs are funding, digital infrastructure, trained staff, student data, governance systems, and international cooperation. Interventions include academic development, digital inclusion programmes, mental health services, curriculum reform, crisis planning, and employability support. Higher education institutions can train lecturers, provide students with access to platforms, offer them strong support mechanisms, and improve institutional policies. This can enhance well-being, employment, academic continuity, progression, and retention.

This approach prevents resilience from remaining an abstract concept, translating it into a measurable policy agenda. While BRICS institutions invest on the BRICS education-related platforms, it is hoped that their investments will lead to a shared approach to digital learning. Ideally, the BRICS institutions should invest in a shared digital learning platform. The idea is to improve access, participation, and provide continuity in the event of disruptions. Similarly, if universities provide mental health services, there should be a decrease in dropout rates and an increase in student well-being.

Table 6: Theory of Change for Resilient Higher Education

Inputs	Interventions	Outputs	Outcomes	Long-term Impact
• Funding • Digital infrastructure • Trained staff and governance systems	• Academic support • Digital inclusion • Mental health services • Curriculum reform • Crisis planning	• Accessible platforms • Trained lecturers • Support systems • Improved policies	• Improved retention • Progression • Graduation • Well-being • Employability	• Inclusive, resilient, and future-oriented higher education systems

Relevance for BRICS

Education plays an important role in the BRICS agenda as it supports human capital, innovation, and social transformation. BRICS countries require graduates who can contribute to the fields of digital economies, green transitions, public administration, education, health, agriculture, engineering, and research. Achieving their development goals will be difficult if higher education systems are weak or misaligned with labour-market needs.

While there are differences in the sizes, economic systems, and political environments of the BRICS countries, they face similar challenges, such as digital divides, unequal institutional capacity, pressures to internationalise, concerns about graduate employability, challenges to student well-being, and future skill needs. In low and medium-income countries (LMIC), internationalisation needs to be approached strategically, including through the engagement of academic diaspora networks.[27] This can be bolstered through research networks, staff exchanges, and knowledge sharing between BRICS countries.

The participating countries can provide a platform to learn from one another regarding higher-education policies. The aim should not be model-based standardisation, but linking different models. Platforms can be set up for comparative research, policy dialogue, collaboration on digital infrastructure, staff training, and encouraging student innovation. There are lessons to learn from South Africa on widening participation and student success in a highly unequal society, and from Iran on academic continuity, crisis adaptation, and educator resilience.

Iran's Experiences in Higher Education Resilience to Be Used Within the BRICS Framework

From the standpoint of BRICS member countries, Iran's experience illustrates how higher education institutions can sustain regular research and innovation activities despite external limitations. This resonates with ongoing debates within BRICS about diminishing reliance on conventional Western-oriented knowledge frameworks and fostering greater dependence on local and indigenous knowledge.[28]

South Africa's Experiences in Higher Education Resilience to be Used Within the BRICS Framework

South Africa offers important perspectives to other BRICS member states on how universities can remain resilient while simultaneously pursuing equity and social transformation,[29] given the measures already taken and currently underway in the areas of inclusive access, institutional transformation, social justice, and digital learning capacity.

Recommendations for BRICS

Establish a Higher Education Resilience Framework

BRICS should create a Higher Education Resilience Framework that emphasises student success, digital equity, crisis preparedness, capacity, and employability. It should provide general direction but allow individual countries flexibility in implementation. These indicators include retention, graduation, digital access, well-being, staff training, and graduate employment. A common framework will ensure that BRICS cooperation translates more effectively into action.

Invest in Inclusive Digital Infrastructure

Digital equity should be integral to the BRICS higher education paradigm. This includes low-cost internet connectivity, device support, reliable learning platforms, digital libraries, and open-source learning. Digital infrastructure should be inclusive, especially for students in rural areas, low-income students, and those with disabilities. Digital learning cannot be a reactive solution; it should be a part of an institution's long-term resilience.

Create a Student Success and Retention Network

BRICS should establish a university network to promote academic counselling, tutorial, mentoring, and early warning systems (EWS). This would be particularly beneficial for historically disadvantaged students in South Africa, who need structured academic and social support. It would also be advantageous for Iran and other BRICS members by enabling exchange of approaches towards student engagement during online classes or in times of crisis.

Strengthen Mental Health and Well-being Systems

Higher education institutions must set up student well-being systems supported by BRICS. The systems should include counselling, peer support, crisis response, referral systems, and digital mental health resources. Student well-being is not a welfare issue; it is part of learning.

Build Staff Capacity for Digital and Crisis-Responsive Teaching

Academic staff are crucial to institutional resilience. The BRICS staff must create development programmes on the themes of digital pedagogy, inclusive teaching, crisis-responsive education, the design of assessment, and student support. Institutions should train staff to use technology and develop meaningful learning experiences. In Iran, researchers have identified the factors that affected educators' resilience during the COVID-19 pandemic: institutional support, adaptability, and digital teaching skills.[30]

Align Curricula with Future Skills

The connection between curricula and labour market needs should be strengthened at universities in BRICS countries. This does not mean making higher education a job-training programme. Instead, it is about cultivating graduates who are inquisitive, 'tech-savvy,' communicative, entrepreneurial, and flexible. Curriculum reform should include employer involvement, work-integrated learning and projects, or entrepreneurship education. This may improve graduates' employability in South Africa and link academic education with the national agenda in Iran.

Promote Student Voices and Inclusive Governance

Students should participate in curriculum design, policymaking, and curriculum improvement. Their voices will enable institutions to gain insight into actual obstacles to learning and success. Incorporating student perspectives into efforts to improve learning and teaching in the Global South can be achieved by adapting curricula to be more responsive and inclusive.[31] This initiative should include student forums, youth policy dialogues, and participatory research into students' experiences within the BRICS cooperation.

Support BRICS Research Collaboration

BRICS should employ its financial resources to support comparative research on higher education resilience, digital equity, student success, academic well-being, and skills development. Iran should also be part of this research to develop the evidence base for its policies. Research should include projects for rural students, students with disabilities, first-generation students and conflict- or displacement-affected students.[32]

Conclusion

Resilience is a critical policy issue in higher education across Iran, South Africa, and the wider BRICS grouping. In South Africa, successful labour-market transitions, financial instability, student underpreparedness, low retention rates, and inequality are all aspects of resilience. In Iran, resilience is linked to academic continuity, crisis-responsive governance, staff, digital readiness, and student support during periods of uncertainty. Although the circumstances in the two countries are different, both underscore the need for higher education to be institutionally inclusive, measurable, and resilient.

This article has proposed that a ToC can connect inputs, interventions, outputs, and outcomes for resilience. Digital infrastructure, funding, staff training, and governance need to align with classroom practice. This includes academic support, mental health support, curriculum change, digital inclusion, and crisis preparedness. These interventions should positively impact outcomes, including well-being, institutional adaptability, employability, retention, and graduation.

Cooperation among the BRICS nations can be of great importance in this process. A shared Higher Education Resilience Framework, inclusive digital infrastructure, student success networks, mental health systems, staff development, curriculum reform, and research collaboration are ways in which the group can support inclusive, future-oriented, and socially responsive higher education systems. However, the goal should not only be to support the survival of universities in the face of disruption; it should also be enabling universities to produce graduates who can contribute to resilient societies, sustainable development, and equitable growth.

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Endnotes

1 E.T. Woldegiorgis and O. Chiramba, "Access and Success in Higher Education: Fostering Resilience in Historically Disadvantaged Students in South Africa," *Journal of Applied Research in Higher Education* 17, no. 2 (2025): 759-771, https://doi.org/10.1108/JARHE-05-2023-0217.

2 M. Mokhtarzadeh, "Identifying and Ranking Key Components for Resilient Schools: A Mixed-Methods Study in the Iranian Educational Context," *Research in Educational Administration and Leadership* 10, no. 4 (2025): 983-1030, https://doi.org/10.30828/real.1616668.

3 Pelletier Kathe and Robert Jenay, "Building Institutional Resilience to Adapt and Thrive in Times of Uncertainty," July 14, 2025, https://er.educause.edu/articles/2025/7/building-institutional-resilience-to-adapt-and-thrive-in-times-of-uncertainty.

4 M. Moin, M. Mahmoudi, and N. Rezaei, "Scientific Output of Iran at the Threshold of the 2020s," *Scientometrics 122*, no. 3, 1805–1817.

5 Tash Mosheim, "Iran's Universities Battered But Not Beyond Repair, Scholars Say," Times Higher Education, March 4, 2026, https://www.timeshighereducation.com/.

6 Z.M. Mthombeni, "Higher Education Access Crisis in South Africa: Implications for the Developmental State," *Globalisation, Societies and Education* (2026), 1–17, https://doi.org/10.1080/14767724.2026.2662973; I.G. Dezhina, "Science Under Sanctions: The Experience of Iranian Universities," *Studies on Russian Economic Development 33*, no. 5 (2022), 580–587.

7 Mosheim, "Iran's Universities Battered but Not Beyond Repair, Scholars Say".

8 Darabi Targol, Shariatmadari Mehdi, Mahmoodi Amir Hossein, "Developing Good Practices and Organisational Resilience During the COVID-19 Pandemic: A Retrospective Qualitative Case Study in a Higher Education Institution," *Iranian Journal of Educational Sociology* 6, no. 3 (2023): 43-61,

9 Mosheim, "Iran's Universities Battered but Not Beyond Repair, Scholars Say".

10 S. Zandi, F. Ahmadi, Ö. A. Cetrez, and S. Akhavan, "Coping Orientation of Academic Community in the Time of COVID-19 Pandemic: A Pilot Multi-country Survey Study," *Illness, Crisis, and Loss* 31, no. 3 (2023), 504–524, https://doi.org/10.1177/10541373221088391.

11 Virmasalo Veera, "South Africa's Policy-driven Internationalisation is Striving to Strike a Balance Between Global Excellence and Equality at Home," *Opetus- ja kulttuuriministeriö*, May 29, 2026, https://okm.fi/en/pretoria-sa.

12 Mosheim, "Iran's Universities Battered but Not Beyond Repair, Scholars Say".

13 Mohammad Mehdi Panahi and Neda Moayerian, "Seeds of Resilience: How Social Capital Cultivates Community Strength in Environmental Crisis Management," *Journal of Environmental Management* 380 (2025), https://doi.org/10.1016/j.jenvman.2025.124937.

14 Mosheim, "Iran's Universities Battered but Not Beyond Repair, Scholars Say".

15 Woldegiorgis and Chiramba, "Access and Success in Higher Education: Fostering Resilience in Historically Disadvantaged Students in South Africa".

16 P. Mashau and Tshililo Ruddy Farisani, "Accessibility of Digital Higher Education in the Global South," IGI Global, 2023, https://doi.org/10.4018/978-1-6684-9179-9.ch004.

17 T. Bucos, "Educational Resilience Through e-Learning: How Higher Education Adapts to Global Challenges," *Sustainability and Economic Resilience in the Context of Global Systemic Transformations* (2025): 9-10, https://doi.org/10.53486/ser2025.01.

18 M. Gull, P. Shazia, and A.R Sridadi, "Resilient Higher Educational Institutions in a World of Digital Transformation," *foresight* 26, no. 5 (2024): 755-774, https://doi.org/10.1108/FS-12-2022-0186.

19 Darabi, Shariatmadari, Mahmoodi, "Developing Good Practices and Organisational Resilience During the COVID-19 Pandemic: A Retrospective Qualitative Case Study in a Higher Education Institution".

20 M. Ghiasvand, A. Enayat, and S. Mahsa, and J. Pariab, "Educator's Resilience in Agricultural Higher Education System During COVID-19 Pandemic: Empirical Evidence From Iran," *Frontiers in Education* 9 (2024):1413657, https://doi.org/10.3389/feduc.2024.1413657.

21 M. Mokhtarzadeh, "Identifying and Ranking Key Components for Resilient Schools: A Mixed-Methods Study in the Iranian Educational Context," *Research in Educational Administration and Leadership* 10, no. 4 (2025): 983-1030, https://doi.org/10.30828/real.1616668.

22 X. Khohliso and M. Mphuthi, "Student Voice as a Curriculum Practice to Enhance Learning and Teaching in Higher Education in the Global South," *Journal for New Generation Sciences* 23, no. 1 (2025): 1-15, https://doi.org/10.47588/jngs.2025.23.01.a1.

23 K. Kurniadi, L.W. Meiliyandrie, R. Rahmah, "Digital Mapping of Resilience and Academic Skills in the Perspective of Society 5.0 for Higher Education Level Students," 2023, https://www.researchgate.net/publication/371806371. https://doi.org/10.32388/FO9ZQO.

24 N.O Gold, H. Coovadia, and T. Mahmood, "Critical Thinking Development in a Quality Matters-Based Online Learning: Student Insights from a South African Higher Education Context," *Frontiers in Education* 10 (2025), https://doi.org/10.3389/feduc.2025.1642266.

25 S. Mahdavi-Zargari, "The Role of Digital Teaching Skills in the Contemporary University," *Revista Metropolitana de Ciencias Aplicadas* 9, no. 1 (2026): 64-70, https://doi.org/10.62452/8reb2p79.

26 Craig Valters, "Understanding Theory of Change in International Development. The Justice and Security Research Program," *The Asia Foundation*, 2012, https://www.researchgate.net/publication/259999367.

27 M. Moshtari et al., "Challenges and Strategies for Academic Diaspora Engagement in the Internationalisation of Higher Education Institutions: Empirical Evidence From a Low-and Medium-Income Country," *Higher Education Quarterly* 79, no. 1 (2025): e70004, https://doi.org/10.1111/hequ.70004.

28 Wolhuter Charl," Iran Laying the Capstone Brick for a BRICS Grouping of Countries: New Horizons for Comparative and International Education," *Iranian Journal of Comparative Education (IJCE)* 6, no. 1 (2023): 2228-2370, https://journal.cesir.ir/journal/.

29 Nungelo Gina, Department of Science, Technology and Innovation SA, https://www.facebook.com/.

30 Ghiasvand, Enayat, Mahsa, and Pariab, “Educator’s Resilience in Agricultural Higher Education System During COVID-19 Pandemic: Empirical Evidence From Iran”.

31 Khohliso and M. Mphuthi, “Student Voice as a Curriculum Practice to Enhance Learning and Teaching in Higher Education in the Global South”.

32 M.I. Naeemy et al., “Resilience Amid Barriers: Narratives of Disability Inclusion in Afghan Higher Education Institutions,” *Educational Process: International Journal* 20 (2026), https://doi.org/10.22521/edupij.2026.20.15

Investing in Resilience: A Systemic Imperative

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Abstract

'RESILIENCE' AS A PARADIGM has gained prominence amidst multiple crises and prolonged geopolitical uncertainty and the devastating impacts on people's lives. The importance of resilience as a governance yardstick and performance benchmark is being tested during these times of multiple crises. This article discusses the financing dimension of resilience: the instruments, institutions, and investment flows required to build resilient systems. Accordingly, four domains—infrastructure, climate, supply chains, and fiscal systems—are assessed through the lens of how BRICS can mobilise, structure, and de-risk investment to strengthen resilience.

Understanding the Challenge

The concept of 'resilience' has gained attention in policymaking lexicon in recent years, most importantly in forums like G7, G20, and BRICS—perhaps reflecting a global awareness of the apparent inability of short-term knee-jerk policy measures to generate desired impacts. The idea is rooted in 19th-century physical sciences to explain how materials regain their original form after deformation. Since the 1980s, it has expanded to domains spanning ecology, social sciences, disaster studies, international relations, political economy, and development finance.[1] Grounded in systems theory, the seminal work by Holling (1973)[2] and its later development define resilience as "the magnitude of disturbance that can be absorbed before a system changes its structure."[3]

In the economic context, resilience is operationally defined by Walker and Salt (2006) as "the capacity of a system to absorb disturbance and reorganize while undergoing change, so as to retain essentially the same function, structure, identity, and feedbacks."[4] Perhaps the most policy-relevant framing is provided by Brunnermeier (2021), for whom resilience is the capacity to recover from a shock. This is a shift away from risk management, where one seeks to prevent shocks, towards resilience management, where one accepts that shocks will occur anyhow and builds the institutional capacity to absorb and recover from them.[5]

This is particularly relevant in the BRICS context, where the core institutional challenge is not eliminating exposure to geopolitical and financial shocks but constructing the mechanisms capable of absorbing them to avoid systemic collapse. 'Resilience' as a keyword—be it for infrastructure, supply chains, health systems, or climate energy—has appeared in BRICS Leaders' Declarations since India's chairmanship in 2016. The scope of 'resilience' in subsequent Leaders' Declarations continued to widen, with the 2025 Rio Declaration alone mentioning the word in 10 places within the text.[6] The theme of India's BRICS chairmanship in 2026, 'Building for Resilience, Innovation, Cooperation and Sustainability', underscores the importance of resilience for BRICS cooperation, particularly strengthening economic, social, and institutional resilience, and integrates it with the other three pillars of innovation, cooperation, and sustainability, for synergistic development outcomes.[7]

The Relevance of Resilience

Resilience appears to be a sector-neutral paradigm shift that guides policy actions at the conception and design stage to minimise the adverse effects of disruptions arising from disasters, the erosion of infrastructure assets, and additional financing costs. The desired outcome of resilience-embedded policies is expected to be strong, durable, and replicable. This article considers four domains to examine the relevance and criticality of resilience as a systemic imperative: (i) resilient infrastructure; (ii) climate resilience; (iii) supply chain resilience; and (iv) fiscal resilience.

This article adopts a systems approach in the sense that infrastructure, climate, supply chains, and fiscal capacity are treated not as silos but as interlinked components of a single resilience architecture, in which underinvestment in one component propagates costs through the others. For example, underfunded resilient infrastructure raises the fiscal cost of post-disaster reconstruction (fiscal resilience); climate-related disruption to transport corridors weakens supply chain continuity (supply chain resilience); and fragile supply chains, in turn, increase the balance-of-payments and financing pressures that fiscal resilience instruments such as the BRICS contingent reserve arrangement (CRA) are designed to absorb. It is this cross-domain transmission of shocks, rather than any single domain in isolation, that makes resilience a systemic imperative for BRICS. This justifies treating financing decisions in each domain as investments in the resilience of the wider system.

Resilience is a multidimensional concept that extends well beyond the four domains examined here, encompassing health system resilience, food security and resilience, water resilience, and urban resilience, among others—all of which feature in BRICS and G20 policy discussions. This article narrows the focus to infrastructure, climate, supply chain, and fiscal resilience because these four domains: (i) have the most developed BRICS-level institutional architecture to date (the New Development Bank (NDB), CRA, BRICS Pay, and the Strategy for BRICS Economic Partnership); (ii) are the domains where financing gaps are most acute and best documented; and (iii) fall most directly under the mandate of finance and economic policymakers. Health, food, and water resilience are treated as cross-cutting concerns that intersect with, rather than substitute for, these four financing-focused domains.

Resilient Infrastructure

The Coalition for Disaster Resilient Infrastructure (CDRI) defines 'resilient infrastructure' as "infrastructure systems and networks, the components, and assets thereof, and the services they provide, that can resist and absorb disaster impacts, maintain adequate levels of service continuity during crises, and swiftly recover in such a manner that future risks are reduced or prevented."[8] While infrastructure financing requirements will continue to rise across all categories of countries in the coming decades, the need for investing in resilience is of paramount importance. With an estimated average annual loss of US$700 billion in infrastructure and buildings, asset loss, and service disruptions to infrastructure associated with the frequent occurrence of disasters and climate hazards, necessitate the strengthening of infrastructure resilience.[9]

BRICS views infrastructure as a critical enabler of industrialisation, socio-economic growth, and transformation. It has been explicitly included in BRICS Leaders' deliberations since the South African chairmanship in 2013.[10] Between 2013 and 2021, BRICS considered the issues of enhancing infrastructure connectivity, closing the infrastructure financing gap, investment in newer fields like energy infrastructure, digital infrastructure, social infrastructure (e.g. health), unlocking private capital, and the role of the NDB.[11] In 2022, disaster-resilient infrastructure found mention for the first time in the Leaders' Statement within the context of disaster risk reduction. Since then, the BRICS process has underscored the importance of disaster-resilient and climate-resilient infrastructure. The 2025 Rio Summit has called for embedding climate-resilient infrastructure in upcoming projects, marking a radical departure from infrastructure creation to ensuring quality and resilience in the BRICS way of thinking.[12]

The creation of the New Investment Platform (NIP) and the BRICS Multilateral Guarantee (BMG) will facilitate the financing of sustainable development projects in sectors like energy transition, renewable energy, and the strengthening of resilient infrastructure.[13] Investing in resilient infrastructure does not simply mean more money for the infrastructure sectors; rather, it requires parallel changes in areas like mainstreaming disaster risk management in project planning and procurement, risk allocation in contracts, especially in Public-Private Partnership (PPP) projects, regulatory oversight, establishing terms and standards for bidding, award, and remuneration, among others.[14]

Although funding resilient infrastructure will require *ex ante* allocation of finances to cover the risk factors associated with disasters and extreme weather events, a badly conceived risk scenario will result in higher project costs post-event. Hence, ADB (2022) isolates the two components of investment in resilient infrastructure pre-event and financing disaster response post-event.[15] Table 1 illustrates the financing instruments that can be considered for resilient infrastructure after factoring in post-disaster response.

Table 1: Financing Resilient Infrastructure

(A) Funding Options for Investment in Resilient Infrastructure		
Category	**Instruments**	**Benefits**
Own Resources	• Revenue streams • Reserves	• No conditions attached • No cost of borrowing • Efficient spending incentivised
Debt	• Loans • Concessional Loans • Traditional/green bonds • Development/Environment impact bonds • PPPs	• May incentivise efficient spending
Equity	• PPPs • Build-Operate-Transfer (BOT)	• Additional funding channels (private partners) increase financial resilience • Financial risk reduction (dividends are paid only when the owner/ operator makes a profit)
(B) Innovative Mechanisms Balancing Infrastructure Financing and Disaster Response		
Instrument	**Description**	**Benefits**
Insurance-backed Loan Packages	These are (concessional) loans with resilience conditions, including the insurance of assets. Insurance costs may be included in the loan amount.	The loans explicitly integrate risk transfer solutions into debt instruments, thereby reducing the administrative burden of finance arrangements
Pay-as-you-save (PAYS) Schemes	A resilience services company (ReSCo) is an independent agent that pays for and implements resilience measures in exchange for returns from future insurance premium discounts. An analogous example exists in the energy sector but remains untested in insurance.	Retains financial resilience and operational expenses at previous (or slightly improved) levels

Resilience Impact Bonds	A pay–for–performance contract in which private investors cover the costs of providing various aspects of resilience and are repaid by a donor based on the benefits of the project (measured by insurance rebate)	The bonds provide investors with strong incentives to meet all required resilience measures in a cost-efficient manner
Resilience Bonds	Resilience bonds are risk transfer mechanisms similar to catastrophe (cat) bonds that explicitly consider resilience measures in their premium calculation.	The bonds provide strong incentives for investors to put in place projects with large resilience benefits.

Source: ADB (2022)[16]

On return on investment (ROI), CDRI (2023) estimates that every dollar invested in disaster-resilient infrastructure saves US$4 to 6 in post-disaster reconstruction and economic-loss costs, against a current baseline of US$700 billion in average annual infrastructure and building losses.[17] Framing resilient-infrastructure financing in these benefit-cost terms, rather than as an additional cost layer, strengthens the case for allocating scarce fiscal and blended-finance resources to ex ante resilience measures rather than relying solely on post-disaster response.

Climate Resilience

In line with the above-mentioned definitions of resilience, climate resilience points to the ability of governments, policymakers, and communities to anticipate climate risks and prepare to prevent and minimise the extent of damage. The UNFCCC (United Nations Framework Convention on Climate Change) Climate Action Pathway 2021 envisages action in three areas: urban resilience, rural resilience, and coastal resilience. Further, "this vision recognizes that building climate resilience requires combining mitigation and adaptation actions to tackle the current and future impacts of climate change across urban, rural and coastal territories and across sectors such as the agriculture and food systems (MPGCA Land use pathway), water and natural systems (Land use and water pathways), cities (Human settlement pathways), coastal zones and oceans (Ocean pathway), and infrastructures and services (Industry, Transport and Energy pathways)."[18]

In the absence of a roadmap for climate resilience, the impact of climate change would manifest in sudden-onset disasters and slow-onset changes, such as changing water balance and increasing sea levels and temperatures. Nature-based solutions are cost-effective ways to tackle climate resilience.[19] Adaptation helps in improving resilience to climate events. Table 2 maps the verticals/barriers and the required interventions to improve adaptation outcomes which, in turn, will improve resilience to climate shocks.[20]

Table 2: Interventions for Climate Change Adaptation and Resilience

Barriers	Interventions
Needs-driven Adaptation Planning	• Ensure that national adaptation planning is evidence-driven and country-owned, whether through the Nationally Determined Contributions (NDCs), National Adaptation Plans (NAPs), or Adaptation Communications processes • Adopt multi-stakeholder participatory approaches • Ensure that the needs of the most vulnerable are defined and met
Climate Data and Information	• Invest in climate monitoring and forecasting systems, and make climate services available to key stakeholders and the general public • Regularly monitor and synthesise shorter- and longer-term, national and sub-national climate risks and impacts • Raise public awareness on climate risks and launch education or communication campaigns
Policies and Institutions	• Build institutional capacity for climate risk analysis, planning, and project implementation • Improve cross-ministerial and cross-country coordination • Improve policy effectiveness through transparent monitoring and compliance
Incentives and Behaviours	• Reduce economic inefficiencies caused by poor policies • Internalise externalities (e.g., carbon pricing and risk-based insurance) • Introduce norms and regulations (e.g., land use plans and zoning regulations) • Align the taxation system with climate adaptation objectives
Finance	• Create an adaptation investment plan • Build enabling environments for private sector investment in resilience-building • Provide public support for low-income and vulnerable households that are at risk from natural disasters

Decision-making and Actions	• Adopt multi-stakeholder iterative decision-making • Choose robust and flexible solutions • Build necessary capacity, particularly at the local level, to implement projects and absorb funds for adaptation • Regularly revise policies through adaptive learning • Ensure the ability to continue identifying evolving adaptation priorities with changing risks • Manage negative side effects through the creation of compensation schemes

Source: World Bank (2019)[21]

Since the first Leaders' Summit, BRICS has underlined the importance of climate change. The grouping has reiterated its member states' commitment to the Paris Agreement, the Kyoto Protocol, and the UNFCCC. BRICS Ministerial Tracks and the Leaders' Summits in different years have also covered the issues of mobilising financing for adaptation and mitigation efforts, technology transfer, and addressing the specific challenges in sectors like agriculture, health, and energy, among others.

With the intensification of effort towards climate action and the Net Zero commitments by the countries, BRICS has institutionalised its actions in the form of a Task Force for Global Mobilisation against Climate Change, the BRICS Leaders' Framework Declaration on Climate Finance, and the BRICS Climate Research Platform, among others. India's chairmanship in 2026 has two pillars of resilience and sustainability, both envisaging credible BRICS-level initiatives on climate adaptation and mitigation efforts, and will perhaps enhance the effectiveness of the existing mechanisms of the grouping.

The Global Commission on Adaptation has estimated that climate adaptation investment across early warning systems, resilient infrastructure, dryland agriculture, mangrove protection, and water resources can generate benefits several times the initial outlay, with nature-based solutions frequently cited among the most cost-effective adaptation options available to BRICS members.[22] Quantifying these returns can help BRICS climate finance mechanisms build the case for a larger share of climate finance to flow toward adaptation, which currently attracts proportionally less funding than mitigation.

Supply Chain Resilience

The convergence of geopolitical fragmentation, pandemic aftershocks, and the expansion of BRICS itself in recent years has shifted supply chain resilience from background policy language to mainstream BRICS priority. Based on data from the UN Trade and Development (UNCTAD), the expanded grouping's intra-bloc trade has increased from US$84.2 billion in 2003 to US$1.17 trillion in 2024. Nonetheless, BRICS members jointly account for only 20 percent of South-South trade while they represent over two-thirds of the Global South's total Gross Domestic Product (GDP).[23]

Furthermore, as of 2020, over 85 percent of trade between BRICS countries was already focused on capital and intermediate goods rather than on final consumption products.[24] Machinery, professional and scientific equipment, chemicals, agricultural outputs, and raw materials all enter the complex value chains of international output, further emphasising the importance of industrial cooperation across the bloc. Examples of this cooperation include: South Africa and Russia exporting rare metals, and China exporting circuit control chips and other vehicle parts to the United Arab Emirates (UAE) so that the Abu Dhabi-based NWTN factories can assemble electric vehicles for the Middle Eastern markets, or to Brazil, where BYD factories can produce to export to the rest of Latin America.

Critical minerals are another area where supply chain stakes are steep. The extended BRICS collective controls a substantial portion of the world's critical minerals, including lithium, cobalt, and rare earths, and has the power to reshape the global supply chains that depend on them or at least provide alternatives if cooperation goes beyond declaratory commitments.

In sum, the topic of supply chains has real weight in the BRICS resilience agenda, and several instruments have already been designed to address vulnerabilities. The most institutionally developed one so far is the Strategy for BRICS Economic Partnership 2025,[25] adopted in 2020 under the Russian presidency, and updated and renewed through to 2030 in Brazil.[26] It committed its members to enhancing "supply chain connectivity by identifying bottlenecks in regional supply chains" and to developing safe, balanced, and dynamic transnational transportation and logistics systems as an essential enabler of economic growth.[27]

The Chennai–Vladivostok Eastern Maritime Corridor is among the tangible results of this strategy. It became operational in November 2024, and Russia has announced that it is activating this link between its Far East and India.[28] The corridor spans 5,600 nautical miles, reduces transit time from over 40 days via the traditional routes to 24 days, and is already carrying crude oil, liquefied natural gas (LNG), fertilisers, machine parts, and textiles.[29] In addition to the UAE, Saudi Arabia and India being hubs of the India-Middle East-Europe Economic Corridor (IMEC); Russia, Iran, and India have been developing the International North-South Transport Corridor (INSTC); and Russia, China, and even India are willing to explore Arctic trade routes. These are all examples of BRICS maritime-urban connectivity needed to reduce over-reliance on routes with identified bottlenecks such as the geopolitically vulnerable Suez Canal or the drought-affected Panama Canal.[30] Such transportation networks are also made feasible courtesy of the NDB, which finances cross-border infrastructure connecting member countries.

From a financing perspective, connectivity corridors such as IMEC illustrate how supply chain resilience links directly to this article's financing narrative: the corridor's rail, port, and shipping segments require blended public-private capital, sovereign guarantees, and multilateral development bank (MDB) co-financing (including potential NDB participation) to de-risk private investment in the missing links, particularly the rail segment connecting Gulf ports to the Mediterranean. Thus, the IMEC, the Eastern Maritime Corridor, and INSTC have been framed as investable infrastructure assets, with defined financing instruments, risk-sharing arrangements, and revenue models such as port tariffs and rail-freight charges, instead of as purely geopolitical or logistics initiatives.

In 2025, the BRICS Business Council under Brazil's presidency explicitly identified 'Strengthening intra-BRICS trade and supply chain resilience' as one of its four core pillars by removing trade barriers, fostering economic integration, and building resilience to manage supply chain disruptions.[31] Supporting an inclusive and rules-based multilateral trading system was already a cornerstone of the BRICS Initiative on Enhancing Cooperation on Supply Chains adopted in 2022 under the Chinese presidency.[32]

The 9th BRICS Industry Ministers' Meeting in Brasília formalised the working groups on Smart Manufacturing and Robotics, Digital Transformation of

Industry, and Small and Medium Enterprises (SMEs), as well as the PartNIR Sovereign AI initiative for Digital Industrialization. It also formally recognised the BRICS Centre for Industrial Competences (BCIC), which was launched in April 2025 in partnership with the United Nations Industrial Development Organization (UNIDO) with the intention of contributing to strengthening supply chains by building Industry 4.0 skills and fostering productivity among member countries.[33] The meeting's joint declaration reaffirmed BRICS' role in promoting resilient and inclusive supply chains, aligning economic growth with sustainability. The participants at the same meeting also agreed upon the first-ever 2025–2030 Action Plan for SMEs. This is a relevant step given that SMEs comprise 90 percent of companies and over 50 percent of jobs in the world, so their integration into resilient value chains should officially be on the agenda.[34]

Nonetheless, the existing instruments, be it the NDB, the Business Council working groups, the BCIC, or the discussed transport corridors, remain relatively new and underdeveloped compared to the scale of what the bloc controls vis-a-vis resources, trade routes, and manufacturing capacity.

India's presidency needs to close the gap between ambition for supply chain resilience and genuine transition implementation. Priority on the agenda should be given to areas like semiconductors, critical minerals, and pharmaceuticals.[35] The focus should be brought systematically to practical initiatives that can range from customs coordination, the mutual recognition of trusted traders, to regulatory dialogues in emerging industries. Other suggested practical solutions can incorporate the dedicated mapping of alternative logistics corridors, harmonisation of trade standards, and the opening of a 'BRICS Resilience Fund' window inside the NDB.[36]

The return on investment case for supply chain resilience is illustrated by the Chennai–Vladivostok corridor itself: cutting transit time from over 40 days to 24 days lowers inventory-carrying costs, freight-insurance premiums, and working-capital requirements for traders using the route, benefits that compound across the higher-value machinery, energy, and pharmaceutical cargoes it is designed to carry. More broadly, diversifying trade routes away from chokepoints such as the Suez and Panama Canals reduces the risk premium priced into BRICS trade finance and freight costs—an avoided-cost return that reinforces the case for continued investment in alternative corridors and logistics infrastructure.

Fiscal Resilience

BRICS addresses fiscal resilience through three institutional instruments: the contingent reserve arrangement, the NDB, and an emerging architecture for cross-border payments in local currencies. The CRA, established in Brazil in 2014, is a framework that can provide liquidity support and precautionary instruments in response to potential or actual short-term pressures on the balance of payments of member countries.

At present, the pooled resources that countries can draw from amount to US$100 billion contributed by China (US$41 billion), Brazil (US$18 billion), India (US$18 billion), Russia (US$18 billion), and South Africa (US$5 billion).[37] Some BRICS members already participate in alternative arrangements, like China in the Chiang Mai Initiative worth US$240 billion[38] or India in the South Asian Association for Regional Cooperation (SAARC) Currency Swap Arrangement worth US$2 billion.[39] China has a bilateral swap with Brazil[40] worth US$28 billion, and the UAE has discussed a bilateral swap arrangement with the United States.[41]

Yet, the CRA mechanism has remained unused so far. For it to have a meaningful role, it might need to distinguish itself further from existing mechanisms and potentially emancipate itself from its reliance on International Monetary Fund (IMF) conditionality, even if that means designing its own. Premised on the treaty that established it, 70 percent of the resources that a country can access under the CRA are tied to the country, providing evidence that it has an on-track arrangement with the IMF, that the IMF has committed to provide financing to it based on conditionality, and that it has complied with the terms and conditions of that arrangement.[42] The more widespread use of local currencies in the CRA transactions could be another useful demarcation point. This could make the CRA a channel for greater use of national BRICS currencies in the financial operations of connected platforms and institutions.[43]

The BRICS Cross-Border Payments Initiative, adopted in 2024 and known as BRICS Pay, is sometimes misinterpreted as being linked to a hypothetical de-dollarisation strategy. The objective is far less ambitious, as it is only trying to diversify the use of currencies and thereby address the structural vulnerability of emerging markets in cases where they depend on a single currency for all trade settlements and external borrowings. Whenever such currency appreciates following tight monetary policy in the emitting economy, it increases the real cost of borrowing for the emerging market, reduces its fiscal space and can trigger capital outflows, imposing procyclical adjustments.

If business cycles are synchronised or fiscal spaces are ample, as in the UAE, such pass-through effects are easily absorbed by the emerging market. However, as recognised by the IMF, they remain a fundamental driver of fiscal stress for many economies in Africa, Asia, and Latin America,[44] while increased local-currency sovereign bond issuance and domestic absorption have broadly supported emerging market resilience.[45] The 2025 BRICS Finance Ministers and Central Bank Governors' Joint Statement welcomed the Technical Report on the BRICS Cross-Border Payments System as an instrument to facilitate "fast, low-cost, more accessible, efficient, transparent, and safe cross-border payments,"[46] which implies that this payment architecture is directly related to the financial and fiscal resilience of the BRICS countries.

The NDB, as a multilateral development bank, can also contribute to fiscal resilience through its local currency financing strategy, which should cover 30 percent of all its lending by the end of 2026.[47] Shielding member countries from exchange-rate volatility and strengthening domestic capital markets can contribute to their countercyclical capacity and, thus, to their systemic shock resilience.

The ROI for fiscal resilience instruments is best expressed in terms of crisis-cost avoidance rather than direct yield: liquidity support through the CRA is intended to reduce output losses, currency depreciation, and borrowing-cost spikes that typically accompany balance-of-payments crises, while the NDB's local-currency lending directly reduces members' exposure to exchange-rate revaluation losses on foreign-currency debt. Making this avoided-cost logic explicit would help justify the political and financial capital required to operationalise the CRA and expand local-currency financing, both of which have so far seen limited uptake relative to their design capacity.

Policy Recommendations for BRICS

All four domains of resilience—infrastructure, climate, supply chains, and fiscal—constitute the core of the policy action taken by BRICS. In view of the emerging priorities across the digital economy, circular economy, space, and maritime sectors, the focus on resilience will deepen beyond the current level of weight it receives. From such perspective, BRICS may consider the following recommendations for adopting resilience in all its verticals:

BRICS may consider creating a Task Force on Resilient Infrastructure that will advise on the preparation of a pipeline of projects with resilience properties, funding mechanisms, including blended finance options, and other regulatory issues.

BRICS may enhance data and information sharing systems pertaining to disasters and pool national disaster management capacities to strengthen efforts towards climate resilience.

BRICS could prioritise practical supply chain resilience initiatives in semiconductors, critical minerals, and pharmaceuticals through customs coordination, the mutual recognition of trusted traders, the harmonisation of trade standards, and the mapping of alternative logistics corridors.

BRICS could strengthen fiscal resilience by making the CRA more operational and less dependent on IMF-linked conditionality, while expanding local-currency financing and cross-border payment mechanisms to reduce exchange-rate vulnerability and preserve fiscal space during shocks.

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Endnotes

1 Lisa Scordato and Magnus Gulbrandsen, "Resilience Perspectives in Sustainability Transitions Research: A Systematic Literature Review," *Environmental Innovation and Societal Transitions* 52 (2024).

2 C.S Holling, "Resilience and Stability of Ecological Systems," *Annual Review of Ecology and Systematics* 4, no. 1 (1973):23.

3 C.S Holling, "Engineering Resilience versus Ecological Resilience," In *Engineering Within Ecological Constraints*, ed. P.C. Schulze (National Academy Press, 1996), p. 33.

4 B. Walker and D. Salt, *Resilience Thinking: Sustaining Ecosystems and People in a Changing World* (Washington DC, Island Press, 2006), p. 1.

5 Markus K Brunnermeier, *The Resilient Society* (Colorado Springs, Endeavor Literary Press, 2021).

6 BRICS, Leaders' Declarations (2016-2025).

7 BRICS India 2026, "Theme & Priorities," https://www.brics2026.gov.in/brics-india-2026/#brics_theme

8 CDRI, *Global Infrastructure Resilience: Capturing the Resilience Dividend. A Biennial Report from the Coalition for Disaster Resilient Infrastructure*, 2023.

9 "Global Infrastructure Resilience: Capturing the Resilience Dividend. A Biennial Report. Coalition for Disaster Resilient Infrastructure".

10 BRICS, *Leaders' Declaration 2013, BRICS South African Chairship*, 2013.

11 BRICS India 2026, https://www.brics2026.gov.in/

12 BRICS, *Leader' Declaration*, 2025, https://bricsthinktankscouncil.org/knowledge-base/17th-brics-summit-rio-de-janeiro-declaration-2025

13 "BRICS Leaders' Declaration".

14 World Bank, "Technical Brief on Resilient Infrastructure Public-Private Partnerships: Policy, Contracting and Finance," Washington D.C., World Bank Group, 2019.

15 ADB, *Disaster Resilient Infrastructure: Unlocking Opportunities for the Asia and the Pacific*, April 2022, Asian Development Bank, 2022.

16 "Disaster Resilient Infrastructure: Unlocking Opportunities for the Asia and the Pacific".

17 CDRI, *Global Infrastructure Resilience: Capturing the Resilience Dividend. A Biennial Report from the Coalition for Disaster Resilient Infrastructure*, 2023, https://www.cdri.world/upload/biennial/CDRI_Global_Infrastructure_Resilience_Report.pdf.

18 UNFCC, Climate Action Pathways: Climate Resilience, United Nations Climate Change, 2021, https://unfccc.int/climate-action/marrakech-partnership/reporting-and-tracking/climate_action_pathways.

19 World Bank, *Nature-Based Solutions for Climate Resilience and Adaptation. Climate and Development Brief*, Washington DC, 2022, World Bank Group, https://thedocs.worldbank.org/en/doc/111a397e3cdec79a7f1ee6db6b329fb4-0020012022/original/WB-Nature-Based-221102-1838.pdf.

20 World Bank, The World Bank Group Action Plan on Climate Change Adaptation and Resilience, Washington DC, World Bank Group, 2019.

21 "The World Bank Group Action Plan on Climate Change Adaptation and Resilience".

22 Global Center on Adaptation, *Adapt Now: A Global Call for Leadershio on Climate Resilience*," 2019.

23 UNCTAD, *Two Decades of Intra-BRICS Trade: Trends, Patterns and Policies*, 2026, UN Trade and Development, https://unctad.org/system/files/official-document/tcsgdsinf2025d2_en.pdf.

24 David Marx, "Intra-BRICS Trade: Production-Orientation, Rise of Capital Goods, and Potential for Further Cooperation," 2024, https://david-chi-zhang.github.io/MReview/2024/05/31/BricsProductionTrade/.

25 BRICS, *Strategy for BRICS Economic Partnership 2025*, BRICS Information Centre, University of Toronto, http://www.brics.utoronto.ca/docs/2020-strategy.html.

26 Inez Moustafa, "BRICS Approves Joint Declaration for Fairer, More Inclusive Global Trade," https://brics.br/en/news/brics-approves-joint-declaration-for-fairer-more-inclusive-global-trade.

27 "Strategy for BRICS Economic Partnership 2025".

28 Joint BRICS, *Russia Developing Chennai–Vladivostok Maritime Corridor as Trade Focus Shifts to South India*, https://infobrics.org/en/post/84718.

29 "Chennai-Vladivostok Maritime Corridor Becomes Operational, Says Sonowal," *Business Standard,* November 18, 2024, https://www.business-standard.com/industry/news/chennai-vladivostok-maritime-corridor-becomes-operational-says-sonowal-124111801090_1.html.

30 Samir Saran and Jhanvi Tripathi, "BRICS Cooperation: A Programme for Trade and Investment," *ORF Special Report No. 265*, Observer Research Foundation, June 2025.

31 BRICS Business Council, "BBC Issues Note BRICS 2025," InfoBRICS, 2025, https://infobrics.org/files/country/russia/documents/2025/p2p/BRICS_Business_Council_BBC.pdf

32 "BRICS Initiative on Enhancing Cooperation on Supply Chains," https://images.mofcom.gov.cn/gjs/202206/20220610182330518.pdf.

33 BRICS Brazil, "The Ninth Meeting of the BRICS Industry Ministers Joint Declaration," 2025, http://brics.utoronto.ca/docs/250521_Joint_Declaration_9th_Industry_MM.pdf.

34 World Bank, *IFC and Small and Medium Enterprises*, August 2024, World Bank Group, 2024, http://hdl.handle.net/10986/42083.

35 Rajesh Chadha and Himanshu Jaiswal, "India's 2026 BRICS Presidency: Key Priorities for a Multipolar World," Centre for Social and Economic Progress, 2026, https://csep.org/blog/indias-2026-brics-presidency-key-priorities-for-a-multipolar-world/.

36 "Staying the Course in Troubled Waters: India's Priorities for the 2026 BRICS Summit," India Foundation Chintan, 2026, https://chintan.indiafoundation.in/articles/staying-the-course-in-troubled-waters-indias-priorities-for-the-2026-brics-summit/.

37 BRICS Information Center, "Treaty for the Establishment of a BRICS Contingent Reserve Arrangement, signed Fortaleza," July 15, 2014, http://www.brics.utoronto.ca/docs/140715-treaty.html.

38 "Japan, China, Korea, ASEAN to Expand Currency Swap Program, Nikkei Says," *Korea JoongAng Daily*, May 1, 2025, https://koreajoongangdaily.joins.com/news/2025-05-01/world/world/Japan-China-Korea-ASEAN-to-expand-currency-swap-program-Nikkei-says/2297987.

39 “RBI Announces the SAARC Currency Swap Framework for the Period 2024 to 2027,” Reserve Bank of India, 2024, https://www.rbi.org.in/scripts/BS_PressReleaseDisplay.aspx?prid=58170.

40 “Brazil’s Central Bank Signs Currency Swap with People’s Bank of China,” *Merco Press*, 2025, https://en.mercopress.com/2025/05/14/brazil-s-central-bank-signs-currency-swap-with-people-s-bank-of-china.

41 Justin Varghese, “Why US Currency Swap Talks Reflects UAE’s Economic Strength, Not Stress,” *Gulf News,* April 23, 2026, https://gulfnews.com/business/banking/why-uae-us-currency-swap-talks-reflect-economic-strength-not-stress-1.500516609.

42 “Treaty for the Establishment of a BRICS Contingent Reserve Arrangement,” BRICS Information Center, 2014, http://www.brics.utoronto.ca/docs/140715-treaty.html .

43 Yaroslav Lissovolik, “A Revamped BRICS CRA to Model IMF Blueprint?,” *BRICS+ Analytics,* February 9, 2024, https://brics-plus-analytics.org/a-revamped-brics-cra-to-model-imf-blueprint/.

44 Tobias Adrian et al., “Financial Stability Implications of Emerging Market Currency Developments,” IMF Blog, July 22, 2024, https://www.imf.org/en/blogs/articles/2024/07/22/financial-stability-implications-of-emerging-market-currency-developments.

45 “Global Shocks, Local Markets: The Changing Landscape of Emerging Market Sovereign Debt,” International Monetary Fund, 2025, https://www.elibrary.imf.org/display/book/9798229023184/CH003.xml.

46 BRICS Information Center, “1st BRICS Finance Ministers and Central Bank Governors (FMCBG) Meeting Joint Statement,” July 5, 2025, http://www.brics.utoronto.ca/docs/250705-1st_BRICS_FMCBG-Joint_Statement.pdf.

47 “Address by NDB President Dilma Rousseff at Opening of the Plenary Session of the 8th Annual Meeting of the NDB,” New Development Bank, 2023, https://www.ndb.int/insights/address-by-ndb-president-dilma-rousseff-at-opening-of-the-plenary-session-of-the-8th-annual-meeting-of-the-ndb/.

II.

Innovation for People, Planet, and Enterprise

The Role of BRICS in Fostering SMEs

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Abstract

THIS ARTICLE EXAMINES HOW BRICS can foster scalable, inclusive, and environmentally sustainable innovation in small and medium-sized enterprises (SMEs). It highlights the role of SMEs in the global economy and across BRICS countries, and maps the evolving BRICS agenda for SMEs, including its key policy orientation and collective initiatives. The article analyses four strategic challenges: the internationalisation of SMEs; the digitalisation of processes and products; stronger collaboration with knowledge centres; and access to financing for green initiatives. It explores potential initiatives, including the BRICS Network University, the creation of a dedicated supervisory unit within the Contingent Reserve Arrangement, and a more active role for the New Development Bank in supporting SMEs.

Introduction

BRICS has established itself as one of the most important geopolitical platforms for the Global South. More than 15 years since its inception, the group has expanded its membership and deepened cooperation.[1] Following the 2024-2025 expansion, BRICS today comprises 11 full members, representing nearly half of the world's population, around 40 percent of global Gross Domestic Product (PPP terms), and 26 percent of global trade.[a] This gives the grouping legitimacy to demand democratic reforms in global governance, as well as to promote collective development initiatives.

In this context, BRICS has pursued innovation as a driver of sustainable development. Innovation has the potential to increase employment and productivity, reduce poverty, enhance financial security, and promote social inclusion, particularly amid climate change, social inequalities, geopolitical turbulence, and economic instability.[b] Acknowledging small and medium enterprises (SMEs) as an important source of creativity, BRICS is exerting effort to overcome constraints that limit the full potential of these companies. This article analyses how the BRICS group can foster scalable, inclusive, and environmentally sustainable innovation in SMEs. The following section highlights the role of SMEs in the global economy and across BRICS countries and identifies the group's' key policy orientations and collective initiatives for SMEs. The subsequent section discusses challenges in four strategic areas: the internationalisation of SMEs, the digitalisation of processes and

a The first BRICS Summit was held in 2009 without South Africa, which joined the grouping in 2011. At the 2023 BRICS invited Argentina, Saudi Arabia, the United Arab Emirates, Ethiopia, Egypt, and Iran to become members. Argentina, under the leadership of Javier Milei, declined the invitation. Indonesia joined as a full member in 2025. In 2024, BRICS also created the "BRICS partner countries" category, which currently includes Belarus, Bolivia, Cuba, Malaysia, Nigeria, Kazakhstan, Thailand, Uganda, and Uzbekistan. See: https://www.brics2026.gov.in/about-us/.

b For instance, in 2016 BRICS Summit Declaration: "26. We recognise that innovation is a key driver for mid- and long-term growth and sustainable development. (…) 46. We emphasise the importance of enhancing intra-BRICS cooperation in the industrial sector, including through the BRICS Industry Ministers Meetings, in order to contribute to the accelerated and sustainable economic growth, the strengthening of comprehensive industrial ties, the promotion of innovation as well as job creation, and improvement of the quality of life of people in BRICS countries". Similar ideas were presented in 2017 BRICS Declaration: "12. We highlight the importance of innovation as a key driver for mid- and long-term economic growth and global sustainable development. (…) 14. We reaffirm our commitment to fully implementing the 2030 Agenda for Sustainable Development. We will also advocate equitable, open, all-round, innovation-driven and inclusive development, to achieve sustainable development in its three dimensions - economic, social and environmental- in a balanced and integrated manner." In 2024 BRICS Summit Declaration, the same approach towards innovation: "112. We further underscore the importance of science, technology and innovation as a critical catalyst for economic development and improved quality of life of the people in the BRICS nations."

products, the strengthening of synergies with knowledge hubs, and access to financing. In this context, it explores potential initiatives involving the BRICS Network University and the creation of a dedicated supervisory unit within the Contingent Reserve Arrangement, and a more active role for the New Development Bank in supporting SMEs.

SMEs and BRICS

As the World Bank notes, SMEs account for around 90 percent of all businesses and up to 50 percent of global employment.[2] Moreover, they contribute up to 40 percent of GDP in emerging economies.[3] This trend is mirrored across BRICS countries, albeit with certain disparities. According to an interview with the Brazilian coordinator of the BRICS SMEs working group: "In Egypt, for example, 80 percent of GDP is generated by this sector. In China, the situation is similar, with small businesses accounting for 60 percent of GDP. In India, 95 percent of jobs are generated by this sector, with similar figures in China (80 percent), Russia (72.5 percent), and Egypt (72 percent)."[4]

Despite their importance, SMEs face challenges in realising their full potential to deliver inclusive, sustainable, and innovative solutions. One constraint is limited access to financing to scale up products and services. SMEs also often operate in environments characterised by informality and weak integration with research and development (R&D) centres.[5]

Although BRICS has sought to enhance discussions on SMEs since its inception, its initiatives remain fragmented. For instance, SMEs were frequently referenced in the declarations of the BRICS Industry Ministers' Meetings. However, despite being discussed in various working groups, they did not receive a dedicated paragraph in a BRICS Leaders' Declaration until the 2013 Summit, which encouraged a specific cooperation agenda in the field: "We recognise the fundamental role played by Small and Medium-Sized Enterprises (SMEs) in the economies of our countries. SMEs are major creators of jobs and wealth. In this regard, we will explore opportunities for cooperating in the field of SMEs and recognise the need for promoting dialogue among the respective Ministries and Agencies in charge of the theme, particularly with a view to promoting their international exchange and cooperation and fostering innovation, research and development."[6]

Therefore, BRICS addressed SMEs through thematic working groups, including those on Science, Technology and Innovation, Trade, the Business Forum, and Agriculture. Nevertheless, it was only at the 2024 Summit that BRICS leaders endorsed the proposal of the BRICS Partnership on the New Industrial Revolution (PartNIR) Advisory Group to establish a dedicated SMEs Working Group: "76. (…) We endorse the decision by the PartNIR Advisory Group to create seven working groups, including on Chemical Industry; Mining and Metals; Digital Transformation of Industry; SMEs; Intelligent Manufacturing and Robotics; Photovoltaic Industry; Medical Devices and Pharma."[7]

Accordingly, BRICS inaugurated its SMEs Working Group in 2025 with the purpose: "to establish a long-term, mutually beneficial, stable, and regular cooperation mechanism for promoting SMEs development, and support the better integration of BRICS SMEs into global industrial chains, supply chains, and value chains."[8]

The Working Group approved a 2025–2030 Action Plan structured around three pillars: strengthening information exchange and institutional cooperation among BRICS members; fostering interaction and partnerships among SMEs; and promoting their integration into international trade and global value chains.[9] This Working Group could catalyse the ongoing efforts to boost SMEs by bringing together initiatives that are currently dispersed across different BRICS cooperation mechanisms.

Key Cooperation Agendas for BRICS SMEs

Internationalisation

Internationalisation enables SMEs to expand markets and improve resource utilisation. However, asymmetries exist in the international competitiveness of SMEs across BRICS economies. For example, Brazilian SMEs account for less than 1 percent of the country's total export volume, whereas their Chinese counterparts contribute as much as 60 percent.[10]

This unevenness partly reflects differences in national regulatory frameworks. Brazil, South Africa, India, and Indonesia have dedicated ministries for SMEs at the national or federal level, while other BRICS members address

SME-related issues through ministries of trade, economy, industry, or other institutional arrangements. These governance models shape distinct approaches to SME internationalisation and complicate efforts to expand intra-BRICS trade. Differences in SMEs' integration into regional and global value chains further widen these gaps by creating unequal access to the logistical and financial resources needed to compete in international markets, including through e-commerce platforms.

One way to address these asymmetries is to establish permanent platforms for interaction among entrepreneurs, investors, and policymakers. Such platforms could also facilitate joint studies, the exchange of best practices, and government technology procurement initiatives that foster alliances and partnerships among SMEs across BRICS countries.

Another common challenge facing SMEs across BRICS is regulatory complexity, which increases the cost of doing business. To support internationalisation, BRICS should pursue practical policy measures that facilitate trade, investment, and economic cooperation.

These efforts should include measures to simplify cross-border business operations, such as establishing one-stop shops for business registration and streamlining administrative procedures. They should also promote blended finance mechanisms for startups to address funding gaps and unlock entrepreneurial potential across BRICS. Existing development finance institutions, for example, the China Development Bank and the Industrial Development Corporation of South Africa, could play a greater role by providing capital, loans, and business development services tailored to SMEs.

Digitalisation

The global economy is becoming increasingly digitalised, a trend accelerated by the COVID-19 pandemic. The spread of digital payment systems, wider access to internet-enabled devices such as smartphones, computers, and tablets, and the growth of digital marketplace platforms have created new opportunities for SMEs to market innovative products and services domestically and internationally. Realising this potential, however, requires a supportive digital ecosystem, particularly in light of BRICS' concerns about barriers to market access created by large technology companies, or "Big

Tech": "Although a great source of innovation, the rise of Big Technology could potentially create barriers to entry for MSMEs[11] in the platform and digital economy. There is therefore a need to create a conducive environment through regulation and sandbox measures to enable MSMEs to thrive in the digital age."[12]

The rapid expansion of Artificial Intelligence (AI) also offers SMEs opportunities to overcome historical resource constraints and operational inefficiencies, while creating new challenges related to the adoption and governance of these technologies. As noted in the BRICS SME Working Group report: "AI, in particular, offers substantial potential. It enables SMEs to optimize resource allocation, enhance decision-making, improve customer engagement, and predict market trends with greater accuracy. At the same time, it introduces challenges in data governance, ethical responsibility, and technological readiness—especially for SMEs with limited capacity."[13]

Realising these opportunities requires investment in human capital through capacity building and digital literacy, robust and secure digital infrastructure, and enabling policy environments that support both innovation and social inclusion. Creating a digital ecosystem suited to SMEs requires support for investments in open-source AI tools, shared e-commerce platforms, and inclusive training programmes, balancing openness with regulatory safeguards.

Research and Development Centres

One of the historical challenges faced by BRICS has been the expansion of scientific and technological cooperation.[14] The creation of an innovation ecosystem is equally important for SMEs to thrive. However, a large portion of these SMEs remain disconnected from R&D centres, thereby limiting the sector's innovative potential.

A mechanism created by the group that could be repurposed as a catalytic platform for coordinating technological innovation initiatives involving SMEs is the BRICS Network University (BRICS NU). Established in 2015, BRICS NU was initially conceived as a platform to promote academic training, exchange programmes, and collaborative research among institutions, particularly in the areas of energy; computer science and information security; BRICS studies;

ecology and climate change; water resources and pollution treatment; and economics. However, over the years, this initiative has faced difficulties in terms of coordination and the effective implementation of its projects. As observed by Baldrighi and Zardo: "(…) despite its ambitious design, BRICS NU has fallen short of its original goals, operating largely as a loose cooperation forum rather than a consolidated academic institution. Structural problems like shortage of funding, a loose governance structure, and overlaps with competing initiatives have limited its effectiveness, and, so far, it has not been able to improve the still marginal intra-bloc academic flows, which remain peripheral in comparison."[15]

Given the group's recent efforts to revitalise BRICS NU,[16] including the expansion of thematic areas of cooperation and the incorporation of new academic institutions into the mechanism, the initiative could be restructured as the "university pillar" of the BRICS innovation ecosystem. In this context, BRICS NU could coordinate and encourage the creation of university-based innovation hubs focused on SMEs, organising activities to train qualified human capital for startups and SMEs, facilitating cross-incubation programmes, and providing institutional support for technology transfer projects.

Another mechanism that could play a strategic role in improving a virtuous BRICS innovation ecosystem is the Contingent Reserve Arrangement (CRA). Created in 2014, the CRA constitutes a BRICS financial defence mechanism, conceived as a virtual US$100 billion fund aimed at providing mutual support in situations of currency crises and liquidity shortages.[17] Beyond its primary objective of strengthening the global financial safety net, the CRA also holds the potential to become a genuine knowledge hub for BRICS economies through the establishment of the surveillance unit envisaged in Article 3(ix) of its Treaty.[18]

By producing studies and assessments of regional economies and evolving into a regional centre for knowledge production, this surveillance unit could contribute not only to reducing CRA's dependence on Western-led monetary and financial institutions, such as the IMF, the US' dollar, and the SWIFT system, but also to strengthening the regional financial safety net and macroeconomic coordination among BRICS countries. By monitoring systemic risks across BRICS economies, such a surveillance unit, if effectively established, could also contribute to improving macroeconomic conditions, which may indirectly support innovation ecosystems for the SMEs.[19]

Financing Green Initiatives

In the field of financing, particularly for sustainable initiatives, BRICS can leverage the New Development Bank (NDB) to support SMEs. Established in 2014, the NDB was created to enhance the availability of resources for infrastructure and sustainable development projects in developing countries and emerging economies. As summarised by Vasconcelos and Garcia: "(...) the NDB was intended to be an example of a new generation of MDB [Multilateral Development Bank] because it would: (i) be a bank *from and for the South* (addressing the needs of developing and emerging countries), (ii) be a *green* bank (focusing its major funding on infrastructure and sustainable projects), and (iii) be a *noninterventionist* bank (i.e., its operational decisions would be allegedly based on merit, and not on a hidden political agenda)."[20]

Operational since mid-2016, the bank currently manages a portfolio of more than 135 projects with financing exceeding US$42 billion.[21] Although the NDB has already supported SMEs during the pandemic through its Fast-Track COVID-19 Emergency Assistance Programme, it remains a relatively distant institution from the everyday reality of these enterprises.

Most NDB borrowers continue to be governmental entities and large corporations.[22] Despite this current limitation, the bank could be encouraged to develop specific credit lines targeted at these companies.[23] Another important step could be the financing of innovation infrastructure in BRICS countries, such as technology parks, university innovation hubs, and business incubators.

Conclusion

As this article has argued, the establishment of a dedicated SMEs Working Group represents an important step towards overcoming the historical fragmentation of BRICS initiatives related to SMEs. These companies occupy a strategic position within BRICS economies due to their capacity to generate employment, foster social inclusion, and stimulate innovation. However, persistent asymmetries among member states, including differences in regulatory frameworks, levels of digitalisation, access to financing, and integration into global value chains, continue to limit the transformative potential of SMEs. In this context, the SMEs Action Plan for 2025–2030 provides a relevant institutional framework for strengthening BRICS cooperation in areas such as digital transformation, internationalisation, technological innovation, and sustainable development.

The consolidation of a more integrated BRICS ecosystem for SMEs, however, will depend on the group's ability to articulate its existing institutions and mechanisms in a coordinated and strategic manner. Initiatives involving BRICS NU, the CRA, and the NDB could enhance institutional instruments capable of supporting innovation, knowledge production, and financing for SMEs. Re-functionalising and connecting these mechanisms to the SMEs agenda could contribute not only to expanding intra-BRICS trade and technological cooperation but also to fostering more inclusive, sustainable, and innovation-driven development pathways across the Global South.

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Additional References

Brazilian Ministry of Education, "The BRICS Network University Includes 20 Brazilian Institutions," *BRICS Brasil*, May 13, 2025, https://brics.br/en/news/collabs/collaborative-communication/the-brics-network-university-includes-20-brazilian-institutions.

BRICS, "Leaders' Declarations (2009-2025)," https://brics.br/pt-br/documentos/acervo-de-presidencias-anteriores/leaders-declarations.

BRICS, "Treaty for the Establishment of a BRICS Contingent Reserve Arrangement," Fortaleza, July 15, 2014, *BRICS Information Centre, University of Toronto*, http://www.brics.utoronto.ca/docs/140715-treaty.html.

BRICS India 2026 Presidency, "About BRICS," 2026, https://www.brics2026.gov.in/about-us/.

BRICS SMEs Working Group, *BRICS MSMEs Cooperation Framework*, Ministry of Entrepreneurship, Microenterprise and Small Business of Brazil, 2023, https://www.gov.br/memp/pt-br/assuntos/brics-sme-working-group-1/documents-on-smes/2023-africa-do-sul/final-brics-msmes-cooperation-framework-final-_-2-3-africa.pdf.

BRICS, *Digital Transformation in the Age of AI*, BRICS Brasil, 2025, http://brics.br/pt-br/documentos/economia-financas-comercio-e-infraestrutura/250504-report-digital-transformation-in-the-age-of-ai.pdf/@@download/file.

BRICS, *SME Action Plan 2025–2030*, BRICS Brasil, 2025, https://brics.br/pt-br/documentos/economia-financas-comercio-e-infraestrutura/sme-action-plan-2025-2030-wg.pdf/@@download/file.

BRICS SMEs Working Group, *Terms of Reference for the SMEs Working Group of BRICS Countries*, Ministry of Development, Industry, Trade and Services of Brazil, 2025, https://www.gov.br/mdic/pt-br/centrais-de-conteudo/publicacoes/brics/industria/ingles/terms-of-reference-final.pdf.

Jonnas Vasconcelos and Ana Garcia, "Notes on the Performance of the New Development Bank," in *The Multilateralism of the New Development Bank on the Sustainable Economic Growth in BRICS Nations and Beyond* (2025), 125–142, https://doi.org/10.1108/978-1-83662-292-520251011.

Luciana Acioly and Jonnas Vasconcelos, "Arranjo Contingente de Reservas do BRICS: Do Simbólico ao Efetivo," *Revista Tempo do Mundo* 38 (2025): 321–346, https://www.ipea.gov.br/revistas/index.php/rtm/article/view/744.

Luís Cláudio Kubota, "Progressos do BRICS na Cooperação em Ciência, Tecnologia e Inovação: Progress to Be Shown," *Revista Tempo do Mundo* 22 (2020): 95-110, https://www.ipea.gov.br/revistas/index.php/rtm/article/view/238.

Mayara Souto, "Luciana Mancini: 'As Micro e Pequenas Empresas São a Espinha Dorsal da Economia do BRICS'," *BRICS Brasil*, May 8, 2025, https://brics.br/pt-br/noticias/luciana-mancini-as-micro-e-pequenas-empresas-sao-a-espinha-dorsal-da-economia-do-brics.

New Development Bank, “About NDB,” https://www.ndb.int/about-ndb/.

New Development Bank, *Annual Report 2024,* Shanghai, New Development Bank, 2025, https://www.ndb.int/wp-content/uploads/2025/12/NDB_AnnualReport2024_10Dec25.pdf.

Rafael de Moraes Baldrighi and Luiz Marcelo Michelon Zardo, “Cooperação Acadêmica no Âmbito dos BRICS: Dez Anos da Universidade em Rede dos BRICS (BRICS NU) sob uma Perspectiva Brasileira,” *Revista Tempo do Mundo* 38 (2025): 409-446, https://www.ipea.gov.br/revistas/index.php/rtm/article/view/711.

World Bank, “Small and Medium Enterprises (SMEs) Finance,” World Bank Group, https://www.worldbank.org/ext/en/topic/competitiveness/small-and-medium-enterprises-smes-finance#tab-context.

Endnotes

1 Jonnas Vasconcelos and Ana Garcia, "Notes on the Performance of the New Development Bank," in The Multilateralism of the New Development Bank on the Sustainable Economic Growth in *BRICS Nations and Beyond* (2025), 125–142, https://doi.org/10.1108/978-1-83662-292-520251011.

2 World Bank, "Small and Medium Enterprises (SMEs) Finance," World Bank Group, https://www.worldbank.org/ext/en/topic/competitiveness/small-and-medium-enterprises-smes-finance#tab-context.

3 BRICS SMEs Working Group, *BRICS MSMEs Cooperation Framework,* Ministry of Entrepreneurship, Microenterprise and Small Business of Brazil, 2023, https://www.gov.br/memp/pt-br/assuntos/brics-sme-working-group-1/documents-on-smes/2023-africa-do-sul/final-brics-msmes-cooperation-framework-final-_-2-3-africa.pdf.

4 Mayara Souto, "Luciana Mancini: 'As Micro e Pequenas Empresas São a Espinha Dorsal da Economia do BRICS'," *BRICS Brasil*, May 8, 2025, https://brics.br/pt-br/noticias/luciana-mancini-as-micro-e-pequenas-empresas-sao-a-espinha-dorsal-da-economia-do-brics.

5 "BRICS MSMEs Cooperation Framework".

6 BRICS, "Leaders' Declarations (2009-2025)".

7 BRICS, "Leaders' Declarations (2009-2025)".

8 BRICS SMEs Working Group, *Terms of Reference for the SMEs Working Group of BRICS Countries,* Ministry of Development, Industry, Trade and Services of Brazil, 2025, https://www.gov.br/mdic/pt-br/centrais-de-conteudo/publicacoes/brics/industria/ingles/terms-of-reference-final.pdf.

9 BRICS, *SME Action Plan 2025–2030,* BRICS Brasil, 2025, https://brics.br/pt-br/documentos/economia-financas-comercio-e-infraestrutura/sme-action-plan-2025-2030-wg.pdf/@@download/file..

10 Souto, "Luciana Mancini: 'As Micro e Pequenas Empresas São a Espinha Dorsal da Economia do BRICS'".

11 MSME: Micro Small and Medium Enterprises.

12 "BRICS MSMEs Cooperation Framework".

13 "Digital Transformation in the Age of AI".

14 "Analysis of ST&I indicators showed that, in 2015, China spent more than the combined EU28 area, in US$ PPP. India and Russia have high levels of international co-inventions. South Africa has the larger proportion of co-authorships, with BRICS partners and others. Considering BRICS and OECD countries, the scientific production of the first ones are classified as "low collaboration – low quality (impact)" Luís Cláudio Kubota, "Progressos do BRICS na Cooperação em Ciência, Tecnologia e Inovação: Progress to Be Shown," *Revista Tempo do Mundo* 22 (2020): 95-110, https://www.ipea.gov.br/revistas/index.php/rtm/article/view/238.

15 Rafael de Moraes Baldrighi and Luiz Marcelo Michelon Zardo, "Cooperação Acadêmica no Âmbito dos BRICS: Dez Anos da Universidade em Rede dos BRICS (BRICS NU) sob uma Perspectiva Brasileira," *Revista Tempo do Mundo* 38 (2025): 409-446, https://www.ipea.gov.br/revistas/index.php/rtm/article/view/711.

16 Brazilian Ministry of Education, “The BRICS Network University Includes 20 Brazilian Institutions,” *BRICS Brasil*, May 13, 2025, https://brics.br/en/news/collabs/collaborative-communication/the-brics-network-university-includes-20-brazilian-institutions.

17 Luciana Acioly and Jonnas Vasconcelos, “Arranjo Contingente de Reservas do BRICS: Do Simbólico ao Efetivo,” *Revista Tempo do Mundo* 38 (2025): 321–346, https://www.ipea.gov.br/revistas/index.php/rtm/article/view/744.

18 BRICS, “Treaty for the Establishment of a BRICS Contingent Reserve Arrangement,” *Fortaleza*, July 15, 2014, BRICS Information Centre, University of Toronto, http://www.brics.utoronto.ca/docs/140715-treaty.html.

19 Acioly and Vasconcelos, “Arranjo Contingente de Reservas do BRICS: Do Simbólico ao Efetivo”.

20 Vasconcelos and Ana Garcia, “Notes on the Performance of the New Development Bank”.

21 New Development Bank, “About NDB,” https://www.ndb.int/about-ndb/.

22 New Development Bank, *Annual Report 2024*, Shanghai, New Development Bank, 2025, https://www.ndb.int/wp-content/uploads/2025/12/NDB_AnnualReport2024_10Dec25.pdf.

23 Vasconcelos and Ana Garcia, “Notes on the Performance of the New Development Bank”.

Unlocking BRICS Innovation Potential: Pathways to Sustainable and Inclusive Growth

Sabyasachi Saha and Yasmin Shehata

Abstract

IN THE CONTEMPORARY GLOBAL LANDSCAPE, innovation has become a driver of resilience, sustainability, and economic transformation, making it a pillar of BRICS cooperation. As the group has expanded in recent years, it offers greater opportunities to strengthen collaborative innovation for the benefit of member economies, societies, and the environment. This article examines various policy options to help BRICS countries realise their collective potential in innovation. It traces the evolution of the group's innovation systems, assesses opportunities for deeper cooperation, and identifies persistent challenges to the advancement of its innovation agenda. In particular, future policy efforts should prioritise narrowing the digital divide across member countries, developing common data governance standards, enhancing institutional coordination, and pooling strategic resources to foster a more collaborative, partnership-driven innovation ecosystem.

Introduction

Amidst geopolitical tensions, supply-chain disruptions, climate challenges, and rapid technological transformation, innovation has become indispensable to achieving sustainable and inclusive growth across BRICS member countries. This places innovation at the core of India's BRICS presidency under the theme "Building for Resilience, Innovation, Cooperation, and Sustainability," underscoring its crucial role in advancing the grouping's complementary priorities. In this backdrop, the expansion of BRICS presents new opportunities for collaborative innovation to strengthen the collective capacity of member nations to address shared and increasingly complex challenges.

According to the "BRICS Action Plan for Innovation 2025-2030," innovation involves the creative and disruptive transformation of economic processes through the replacement of obsolete technologies and practices with more effective and forward-looking alternatives, contributing to the continuous evolution of societies and economies. In contrast to the traditional linear firm-centric approach to innovation, the contemporary perspective emphasises its holistic interactive nature that involves multiple stakeholders and extends beyond market-oriented goals to encompass broader humanitarian and ethical dimensions.[1] This is reflected in the emergence of "responsible" innovation. In addition, the current paradigm underscores the multifaceted nature of innovation,[2] transcending technological advancements to include institutional, procedural, and systemic forms.[3]

In particular, emerging approaches to innovation include "social" and "inclusive" innovation, which seek to address unmet needs that existing markets fail to satisfy and develop more effective business models that enhance people's position within production systems.[4] It equally involves more effective, efficient, sustainable, or equitable solutions to social problems.[5] Moreover, the emerging notions of "sustainable" and "green" innovation highlight the importance of promoting resource efficiency and environmental resilience to meet present needs without compromising the interests of future generations.[6] Together, these developments underscore the evolving role of innovation in advancing environmental sustainability and social equity alongside economic growth. This clearly aligns with India's people-centric and climate-oriented vision within BRICS, which emphasises inclusive development that prioritises people's well-being and enhances their participation in economic processes, and ensures the translation of innovation into tangible social and environmental benefits.[7]

Accounting for nearly 49 percent of the world's population, 40 percent of global GDP, and 26 percent of global trade,[8] BRICS plays an increasingly important role in the global landscape. This results in substantial opportunities to advance collaborative innovation within the group for the benefit of the economy, society, and environment. Although challenges continue to constrain these prospects, BRICS members collectively have the potential to contribute to a development-oriented global order in which technological innovation serves to achieve broader development objectives, rather than an end in itself. Thus, there is a need to assess the grouping's unique techno-economic characteristics and the associated differences in capacities across member countries, in order to better understand their potential to leverage their respective strengths in shaping the group's development pathways that are closely linked to their innovation capabilities.

This article explores a number of policy options to unlock the BRICS' potential as a collective innovation platform. The next section examines the transformation of BRICS innovation systems, followed by an assessment of the opportunities and challenges for collaborative innovation. The final section concludes with policy recommendations.

The Transformation of BRICS Innovation Systems

Evolution of BRICS Innovation Systems

The National Systems of Innovation (NSI) is a widely used analytical approach for examining how interactions among national institutions support technological change and the emergence and diffusion of innovations, contributing to economic prosperity and international competitiveness.[9] Developed in the late-twentieth century, the framework sought to explain how countries build innovation capabilities through institutional interconnectedness.[10] It subsequently gained prominence among policymakers seeking to establish meaningful linkages among institutions that contribute to national innovation.[11] The NSI approach primarily reflects the realities of innovation systems that have evolved over more than a century in advanced economies such as the United States and Europe. Today its applicability to the developing world remains limited, with successful cases largely confined to specific sectors or regions. While the NSI framework captures the historical evolution of innovation in advanced economies, the BRICS countries have followed more diverse and context-specific innovation pathways.

Russia remains one of the most scientifically advanced BRICS economies, supported by a legacy of industrial research infrastructure, particularly in nuclear energy, engineering, and scientific research. Soviet-era investments in scientific infrastructure and inheritance of a large Research and Development (R&D) sector continue to shape Russia's knowledge-intensive industries and engineering capabilities.[12] This can also be observed in Brazil, which initially focused on innovation in firms, technology-led infrastructure, and increased public investment in R&D. The pillars of its STI system remain human resource development and financing of the innovation projects.[13]

On the other hand, China's structural transition can be narrated through the Lewis dual-sector model[14] with a shift towards export-oriented manufacturing.[15] Further, China climbed the systematic ladder from low-cost assembly to high-value electronics, leading into frontier innovation in artificial intelligence, semiconductors, and green energy transition. It therefore offers an experience of regional innovation systems, as it went through an economic transition that decentralised the innovation systems and made them more regionally concentrated.[16] Rapid evolution can also be observed in Indonesia's trajectory, driven by digital transformation, a large entrepreneurial base, and increasing policy attention towards research, technology, and innovation-led growth. As Southeast Asia's largest economy, Indonesia has promoted innovation through initiatives supporting startups, digital platforms, industrial upgrades, and research capacity development. This has created opportunities for high-tech, high-value-added and specialised production in sectors such as food and beverages; textiles and garments; automotive; electronics; and chemicals.[17]

India's innovation system has developed around strengths in software, pharmaceuticals, biotechnology, engineering, and other knowledge-intensive services.[18] More recently, it has broadened its STI strategy beyond these established sectors through stronger institutions, expanded research capacity, and innovation-oriented governance.[19] Furthermore, India has demonstrated progress in recent years through policy initiatives and an increased emphasis on self-reliance aimed at strengthening industrial and innovation infrastructure. The establishment of the Anusandhan National Research Foundation (ANRF) under the ANRF Act, 2023, with a corpus of INR500 billion (approx. US$6.04 billion),[a] marks a shift towards mission-driven and industry-linked research. The RDI Fund, with a corpus of INR 1 lakh crore (approx. US$11.82 billion),[b] aimed at providing long-term financing or refinancing with long tenors at low or nil interest rates to spur private sector investment in research, development, and innovation further strengthens the support for innovation and technology development. Together with the National Quantum Mission, National AI Mission, and other initiatives, these efforts aim to advance innovation in strategic technologies, while linking them to accelerated development outcomes.

The United Arab Emirates (UAE) has developed a state-led innovation ecosystem focused on economic diversification, advanced technologies, and the transition towards a knowledge-based economy. National strategies and investments in artificial intelligence, space technologies, renewable energy, and digital transformation have been supported by strong infrastructure, substantial investment capacity, and a favourable business environment that supports entrepreneurship and technology-driven enterprises.[20]

At the centre of South Africa's innovation ecosystem is the Council for Scientific and Industrial Research (CSIR), which plays a strategic role in generating knowledge, developing technologies, and facilitating technology transfer in alignment with national development priorities. The country's innovation system benefits from a relatively strong research base, a well-developed financial sector, and an established regulatory environment; however, challenges remain in translating research outputs into commercially viable innovations, strengthening entrepreneurship capabilities, and ensuring adequate funding across the innovation pipeline.[21]

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a For the conversion of Indian rupee to United States (US) dollars, the DEC alternative conversion factor has been applied for the year 2023.

b For the conversion of Indian rupee to United States (US) dollars, the DEC alternative conversion factor has been applied for the latest available year 2024.

Egypt's innovation ecosystem combines expanding research capabilities, a large pool of human capital, and stronger linkages between academia, industry, and government. Increased R&D expenditure reaching 1.02 percent of GDP has supported growth in highly cited scientific publications and strengthened high-technology industries like chemicals, electronics, and pharmaceuticals.[22]

Iran's innovation ecosystem is characterised by a strong scientific base, extensive higher education networks, and significant technological capabilities developed through sustained investments in STI with an emphasis on building self-sufficiency. The country has established a broad network of universities, research institutions, science and technology parks, and knowledge-based firms that support innovation activities, particularly in sectors such as biotechnology, nanotechnology, pharmaceuticals, and engineering. Government policies have sought to promote knowledge-based enterprises and encourage the commercialisation of domestic research outputs.[23]

Saudi Arabia has also developed a dynamic innovation ecosystem as a pillar of Vision 2030, aiming to transform the Kingdom into a knowledge-based economy. Established in 2021, the Research, Development and Innovation Authority (RDIA) co-ordinates national RDI efforts around four strategic priority areas: Health and Wellness, Sustainability and Essential Needs, Energy and Industrials, and Economies of the Future. The ecosystem is supported by targeted funding, advanced research infrastructure, international collaboration, and talent development, contributing to rapid growth in research output and quality and strengthening Saudi Arabia's position as an emerging global innovation hub.[24]

Although Ethiopia remains at an earlier stage of innovation system development, it is shaped by government-led efforts to promote science, technology, and innovation as drivers of structural transformation and industrialisation. The country has invested in expanding higher education, research institutions, and technology infrastructure, while initiatives such as industrial parks, innovation hubs, and digital transformation programmes seek to strengthen technological capabilities and support entrepreneurship. Growing attention is given to digital technologies, fin-tech, renewable energy, and industrial innovation in Ethiopia.[25]

Together, these experiences of diverse innovation pathways present a wide range of scientific, industrial, digital, and institutional capabilities that enhance the potential of the BRICS countries to drive deeper cooperation to foster a more integrated and resilient innovation platform that promotes knowledge sharing, strengthens collective technological capabilities, supports sustainable economic development, and enhances BRICS capacity to address shared development challenges.

Overview of BRICS Innovation Performance

The BRICS share of world GDP increased from 19.22 percent in 2010 to 30.76 percent in 2024. In Purchasing Power Parity (PPP) terms, its share reached 39.9 percent, amounting to US$79.6 trillion in 2024. Moreover, the economic trajectories of BRICS members increasingly reflect a shift from agrarian economies to industrial and service-led structures, particularly in India and China. The BRICS countries have substantially increased their gross fixed capital formation from US$4.1 trillion in 2010 to an estimated US$10.31 trillion in 2023. In addition, the trade of BRICS members in goods and services, including imports and exports, accounts for nearly one-fifth of total world trade.[26]

In this transformational process, enhancing BRICS innovation systems has become increasingly important. Given their significant demographic representation, remarkable economic growth, and structural transformation, the group's members show potential to absorb innovation-driven advancements in both goods and services sectors.

Table 1: BRICS Countries' Ranking in Global Innovation Index and R&D, No. of Researchers and Expenditure in R&D (% of GDP), and Trade in High Technology Products (HTPs)

Country	Number of Researchers in R&D (per million people)	Research and Development Expenditure (% of GDP)	Research and Development Rank (2025)	Global Innovation Index Rank (2025)	Exports of HTPs (US$ Billion, 2024)	Imports of HTPs (US$ Billion, 2024)
Brazil	903.20 (2014)	1.19 (2023)	26	52	8.7	49.28
China	2,107.27 (2023)	2.58 (2023)	16	10	769.7	355.94
Egypt	1,120.22 (2024)	1.02 (2024)	57	86	0.9	5.83
Ethiopia	89.04 (2017)	0.27 (2017)	100	134	-	-
India	259.26 (2020)	0.65 (2020)	34	38	53.9	84.72
Indonesia	395.34 (2020)	0.28 (2020)	42	55	9.8	25.78
Iran	2,239.74 (2021)	0.73 (2021)	51	70	-	-
Russia	2,638.56 (2024)	0.94 (2024)	35	60	-	-
Saudi Arabia	1,234.71 (2024)	0.64 (2024)	32	46	0.2	28.10
South Africa	444.16 (2022)	0.61 (2022)	43	61	2.4	10.97
United Arab Emirates	2,606.78 (2021)	1.49 (2021)	29	30	-	-

Source: Data retrieved from the WDI database of the World Bank and GII report 2025 from WIPO, United Nations, and Authors' HTPs Trade calculation based on Eurostat High-tech aggregation by SITC Rev.4, WITS Database

As shown in Table 1, several factors influence innovation systems. These include research and development performance, measured by R&D expenditure as a percentage of GDP, the number of researchers per million people, and the R&D ranking. Despite progress, the innovation systems of developing countries continue to lag behind those of developed nations, indicating that other factors influence the development of innovation infrastructure. The Global Innovation Index (GII) provides a comprehensive assessment of innovation performance by examining factors such as the policy and institutional environment, human capital and research, infrastructure, and knowledge creation within an economy.[27] Within the BRICS grouping, only China ranks among the top 10 countries in the Global Innovation Index (GII). It is followed by the United Arab Emirates (30th), India (38th), Saudi Arabia (46th), Brazil (52nd), Indonesia (55th), Russia (60th), South Africa (61st), Iran (70th), Egypt (86th), and Ethiopia (134th).

Current Framework, Opportunities, and Challenges for Collaborative Innovation in BRICS

As innovation has become a pillar of BRICS cooperation in STI, several initiatives have been launched to promote collaborative innovation across to pool financial resources, talent, and industrial infrastructure across member nations. The aim is to achieve technological sovereignty and sustainable economic growth, guided by the "BRICS Action Plan for Innovation 2025-2030".

There is massive potential to expand and strengthen innovation across the members of the grouping. Many BRICS countries have achieved innovation successes that can be shared and scaled to generate positive outcomes for people, planet, and enterprise across the grouping. This section explores the opportunities and challenges facing BRICS countries in advancing this objective.

Current Collaborative Innovation Framework within BRICS

Collaborative innovation within BRICS is currently led by the "BRICS Action Plan for Innovation 2025-2030", which acts as a strategic roadmap designed to accelerate technological development, strengthen regional industrial cooperation, and build a unified innovation ecosystem across member nations. It builds on previous initiatives like the iBRICS Network and BRICS Techtransfer, which serve as mechanisms for direct dialogue among actors in innovation in BRICS countries to promote mutual support, joint projects, and the exchange of best practices with a view to advancing BRICS systems of innovation.

In this context, a number of initiatives have been launched to promote BRICS as a collaborative innovation platform through the "Partnership on New Industrial Revolution" (PartNIR) and the BRICS STI Framework Programme mechanisms, advancing innovation for people, planet, and enterprise.

The PartNIR establishes a comprehensive framework to advance industrial development, innovation, and technological cooperation among member nations. It focuses on identifying shared interests and exploring the challenges and opportunities created by the New Industrial Revolution. It targets **s**haring resources and expertise in five key areas: digitisation, industrialisation, innovation, inclusiveness, and investment.[28] Meanwhile, the BRICS STI Framework Programme represents the primary mechanism for funding multilateral R&D, featuring flagship projects supporting joint research with broad impact to develop innovative solutions to shared challenges, enabling researchers from BRICS countries to participate in competitive multinational funding opportunities.[29]

Opportunities and Challenges for Collaborative Innovation within BRICS

Innovation for People

The large youth populations in BRICS nations provide a strong foundation for youth-led innovation and empathy-driven entrepreneurship.[30] This is supported by the recently established BRICS Network University, which offers a valuable platform for advancing collaboration in social innovation.[31] In particular, sizeable opportunities exist for cross-border collaboration among biotech startups to reduce drug development costs and improve access to essential medicines across member countries, especially with pharmaceutical ingredients being manufactured in Brazil, China, and India.[32]

Although interest in social innovation has increased, initiatives across the BRICS remain fragmented, typically arising from discrete individual or institutional endeavours. Moreover, these endeavours typically feature strong international component, as they are frequently guided by or implemented in collaboration with organisations and experts from the Global North.[33] The effectiveness and sustainability of social innovation initiatives are also contingent upon the capacity to mobilise financial resources, which is often shaped by the prevailing policy context.[34] Furthermore, the efficiency of used digital platforms in these initiatives is frequently challenged by issues such as data security concerns, digital divide, and disparities in technological capabilities.[35] A persistent key challenge to the uptake of social and responsible innovation in BRICS countries is the widespread perception among firms that social responsibility comes at the expense of profitability.[36]

Innovation for Planet

Given their enormous current and future consumption levels, BRICS countries' potential for energy-saving innovation is massive. Also, given the BRICS countries' frugal innovation capabilities specifically suited to benefit the poor in low-income countries, they are uniquely positioned to advance affordable and simplified low-carbon technologies. Moreover, private enterprises across the BRICS are increasingly pursuing proactive technology acquisition strategies to accelerate innovation and bypass the costs and risks of early-stage R&D. These strategies include deeper integration into global value chains, collaborative R&D with international firms, and strategic outward foreign direct investment aimed at acquiring advanced capabilities and knowledge-intensive technologies.[37]

Despite substantial progress, sustainable innovation in BRICS still faces challenges, including inconsistent knowledge standards, intellectual property rights barriers, and infrastructure constraints.[38] The competition between renewable and fossil energy technologies is also profoundly unequal, as fossil fuels continue to benefit from entrenched infrastructures, institutional support, and historical advantages. Moreover, Learning, Innovation, and Competence-building Systems (LICS) are often underfunded, fragmented, and weakly coordinated across the Global South.[39] Meanwhile, key technological capabilities in renewable energy remain concentrated in a few countries, placing the Global South countries at a disadvantage in developing competitive domestic industries and reinforcing technological dependence.[40]

Innovation for Enterprise

As technological shifts emerge as an essential dimension of industrial development, with growing focus on innovation, capability building, and sustainability,[41] the expanding technological capacities of BRICS economies create opportunities for enterprise-led innovation and industrial development. In 2024, the BRICS accounted for 15.74 percent of global high-technology imports and 25.66 percent of exports, reflecting the grouping's growing importance as a global hub for high-technology production and trade.

Despite these advances, enterprise innovation among the BRICS members remains uneven due to disparities in terms of innovation infrastructure, technological capabilities, and industrial competitiveness. While some member countries have integrated themselves into trade in high-value-added products through strengthened innovation systems and technological capabilities, others face weak innovation ecosystems that continue to limit the production of higher value-added goods and services and hinder participation in global value chains, due to inadequate digital infrastructure, shortages of skilled human capital, limited economic reforms, weak institutional frameworks, and limited access to finance, especially given that the development of STI comes with huge institutional requirements and investments. These structural asymmetries reinforce technological dependence and constrain the ability of enterprises in many BRICS economies to compete in knowledge-intensive industries.

Policy Recommendations

A unified BRICS innovation vision, supported by an outcome-oriented performance framework with measurable indicators, is essential to strengthening the grouping's role as a collective innovation platform. This integrated vision should foster deeper collaboration to expand technological partnerships, accelerate knowledge creation, and enhance technology diffusion, thereby promoting inclusive and sustainable development. Future policy initiatives should prioritise strengthening innovation ecosystems across all member countries by facilitating investment in critical enablers, including technical infrastructure, specialised human capital, R&D capacity, and organisational capabilities. At the institutional level, the group should also pursue greater regulatory cooperation and strengthen regulatory sandboxes to facilitate the responsible development and scaling of emerging technologies.

Aligning economic incentives with social and environmental objectives is essential to promote responsible innovation. To transform responsible innovation from a perceived burden into a strategic driver of profitability, responsible innovation certification, and labelling schemes that reward responsible business practices with enhanced market access and economic benefits need to be developed and harmonised within the group. Moreover, the successful adoption of scientific social responsibility and frameworks on access, equity, and inclusion and STI to achieve sustainable development goals (SDGs) as key policy guidelines can be expanded to all member countries.[42] Furthermore, launching an innovation mobility scheme that supports exchanges among researchers, entrepreneurs, and students through joint fellowships, internships, and innovation residencies would strengthen knowledge transfer, enhance skill development, and foster sustained cross-border professional networks. Coordinated training in artificial intelligence, quantum technologies, biotechnology, cyber security, and advanced manufacturing can contribute to common skills development and capacity building.

Advancing sustainable innovation requires establishing a green technology collaboration platform within BRICS to co-develop and deploy low-carbon technologies, renewable energy systems, sustainable agriculture, and circular economy solutions. At the same time, strengthening North-South collaboration and knowledge exchange is crucial to accelerate the global transition towards sustainability. In parallel, effective adoption and diffusion of acquired technologies within local contexts necessitates the enhancement of member states' absorptive capacity through the development of technology-specific and low-carbon Learning, Innovation, and Competence Systems (LICS).

Future green innovation initiatives could include establishing a circular economy initiative to advance resource efficiency by promoting innovation in waste reduction, recycling technologies, and sustainable materials across member economies. They could also include creating a sustainable infrastructure framework to guide investments in green transport, resilient urban systems, low-carbon construction, and environmentally responsible industrial development.

Furthermore, maximising innovation outcomes within the group requires an integrated governance framework that fosters public-private partnerships and institutionalises stakeholder engagement. Expanding private sector participation in innovation activities can play a pivotal role in advancing technological progress across the BRICS, while creating significant opportunities for start-ups and fostering a more dynamic innovation ecosystem. However, BRICS governments are encouraged to take the lead in infrastructural transformation, as infrastructure is a public good that requires substantial upfront investments which private actors may be unwilling or unable to undertake. This is particularly important as existing infrastructure can generally support only incremental technological improvements, whereas radical disruptive innovations require substantial infrastructural reconfiguration, including the development of new infrastructure, particularly for decentralised and renewable energy systems to enable low-carbon development pathways.

BRICS nations should equally adopt regulatory sandboxes for emerging technologies as an agile governance mechanism to mitigate legal lags and systematically build institutional capacity. These sandboxes should be primarily designed not only as commercial launch pads to promote innovation but also as spaces for proactive experiential policy learning.

To capitalise on these efforts, an innovation complementarity framework can be adopted to identify ways to combine comparative strengths of individual members to generate greater collective value through an interactive database that identifies sector-specific complementarities and automatically matches research institutions, firms, and funding opportunities across member countries. The role of the New Development Bank could be further strengthened to support collaborative innovation and long-term development. In sum, BRICS countries need to deepen cooperation to reduce digital disparities across the group by strengthening collective capabilities for more equitable technological development. By cooperating on data governance standards, enhancing institutional coordination, and pooling strategic resources, the group possesses a unique opportunity to move beyond fragmented development strategies and decisively pioneer a new model of inclusive and sustainable technological governance to form collaborative and partnership-driven innovation ecosystems.

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Endnotes

1 Jin Chen, Xiaobo Yin, and Ming Liang, “Holistic Innovation: An Emerging Innovation Paradigm,” *International Journal of Innovation Studies* 2, no. 1 (2018): 1-13, https://doi.org/10.1016/j.ijis.2018.02.001; Erik Lindhult, “Systemic Innovation,” *Systems Thinking* 3, no. 1 (2023): 1-14, https://doi.org/10.54120/jost.0000022.

2 G. Manjunath et al., “A Comparative Analysis of Responsible Innovation Governance: Mapping Policy Instruments across the BRICS Spectrum,” *European Economic Letters* 16, no. 1 (2026): 1219-1233, https://doi.org/10.52783/eel.v16i1.4262; José N. Pacheco, Albert Turro, and David Urbano, “Open Social Innovation: A Systematic Literature Review and Future Research Agenda,” *Technological Forecasting and Social Change* 216 (2025), https://doi.org/10.1016/j.techfore.2025.124160.

3 Mónica Edwards-Schachter, “The Nature and Variety of Innovation,” *International Journal of Innovation Studies* 2, no. 2 (2018): 65–79, https://doi.org/10.1016/j.ijis.2018.08.004; Siphelele N. Mahlaba, Sethulego Zacheus Matebesi and Victor H Mlambo, “The Importance of Innovation and Knowledge Sharing in Building Sustainable Economies: A Case of BRICS Countries,” ResearchGate 11, no. 3 (2023): 383-388.

4 Chen, Yin, and Liang, “Holistic Innovation: An Emerging Innovation Paradigm”.

5 Pacheco, Turro, and Urbano, “Open Social Innovation: A Systematic Literature Review and Future Research Agenda”.

6 Mahlaba, Matebesi, and Mlambo, “The Importance of Innovation and Knowledge Sharing in Building Sustainable Economies: A Case of BRICS Countries,” 383; Jaan-Pauli Kimpimäki, Irene Malacina, and Olli Lähdeaho, “Open and Sustainable: An Emerging Frontier in Innovation Management?,” *Technological Forecasting and Social Change* 174 (2022), https://doi.org/10.1016/j.techfore.2021.121229; Tim Schiederig, Frank Tietze, and Cornelius Herstatt, “Green Innovation in Technology and Innovation Management: An Exploratory Literature Review,” *R&D Management* 42, no. 2 (2012): 180–192, https://doi.org/10.1111/j.1467-9310.2011.00672.x.

7 Sabyasachi Saha and Pratyush Sharma, *India’s BRICS Chairship 2026: Cooperation for Resilience and Sustainability*, RIS Discussion Paper No. 322, New Delhi, Research and Information System for Developing Countries, March 2026, https://www.ris.org.in/sites/default/files/Publication/DP-322_%20Sabyasachi-Saha_Pratyush-Sharma.pdf.

8 BRICS India, “About BRICS,” https://www.brics2026.gov.in/

9 Margo Lankhuizen and Rosalinde K. Woolthuis, *The National Systems of Innovation Approach and Innovation by SMEs*, Scales Research Reports, Zoetermeer, EIM Business and Policy Research, 2004.

10 Organisation for Economic Co-operation and Development (OECD), *National Innovation Systems*, Paris, OECD, 1997, http://www.oecd.org/science/inno/2101733.pdf.

11 Richard R. Nelson and Nathan Rosenberg, "Technical Innovation and National Systems," in *National Innovation Systems: A Comparative Analysis*, ed. Richard R. Nelson (New York: Oxford University Press, 1993), 3-21; Bengt-Åke Lundvall, ed., *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning* (London: Pinter Publishers, 1992);

Christopher Freeman, *Technology Policy and Economic Performance: Lessons from Japan* (London: Pinter Publishers, 1987).

12 Dmitry Ivanov, "Human Capital and Knowledge-Intensive Industries Location: Evidence from Soviet Legacy in Russia," *The Journal of Economic History* 76, no. 3 (2016): 736-768; Peter Krott, *The Russian National Innovation System: An International Perspective*, Research Report, Lappeenranta, Lappeenranta University of Technology, Faculty of Technology Management, Department of Industrial Management, 2008.

13 Priscila Koeller and José Eduardo Cassiolato, "Federal R&D Expenditures in Brazil: The Last 10 Years," in *The Innovation Competitiveness of BRICS Countries*, ed. Michael Kamp et al. (Singapore: Springer Nature Singapore, 2025), 115-132.

14 W. Arthur Lewis, "Economic Development with Unlimited Supplies of Labour," *The Manchester School* 22 (1954): 139–191, https://doi.org/10.1111/j.1467-9957.1954.tb00021.x.

15 Nazrul Islam and Kazuhiko Yokota, "Lewis Growth Model and China's Industrialization," *Asian Economic Journal* 22 (2008): 359-396, https://doi.org/10.1111/j.1467-8381.2008.00282.x.

16 Xielin Liu and Steven White, "Comparing Innovation Systems: A Framework and Application to China's Transitional Context," *Research Policy* 30, no. 7 (2001): 1091-1114.

17 Organisation for Economic Co-operation and Development (OECD), *OECD Economic Surveys: Indonesia 2024*, Paris, OECD Publishing, 2024, https://doi.org/10.1787/de87555a-en;

UNESCO, *UNESCO Science Report: The Race Against Time for Smarter Development*, ed. Susan Schneegans, Tiffany Straza, and Jake Lewis (Paris: UNESCO Publishing, 2021), https://unesdoc.unesco.org/ark:/48223/pf0000377433.

18 Cornelius Herstatt, Rajnish Tiwari, Stephan Buse, and Dieter Ernst, *India's National Innovation System: Key Elements and Corporate Perspectives*, East-West Center Working Paper (2008).

19 V. K. Sattiraju and M. D. Janodia, "Analysis of Science, Technology, and Innovation (STI) Policies of India from 1958 to 2020," *Journal of Science and Technology Policy Management* 15, no. 6 (2024): 1691-1708.

20 UAE Government, "National Innovation Strategy," https://u.ae/en/about-the-uae/strategies-initiatives-and-awards/strategies-plans-and-visions/strategies-plans-and-visions-untill-2021/national-innovation-strategy;

Organisation for Economic Co-operation and Development (OECD), *Investment Policy Perspectives in the United Arab Emirates*, Paris, OECD Publishing, 2026, https://doi.org/10.1787/d83cbff3-en.

21 Moloko G. Mathipa-Mdakane, "Supporting Innovation to Address South Africa's Socio-Economic Challenges: A Strategic Framework," *South African Journal of Science* 121, no. 9/10 (2025): 34–37, https://doi.org/10.17159/sajs.2025/21836.

22 Organisation for Economic Co-operation and Development (OECD), *OECD Reviews of Innovation Policy: Egypt 2026, Paris OECD Reviews of Innovation Policy*, 2026, https://doi.org/10.1787/c6675315-en.

23 Center for Progress and Development Iran (CPDI), *Science, Technology, and Innovation in Iran: A Brief Review,* 2025, https://en.cpdi.ir/news/-----Science-Technology-and-Innovation-in-Iran-A-Brief-Review-IRAN-2025.

24 Research, Development and Innovation Authority (RDIA), *Insights into Saudi Arabia's research and innovation ecosystem:* Executive summary, 2024, https://rdia.gov.sa/media/up5pd0et/insights-into-saudi-arabias-research-and-innovation-ecosystem_executive-summary.pdf.

25 Ministry of Innovation and Technology (MINT), *Digital Ethiopia 2030: A Strategy for Inclusive Prosperity*, https://www.pmo.gov.et/media/other/Digital_Ethiopia_2030.pdf;

"UNESCO Science Report: The Race Against Time for Smarter Development".

26 Sabyasachi Saha, Syed A. Ali, and Kanishk Rohilla, "Technology and Employment: Opportunities of Industrialisation and Self-Reliance in India," *Economic and Political Weekly* 61, no. 1, 2026, https://doi.org/10.71279/epw.v61i01.47698.

27 World Intellectual Property Organization (WIPO), *Global Innovation Index 2025: Innovation at a Crossroads*, Geneva, WIPO, 2025, https://doi.org/10.34667/tind.58864.

28 BRICS, *PartNIR: Partnership on New Industrial Revolution Issue Note* (2025), https://www.gov.br/memp/pt-br/assuntos/brics-sme-working-group-1/partnir/issue-note-partnir-partnership-on-new-industrial-revolution-15-01-2025.pdf.

29 BRICS STI Framework Programme, *Pilot STI Flagship Projects Call 2026,* https://www.ufs.ac.za/docs/librariesprovider41/nrf-evaluating-and-rating/brics_sti_flagship_projects_call_2026.pdf?Status=Master&sfvrsn=b6bbf120_1.

30 Samuel Bangura, P. T. Duma, and N. A. Mthembu, "Opportunities and Challenges Facing Social Entrepreneurship in BRICS+ Countries," *International Research Journal of Business Studies* 18, no. 3 (2025): 287–297, https://doi.org/10.21632/irjbs.18.3.287-297.

31 Paula R. Cruz, Victor Rebourseau, and Alyssa Luisi, "Social Innovation and Higher Education in the BRICS (1): A Background Overview," *BRICS Policy Center Papers* 5, no. 2 (2018), https://bricspolicycenter.org/en/publications/social-innovation-and-higher-education-in-the-brics-1-a-background-overview/.

32 Zoheir Ezziane, "Engaging BRICS: Essential Drugs Production in Brazil, Russia, India, China and South Africa (BRICS): Opportunities and Challenges," *International Journal of Health Policy and Management* 3, no. 7 (2014): 365–370, https://doi.org/10.15171/ijhpm.2014.118.

33 Cruz, Rebourseau, and Luisi, "Social Innovation and Higher Education in the BRICS (1): A Background Overview."

34 Cruz, Rebourseau, and Luisi, "Social Innovation and Higher Education in the BRICS (1): A Background Overview."

35 Mahlaba, Matebesi, and Mlambo, "The Importance of Innovation and Knowledge Sharing in Building Sustainable Economies: A Case of BRICS Countries".

36 Manjunath et al., "A Comparative Analysis of Responsible Innovation Governance: Mapping Policy Instruments - across the BRICS Spectrum".

37 Rasmus Lema and Carlota Perez, "The Green Transformation as a New Direction for Techno-economic Development," UNU-MERIT, *UNU-MERIT Working Papers*, no. 001 (2024), https://www.merit.unu.edu/publications/wppdf/2024/wp2024-001.pdf.

38 Mahlaba, Matebesi, and Mlambo, "The Importance of Innovation and Knowledge Sharing in Building Sustainable Economies: A Case of BRICS Countries".

39 Erika Kraemer-Mbula, Susan Cozzens, Andrew Cummings, Michiko Iizuka, Rasmus Lema, and Marina Szapiro, "New Directions in Innovation and Development: Twenty Years of Globelics," *Innovation and Development* (2026): 1–20, https://doi.org/10.1080/2157930X.2025.2597583.

40 Lema and Perez, "The Green Transformation as a New Direction for Techno-Economic Development."

41 Lema and Perez, "The Green Transformation as a New Direction for Techno-Economic Development."

42 Press Information Bureau, Government of India, Ministry of Science & Technology, https://www.pib.gov.in/PressReleasePage.aspx?PRID=1845323&reg=48&lang=2;

Sabyasachi Saha, *SDG Gaps and Technology Needs in Developing Countries: Scope for Locally Agile Technology Ecosystems*, New Delhi, Research and Information System for Developing Countries, 2024;

Sachin Chaturvedi, *Equitable Development Transformation with Technology: Relevance of the Indian Experience for the Global South*, New Delhi, Research and Information System for Developing Countries, 2024.

Technology Co-Creation for Inclusive Development: Lessons from Ethiopia–China Cooperation within BRICS

Tewolde Girma Hailemikael and Cao Wenjiao

Abstract

CHINESE FINANCE AND FIRMS have played an essential role in Ethiopia's infrastructure development and industrialisation. With Ethiopia's accession to BRICS in 2024, it is important to explore new avenues for innovation cooperation between Ethiopia and China within the BRICS framework. This article argues that shifting from technology transfer to technology co-creation offers the most effective path to sustainable and inclusive development. It evaluates the successes and shortcomings of current cooperation, drawing on evidence from the areas of digital transformation, innovation ecosystems, and development finance. As the innovation ecosystem in Ethiopia is still underdeveloped, both sides may further complement infrastructure financing with greater support for innovation-driven development and local entrepreneurial capacity. Mutual recognition of digital skill certificates and the BRICS+ Import Opportunity Atlas will also help maximise the benefits of technology co-creation.

Introduction

Sustainable and inclusive growth is unthinkable without innovation. For BRICS member countries, innovation is increasingly important for addressing development challenges, such as low productivity, unemployment, climate change, and digital transformation. As developing countries seek to industrialise while adapting to technological change, innovation offers opportunities to boost productivity, create jobs, and drive economic transformation.[1]

Like other countries, Ethiopia faces many of these opportunities and challenges. Although the country has registered strong economic growth over the last two decades, it continues to confront structural barriers, including low productivity, limited manufacturing diversification, gaps in technological capabilities, and high youth unemployment. The Ethiopian economy grew at an average of 7.725 percent over fiscal years 2021/22–2024/25.[2] However, maintaining this growth momentum and reaching middle-income status requires a shift from resource-driven growth to productivity- and innovation-driven growth. Since more than 70 percent of its population are under the age of 30,[3] creating jobs for young people remains a national priority.

To tackle these challenges, Ethiopia has prioritised innovation and digital transformation in its development strategy. The Digital Ethiopia 2030 Strategy aims to expand digital finance (mobile money, fintech), e-commerce, information and communications technology (ICT)-enabled agriculture, industry, and services, and the startup and innovation ecosystem.[4] Simultaneously, Ethiopia's Climate Resilient Green Economy Strategy recognises the role of innovation in supporting renewable energy development, resource efficiency, and sustainable growth.[5] These strategies have begun to strengthen the enabling conditions for entrepreneurship and employment in new industrial sectors, especially for young people.

China's development experience offers valuable lessons for countries pursuing innovation-driven transformation. China had developed into a labour-intensive 'world's factory' since its reform and opening up. However, in 2015, it introduced the New Development Philosophy, centred on innovative, coordinated, green, open, and shared development,[6] which was incorporated into the Constitution in 2018.[7] More recently, the concept of 'New Quality Productive Forces' has also focused on innovation, green development, and technological advancement as key drivers for future growth.[8] Today, China has successfully transitioned from a labour-intensive manufacturing economy to a global leader in advanced manufacturing, digital technology, renewable energy, and artificial intelligence. According to the Global Innovation Index

2025 released by the World Intellectual Property Organization (WIPO), as the only middle-income economy within the top 30, China ranks 10th and leads the world with 24 innovation clusters for the third consecutive year, surpassing the United States, which has 22.[9]

The growing connection between Ethiopia's development goals and China's innovation agenda has created new opportunities for collaboration. Beyond traditional investment and infrastructure projects, both countries are emphasising technology, skill development, digital transformation, and green innovation. This shift underlines the need to move from technology transfer to technology co-creation. While technology transfer typically focuses on importing equipment and technical knowledge, technology co-creation highlights joint learning, local capacity building, and collaborative problem-solving, which are more likely to produce sustainable development outcomes. This article examines possible changes and alternative policy recommendations across digital transformation and fintech, innovation ecosystems, and financing in Ethiopia–China cooperation within the BRICS framework.

Digital Transformation and Fintech

Digital transformation is one of the six pillars of Ethiopia's medium-term development strategy. Over the last eight years, the government has increasingly viewed digital technologies as a means of addressing structural challenges related to financial exclusion, service provision, and market accessibility. However, Ethiopia's digital economy is still in its infancy; many rural areas struggle with connectivity issues, accessibility remains constrained, and digital infrastructure is inconsistent. According to the Global Findex Database by the World Bank, in 2024, only about 49 percent of Ethiopian adults had formal financial accounts, 58 percent of Ethiopian adults owned a mobile phone, and 14 percent had used the internet in the three months prior to the survey, while in China, the corresponding percentages were 89 percent, 97 percent, and 86 percent.[10] The sharp contrast between these figures underscores the obstacles to building a more comprehensive digital economy in Ethiopia, and China's digital advancement journey may provide valuable lessons for nations seeking digital transformation.

Digital Public Infrastructure

Global attention often centres on platforms such as Alipay and WeChat Pay. More fundamental, however, is China's sustained investment in digital public infrastructure, comprising the physical infrastructure layer, data-sharing layer, common platforms and technical capabilities, and integrated application programming interfaces (APIs) and portals, with security safeguards embedded at each layer.[11] Physical infrastructure, for example, requires extensive 4G and 5G network coverage to meet the demands of businesses and consumers. In China, internet access has been regarded as an emerging human right, a right to an adequate standard of living. China is determined to strengthen internet infrastructure construction and upgrade the internet signal, especially in rural and remote areas, and increase broadband network coverage in border areas.[12] In most parts of China, people can get through a day without cash, relying instead on mobile payments.

However, many Ethiopians, particularly those working in the informal economy,[13] remain unable to access banking services outside major urban areas due to an underdeveloped agent network and supporting infrastructure. Rather than replicating Chinese digital platforms, Ethiopia should draw lessons from China's investment in foundational digital infrastructure to enable nationwide digital transformation. The Digital Ethiopia 2025 and Digital Ethiopia 2030 strategies place significant emphasis on connectivity, digital identity, and digital public services.[14] Significant advancement has been made in expanding digital identification networks, though implementation differs. In rural areas, where connectivity is weaker and public services are often limited, barriers to digital participation persist. In 2025, Ethiopia and China signed a Memorandum of Understanding on Digital and Emerging Technologies to cooperate in sectors including 5G networks, fibre-optic infrastructure, and satellite communications.[15] Although the agreement's specific arrangements have not been made public, it could provide a framework for technology co-creation if implemented with meaningful participation from Ethiopian institutions and skilled workers, while extending benefits to underserved areas where the digital divide is most pronounced.

Cybersecurity and Regulatory Credibility

As government services, financial operations, and business activities move online, cybersecurity and regulatory credibility have become increasingly important. Although Ethiopia has established cybersecurity institutions, they remain relatively new, and technical expertise in areas such as digital risk management and incident response requires further development. China, by contrast, has developed a mature regulatory framework supported by advanced technologies, technical standards, legal rules, and supervisory institutions.

For example, in 2015, the People's Bank of China introduced a three-tiered know-your-customer (KYC) framework that verifies customers' identities while allowing access to basic financial services through simplified verification and requiring more comprehensive checks for higher-value transactions.[16] This balances financial inclusion with financial security. Ethiopia's regulatory framework, by comparison, remains more restrictive, particularly for informal enterprises lacking formal documentation. The National Bank of Ethiopia should similarly seek to balance financial inclusion, stability, and consumer protection to facilitate the rapid expansion of digital financial services. This does not mean replicating China's policies. An appropriate approach for Ethiopia is to adopt phased supervision similar to China's: simplify entry-level accounts with low transaction limits and enhance supervision as risks increase. It is technically feasible for Ethiopia.

The experiences of China and Ethiopia suggest that, for BRICS countries, strengthening connectivity and other forms of digital public infrastructure is fundamental before promoting platform-based services. It also shows that cybersecurity and trust in digital systems require a coordinated approach combining sound legal and regulatory policies with technological measures.

Innovation Ecosystems for Technology Co-Creation

Technology cannot simply be treated as a commodity transferred from one nation to another. Its value resides in people's knowledge. Lasting benefits therefore depend on whether Ethiopian institutions, businesses, and professionals develop the skills to adapt, manage, and improve these technologies over time.[17] There must be an innovation ecosystem for technology co-creation to realise inclusive and sustainable development. Therefore, digital cooperation between Ethiopia and China must move beyond traditional investment approaches. With a population of more than 135 million in 2025,[18] Ethiopia is not merely a large market or a recipient of technology. It can contribute valuable local and contextual knowledge of development challenges in areas such as climate resilience, agriculture, logistics, and financial inclusion. Through collaboration with local universities and technical and vocational education and training (TVET) institutions, this knowledge can support the co-creation of technologies adapted to local needs and conditions.

However, a concentrated physical space remains necessary to facilitate the shift from traditional investment-led cooperation to technology co-creation. Industrial parks are among the key elements of China–Ethiopia economic cooperation, providing space for manufacturing growth, skills development, and technology sharing. Chinese companies have helped Ethiopia build around 12 industrial parks, including those in Dukem, Hawassa, and Adama. Together with parks built by other foreign partners, these projects have helped position Ethiopia as a leading manufacturing hub in Africa, generating more than 100,000 direct jobs and around 150,000 indirect jobs as of 2024. Among these industrial parks, the Chinese-built Hawassa Industrial Park alone has created over 30,000 jobs, 80 percent of which are women ages 18–24, and contributed over US$30 million in export revenue since 2017.[19] The parks' one-stop access to shared logistics services, production infrastructure, and on-site technical training has also contributed to improvements in productivity.

However, the technology transfer is limited due to various factors.[20] It may become more realistic when integrated into the production process than when pursued solely through contracts. The host country must leverage all its capacity to match individuals or firms with enough capacity to facilitate technology transfer. Both China and Ethiopia agree that talent development is one of the keys to strengthening local capacity for Ethiopia's independent development.[21] The Ethiopian experience in Chinese line-vocational skill transfer offers important lessons. Under the Ethiopia-China TVET Cooperation Agreement, Ethiopian engineers, technical professionals, and new graduates can receive factory-based training to establish direct links between education and production in firms. According to the Ethiopian Ministry of Education, by 2024, vocational tracks established through Ethiopia–China cooperation had produced around 1,200 graduates in mechatronics and industrial electrical systems.[22] Now, Ethiopian professionals have opportunities to get trained in Chinese universities and institutions.[23] This practice has important implications for cooperation among BRICS member countries. Instead of separate foreign investment projects, combining training institutions with industrial production enhances the capacity to absorb new skills and accelerates workforce development. Furthermore, a BRICS-wide Mutual Recognition Framework for TVET certificates could facilitate labour mobility. It lays the foundation for technicians trained in Chinese-run industrial parks in Ethiopia to work in other BRICS manufacturing facilities.

Though industrial parks have brought gains in manufacturing output in Ethiopia, the benefits from these developments have largely gone to large corporations. It has been observed that small and medium-sized enterprises (SMEs) and startups have weak linkages to global networks of modern technology, which restricts their ability to access capital, technical tools, and commercial markets. Many people believe that new programmes are beginning to show that a more welcoming strategy is being created. For example, in December 2025, the China-BRICS Science and Innovation Incubation Park for the New Era announced a plan to establish a fund with an initial scale of US$7.1 million to support BRICS science and innovation incubation initiatives, including the BRICS Young Science and Innovation Ambassadors Exchange Program and the BRICS Cross-Border Innovation Accelerator Program.[24] The latter provides international innovation firms with tailored technical guidance and access to Chinese market-entry channels.[25] If Ethiopian technology start-ups are admitted to such initiatives, these programmes could offer early-stage support while also demonstrating the potential of international technology alliances.

Sustainability is a result that depends on whether cooperation encourages learning, adaptation, and local problem-solving. This approach aligns with the broader objectives of BRICS+ cooperation. Since many developing countries face similar challenges in digital transformation and technology co-creation, China–Ethiopia cooperation experience holds wider significance for the BRICS+ framework beyond the bilateral relation.

Financing and Policy Recommendations

Common wisdom in the domain of development cooperation holds that a lack of funding is the primary impediment to innovation-led transformation. Accordingly, the priority is to expand access to technology financing while building the economic networks that sustain innovation. This is valid to a large extent, and deeper integration between China's established crowdfunding ecosystem and Ethiopia's emerging regulatory framework for crowdfunding could provide an additional source of finance. Through this method, funds from citizens living abroad and local investors can be raised, creating an alternative source of capital for newly established ecological and electronic firms, as these firms frequently encounter difficulties securing conventional loans.

The New Development Bank (NDB) can be a window of opportunity and also a reminder of the limitations within current financing mechanisms. Since its establishment in 2015, the NDB has approved financing with a net portfolio of US$35.152 billion for 105 projects at the end of 2024.[26] The NDB also aims to catalyse sustainable and inclusive development and digital infrastructure is one of its focus areas.[27] Ethiopia has become a member of BRICS and now also a prospective member admitted by the NDB's Board of Governors. After it deposits its instrument of accession, it will become a full member of the NDB,[28] and can receive funds from the NDB for technology co-creation projects. Providing local-currency financing is a major game-changer and also a strategic priority of the NDB, which could mitigate the currency mismatch risks and promote the development of domestic markets in member states.[29] Local-currency financing of the NDB's annual approval in 2024 has reached 43.5 percent,[30] and the NDB continues to explore financing in other national currencies of borrowing members.[31] It may therefore be possible for Ethiopia to receive financing in Birr from the NDB in the future.

However, the problem may not just be how much capital is available, but how it is organised, coordinated, and linked to sustained capacity building. Between 2000 and 2023, China's official sector provided US$18.9 billion in loans and grants to support Ethiopia's industrial transformation.[32] Most of this financing has been directed towards infrastructure, equipment, and other physical assets rather than technology co-creation, despite the importance of such investments. Achieving inclusive and sustainable development therefore requires not only greater financing but also stronger integration between capital, technological learning, institutional development, and knowledge creation.

In light of the analysis above, cooperation between Ethiopia and China should be based on a more comprehensive, strategic approach if we want to see real progress in innovation-led development. Within the BRICS setup, considerable improvements can be achieved through various policy interventions.

First, enhance institutional coordination by designing a special NDB liaison office within the Ethiopian Ministry of Innovation and Technology and setting up an NDB regional office in East Africa, focused on innovation and financing of SMEs after Ethiopia becomes a full member of the NDB.

Second, introduce collaborative innovation vouchers and small matching-grant schemes to address a major challenge for Ethiopian firms: access to specialised technical knowledge. Innovation vouchers would help early-stage start-ups purchase technical diagnostics, testing, certification, and advisory services from accredited Ethiopian and Chinese providers. For more mature firms, small matching grants could support technology adoption, digital upgrading, and green-technology adaptation, with firms sharing part of the cost. This two-track model would encourage learning, reduce financial barriers, and strengthen firm-level technological capabilities.[33]

Third, pilot mutual recognition of selected digital skills and technical certificates by building on the existing TVET cooperation and digital-technology agreement.[34] Rather than attempting comprehensive qualification recognition, the pilot should begin with clearly defined competency modules in areas such as cloud services, cybersecurity, e-commerce, industrial robotics, and digital payment operations. If successful, it could provide practical experience for a future BRICS-wide skills passport framework.

Fourth, establish a joint regulatory sandbox between the National Bank of Ethiopia and the People's Bank of China. A regulatory sandbox would provide a controlled environment in which innovative financial products and services could be tested under regulatory supervision. The initiative could start with cross-border quick-response (QR) payment interoperability. Giving five to 10 Ethiopian fintech enterprises a chance to test their solutions and products through international payment platforms like Alipay+ and WeChat Pay for 12 months could generate valuable practical experience and regulatory insights for future digital finance cooperation across the BRICS countries. Qualified Ethiopian banks and financial institutions could also explore participation in the Cross-Border Interbank Payment System (CIPS) to improve the efficiency of cross-border financial clearing and settlement.

Fifth, Ethiopia should make more effective and strategic use of digital trade corridors. As the largest producer of Arabica coffee in Africa, Ethiopia's coffee export revenue often constitutes more than one-third of the country's entire export revenue. Ethiopian coffee exports to China have grown by 27 percent annually in recent years, making China the eighth-largest destination for Ethiopian coffee exports. This largely owes to the e-commerce platforms making it possible for Chinese coffee buyers to import coffee directly from Ethiopia.[35] Such digital export schemes can be extended to other goods, such as sesame, horticulture, textiles, leather products, and even knowledge-based services.

Sixth, align innovation partnerships with Ethiopia's National Development Plan by using quantitative key performance indicators (KPIs). Local-content provisions, technology transfer standards, export goals, employment-generation goals, and research collaboration results should become standard features of ongoing cooperation agreements.

Finally, Ethiopia, together with its BRICS partners, should jointly formulate a BRICS+ Import Opportunity Atlas based on a detailed trade breakdown at the Harmonized System (HS) code level. This initiative will identify industries in which Ethiopia's growing production capabilities align with existing and potential import needs, not only worldwide but also in the BRICS markets. This will be a great help in converting broad policy objectives into actual investment and export opportunities.

Overall, these proposals aim to shift from technology transfer to collaborative innovation. In the future, Ethiopia–China innovation partnerships should not be assessed only based on the infrastructure developed or equipment delivered but also by the technology co-creation.

Conclusion

Examining Ethiopia–China cooperation through the BRICS framework provides insights into both the opportunities and limitations of innovation cooperation in the Global South. Over the past decade, Chinese investment has been quite instrumental in expanding Ethiopia's digital infrastructure, industrial capacity, and renewable energy sector. These investments have delivered concrete increases in productivity and contributed to achieving additional national development objectives. However, the existing model, focused primarily on infrastructure building and equipment provision, has so far failed to deliver effective technological innovation or long-lasting local capacity growth.

A relevant lesson from the Ethiopia–China cooperation experience is that financing is necessary but not sufficient by itself to generate sustainable innovation outcomes. Sustainable progress relies on the connection between investment, institutional growth, workforce enhancement, technology learning, and many other research collaborations. Thus, shifting from technology transfer to co-creation of technology is a positive next step. This strategy prioritises joint problem-solving, local adaptation, and learning from one another over one-way equipment transfer and knowledge flows.

For Ethiopia, this means that local-content rules, technology-transfer targets, and research partnerships must be incorporated into the country's cooperation projects. For China and other BRICS countries, it is a matter of having financing mechanisms that foster capability-building and infrastructure investments. Failure to undertake this transformation may result in innovation cooperation continuing to produce temporary benefits while at the same time posing problems of developing technological capabilities that are essential for long-term, inclusive, and sustainable development.

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Endnotes

1 See United Nations Industrial Development Organization (UNIDO), *Industrial Development Report 2024: Turning Challenges into Sustainable Solutions* (Vienna: UNIDO, 2024), 56, https://www.unido.org/idr/idr2024#/.

2 See Ministry of Finance of Ethiopia, *Mid-year Budget Implementation Review 2025/26* (Addis Ababa: Ministry of Finance of Ethiopia, 2026), 2, https://www.mofed.gov.et/media/filer_public/ee/f5/eef50cc8-4871-425e-b738-33fe9ed649e0/mid_year_review_2025_26_final_2.pdf.

3 See Ministry of Planning and Development of Ethiopia, *Ethiopia: The Third Voluntary National Review 2025* (Addis Ababa: Ministry of Planning and Development of Ethiopia, 2025), 142, https://hlpf.un.org/sites/default/files/vnrs/2025/VNR%202025%20Ethiopia%20Report.pdf; UNFPA Ethiopia, *Country Programme Evaluation 2020–2025* (Addis Ababa: UNFPA Ethiopia, 2024), xi, 15, https://www.unfpa.org/sites/default/files/board-documents/Ethiopia%20-%20CPE%20-%20Country%20Programme%20Evaluation%20Report%20%20%281%29.pdf.

4 See Government of Ethiopia, *Digital Ethiopia Vision 2030: Locally Rooted, Digitally Powered* (Addis Ababa: Federal Democratic Republic of Ethiopia, 2025), https://www.pmo.gov.et/media/other/Digital_Ethiopia_2030.pdf.

5 See Environmental Protection Authority of Ethiopia, *Ethiopia's Climate-Resilient Green Economy: Green Economy Strategy* (Addis Ababa: Environmental Protection Authority of Ethiopia, 2011), https://www.ldc-climate.org/wp-content/uploads/2018/01/crge-strategy.pdf.

6 See Central Committee of the Communist Party of China, "中共中央关于制定国民经济和社会发展第十三个五年规划的建议" [Proposals of the Central Committee of the Communist Party of China for Formulating the 13th Five-Year Plan for National Economic and Social Development] (adopted on 29 October 2015), National Development and Reform Commission of China, 7–8, https://www.ndrc.gov.cn/fggz/fzzlgh/gjfzgh/201605/P020191029595710374318.pdf.

7 See "Constitution of the People's Republic of China," State Council of the People's Republic of China, 20 November 2019, preamble, https://english.www.gov.cn/archive/lawsregulations/201911/20/content_WS5ed8856ec6d0b3f0e9499913.html.

8 See "Xi Focus: Charting a Course for China's Growth with New Quality Productive Forces," Xinhua News Agency, 8 March 2026, https://english.news.cn/20260308/c73aee398dac4071bff7e7f4f64233a4/c.html.

9 See WIPO, *Global Innovation Index 2025: Innovation at a Crossroads* (Geneva: WIPO, 2024), 19, 25–26, https://www.wipo.int/web-publications/global-innovation-index-2025/en/index.html.

10 See Leora Klapper et al., *The Global Findex Database 2025: Connectivity and Financial Inclusion in the Digital Economy* (Washington, DC: World Bank Group, 2025), 296, https://openknowledge.worldbank.org/entities/publication/8b9002b6-d8dd-426c-aa7c-6d7d16902cd7.

11 See Chinese Academy of Information and Communications Technology, *Digital Public Infrastructure Solutions: From the Perspective of China's Practices* (Beijing: Chinese Academy of Information and Communications Technology, 2025), 13–15, https://www.caict.ac.cn/english/research/whitepapers/202509/P020250923335045699470.pdf.

12 See State Council Information Office of China, *National Human Rights Action Plan of China (2026–2030)* (Beijing: State Council Information Office of China, 2026), https://en.humanrights.cn/2026/06/11/bc922bb1beaa4c2d801d41d402bb105f.html.

13 Nearly 85 percent of Ethiopian workers were employed informally in 2021. See Danish Trade Union Development Agency, *Ethiopia Labour Market Profile 2024/2025* (Copenhagen: Danish Trade Union Development Agency, 2024), 16, https://www.ulandsserkretariater.dk/uploads/2024/04/Ethiopia-LMP-final.pdf.

14 See Government of Ethiopia, *Digital Ethiopia 2025: A Digital Strategy for Ethiopia Inclusive Prosperity* (Addis Ababa: Federal Democratic Republic of Ethiopia, 2020), reproduced on Food and Agriculture Organization (FAO), https://faolex.fao.org/docs/pdf/eth215804.pdf; and *Digital Ethiopia Vision 2030.*

15 See "Ethiopia, China Sign MoU to Boost Cooperation in Digital and Emerging Technologies," Ethiopian News Agency, 25 September 2025, https://www.ena.et/web/eng/w/eng_7399705.

16 See People's Bank of China, "非银行支付机构网络支付业务管理办法" [Administrative Measures for the Online Payment Business of Non-Banking Payment Institutions], 28 December 2015, arts. 6 and 11, https://www.pbc.gov.cn/zhifujiesuansi/128525/128535/128629/3301282/index.html.

17 See Tang Xiaoyang, *Chinese Manufacturing Investments and Knowledge Transfer: A Report from Ethiopia*, Working Paper No. 2019/24 (Washington, DC: China Africa Research Initiative, School of Advanced International Studies, Johns Hopkins University, 2019), https://www.sais-cari.org/s/WP-2019-03-Tang-Ethiopia-Manufacturing.pdf.

18 See World Bank, "Population, Total – Ethiopia," accessed 24 July 2026, https://data.worldbank.org/indicator/SP.POP.TOTL?locations=ET.

19 See UNIDO, *Industrial Development Report 2024*, 106.

20 See, e.g., UNIDO, *Industrial Park Development in Ethiopia Case Study Report* (Vienna: UNIDO, 2018), 37, https://ipp.unido.org/knowledge/documents/industrial-park-development-ethiopia-case-study-report; Tang Xiaoyang, *Chinese Manufacturing Investments and Knowledge Transfer*.

21 See People's Republic of China and Federal Democratic Republic of Ethiopia, "中华人民共和国与埃塞俄比亚联邦民主共和国关于建立全天候战略伙伴关系的联合声明" [Joint Statement between the People's Republic of China and the Federal Democratic Republic of Ethiopia on the Establishment of All-Weather Strategic Partnership], Ministry of Foreign Affairs of China, 17 October 2023, art. 10, https://www.fmprc.gov.cn/zyxw/202310/t20231017_11162386.shtml.

22 See Ministry of Education of Ethiopia, *Ethiopia–China TVET Cooperation Agreement: Monitoring and Evaluation Report* (Addis Ababa: Ministry of Education of Ethiopia, 2024) [unpublished manuscript], 8. According to Xinhua News Agency, the China-sponsored Luban Workshop in Ethiopia had provided vocational training for more than 1,500 local students by 2024. See "Vocational Education Venturing Abroad to Bolster Cultural Exchanges," Xinhua News Agency, 4 October 2024, https://english.news.cn/20241004/0ed79c8a0d874e858eaef8a34a0a39d7/c.html.

23 See “Ethiopia, China Pledge to Revitalize TVET Cooperation into Higher Levels,” Ethiopian News Agency, 23 October 2024, https://www.ena.et/web/eng/w/eng_5342851; “A New Chapter for China-Ethiopia Vocational Education Cooperation: Our School’s Customized Teacher Training Program Sets Sail,” Zhejiang Business Technology Institute, 19 May 2025, https://eng.zbti.edu.cn/2025/0519/c1942a51625/page.htm.

24 See “Xiamen Becomes BRICS Hub for Science and Innovation Collaboration,” *China Daily*, reproduced on the official website of the People’s Government of Fujian Province, 22 December 2025, https://www.fujian.gov.cn/english/news/202512/t20251222_7049130.htm.

25 See “BRICS Cross Border Innovation Accelerator Program 2026,” Plug and Play China, accessed 19 June 2026, https://playbook.pnpchina.com/#/CrossGoldXiaMen; also reproduced on Innovation Bridge, accessed 19 June 2026, https://innovationbridge.info/ibportal/content/xiamen-brics-cross-border-innovation-accelerator-program-2026-gateway-china-market-brics.

26 See New Development Bank (NDB), *Annual Report 2024: Investing in a Sustainable Future* (Shanghai: NDB, 2024), 6, 47, https://www.ndb.int/annual-report/2024/overview/.

27 See NDB, “Focus Areas,” accessed 13 June 2026, https://www.ndb.int/about-ndb/focus-areas/.

28 See NDB, “Members,” accessed 13 June 2026, https://www.ndb.int/about-ndb/members/.

29 See NDB, *Annual Report 2024*, 49.

30 See NDB, *Annual Report 2024*, 32.

31 See NDB, *Annual Report 2024*, 49.

32 See JulieAnn Sickell and Brooke Escobar, *Ethiopia: Chinese Development Finance, 2000–2023* (Williamsburg, VA: AidData, 2026), 5, https://www.aiddata.org/publications/ethiopia-profile-of-chinese-development-finance-2000-2023.

33 For details on innovation vouchers and small matching grants, see Xavier Cirera et al., *A Practitioner’s Guide to Innovation Policy: Instruments to Build Firm Capabilities and Accelerate Technological Catch-Up in Developing Countries* (Washington, DC: World Bank Group, 2020), 90–122, https://openknowledge.worldbank.org/entities/publication/d1d798b0-2394-5925-ae12-34a527c74382.

34 See “Ethiopia, China Sign MoU to Boost Cooperation in Digital and Emerging Technologies.”

35 See “China Shares E-Commerce Development Experience with African Countries,” *People’s Daily Online*, 6 December 2023, https://en.people.cn/n3/2023/1206/c90000-20106754.html; Habtamu Worku and Liu Fangqiang, “Ethiopia Eyes Value Addition to Harness Coffee Potential amid Growing Demand from China,” Xinhua News Agency, 16 July 2024, https://english.news.cn/africa/20240716/e59787a42ec94b8e8d0b2b6d450f9116/c.html.

From Capital to Capability: Recommendations for an Innovation-Led BRICS Investment Architecture

Soumya Bhowmick and Joe Y Battikh

Abstract

MOST GLOBAL SUSTAINABLE DEVELOPMENT GOAL (SDG) targets are demonstrably off-track for the 2030 deadline. The post-2030 development agenda for BRICS economies demands a sharper question than how much foreign direct investment (FDI) they can attract; it should focus on what that investment leaves behind. This article argues that the developmental value of contemporary FDI rests on intangibles—compute, cloud infrastructure, localised data, AI capabilities, and patient capital—rather than capital volumes alone, and that multinational corporations (MNCs) must function as long-term partners, not extractive actors. Drawing on statistical evidence and using the India–United Arab Emirates (UAE) corridor as an illustration, it offers three operational recommendations for an innovation-led, SDG-aligned BRICS investment architecture: a quality-based Investment Qualities Dashboard at the New Development Bank, a conditional incentives framework, and an interoperable digital governance scaffold for trusted cross-border data, payments, and AI cooperation.

Introduction

The BRICS grouping has evolved from a financial-market shorthand into one of the most consequential platforms shaping the architecture of global development. After several enlargements, it now accounts for about 49 percent of the world's population and roughly 40 percent of global gross domestic product (GDP) at purchasing power parity.[1] At a time when multilateralism is being contested and the post-2030 development agenda is under negotiation, the question of how BRICS economies finance, govern, and direct innovation has become particularly important.

This chapter asks: How can BRICS countries move beyond traditional strategies to attract foreign direct investment (FDI) towards an innovation-led, technology-enabled, and development-aligned model of investment governance, in which multinational corporations (MNCs) function as long-term partners, not extractive actors? The India–United Arab Emirates (UAE) investment corridor serves as a case study, given the depth and contemporaneity of bilateral investment flows in it.

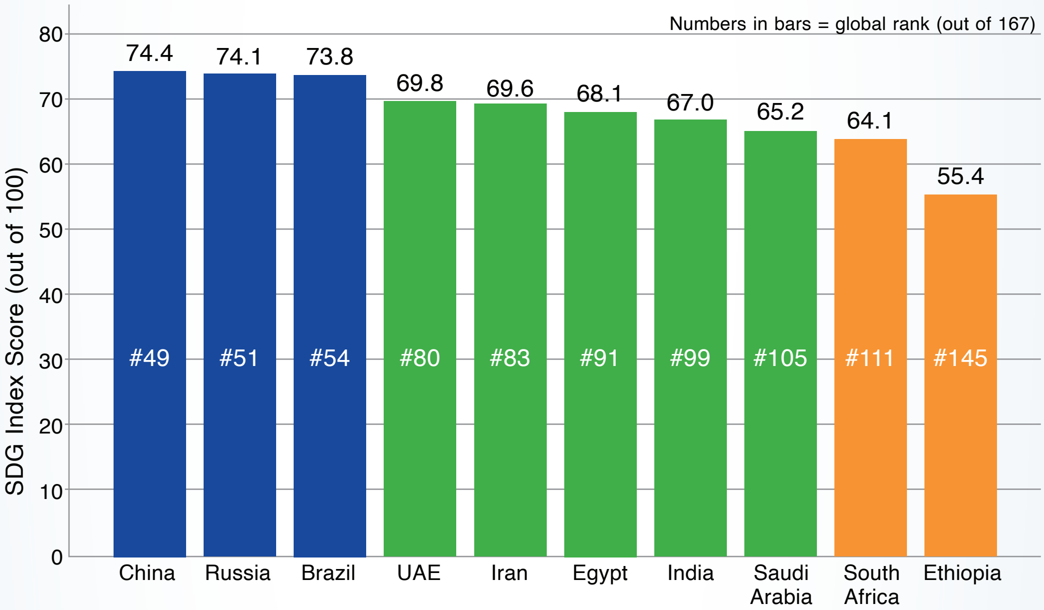
The urgency of this enquiry is heightened by the reality that the world is falling behind on the Sustainable Development Goals (SDGs) as the 2030 horizon approaches.[2] The shortfall lands disproportionately on emerging and developing economies, including most BRICS+[a] members, where financing, infrastructural, and institutional capacity deficits are most pronounced. The post-2030 era, therefore, needs not a renewed SDG-only lens but a broader articulation of sustainable development objectives encompassing technological sovereignty, climate resilience, and inclusive prosperity.

a This chapter uses both terms deliberately. "BRICS" denotes the founding five members—Brazil, Russia, India, China, and South Africa—and the bloc as an institution, whose architecture, including the New Development Bank, remains anchored in those five. "BRICS+" denotes the enlarged grouping that has taken shape since the 2024–25 accessions of Egypt, Ethiopia, Iran, and the United Arab Emirates, followed by Indonesia, with Saudi Arabia participating following its invitation. "BRICS+" is therefore used wherever the data, membership, or argument covers the expanded bloc, and "BRICS" where the reference is institutional or to the original five.

Sustainable Development Objectives in a Post-2030 Innovation-Led Era

With only a fraction of SDG targets on track and the rest stagnating or regressing, the 2030 deadline has shifted from a milestone of fulfilment to a marker of unmet objectives. According to a United Nations (UN) assessment (2025), only 35 percent of SDG targets are on track or showing moderate progress, while nearly half are advancing too slowly and 18 percent have regressed below their 2015 baselines.[3] Within BRICS and BRICS Partners, performance varies, with several emerging members and newer entrants lagging on goals related to industry, innovation, and infrastructure (SDG 9); and decent work and economic growth (SDG 8).[4]

Figure 1: SDG Index Performance of Selected BRICS and BRICS Partner Economies, 2025



Source: Sachs et al., Sustainable Development Report 2025.[5]

The deeper lesson, however, is conceptual, not a matter of arithmetic. The SDG architecture was designed for a pre-COVID-19 world where artificial intelligence (AI), though already in use, had not yet been deployed at commercial scale, and geoeconomic fragmentation was less intensive. The post-2030 conversation cannot just renew the same goals; it must articulate a broader set of sustainable development objectives (SDOs) that explicitly take into account technological sovereignty, climate resilience, demographic transition, and inclusive prosperity in fundamentally reshaped economies.[6] Three private-sector capabilities will be foundational to this: AI, proprietary and public data ecosystems, and patient capital with technological depth—i.e., long-horizon financing from sovereign wealth funds, pension funds, and development banks that is able to underwrite multi-year technology and infrastructure projects whose returns accrue slowly.[7]

This reframing is especially important for BRICS. The bloc is at once the largest reservoir of unmet development needs and a leading hub of indigenous AI and clean-tech innovation: China alone accounted for over 70 percent of global generative-AI patent filings between 2014 and 2023, while India ranked fifth among the leading filers and posted the highest annual growth rate at 56 percent.[8] Yet BRICS continues to absorb a substantial share of climate, demographic, and infrastructure deficits. The post-2030 agenda must therefore factor in this paradox: BRICS economies can neither passively consume innovation produced elsewhere nor underwrite global externalities without commensurate gains. Rather than aspirational goal-setting, a credible vision must rest on investment patterns and partnership architectures that will actually deliver development outcomes.

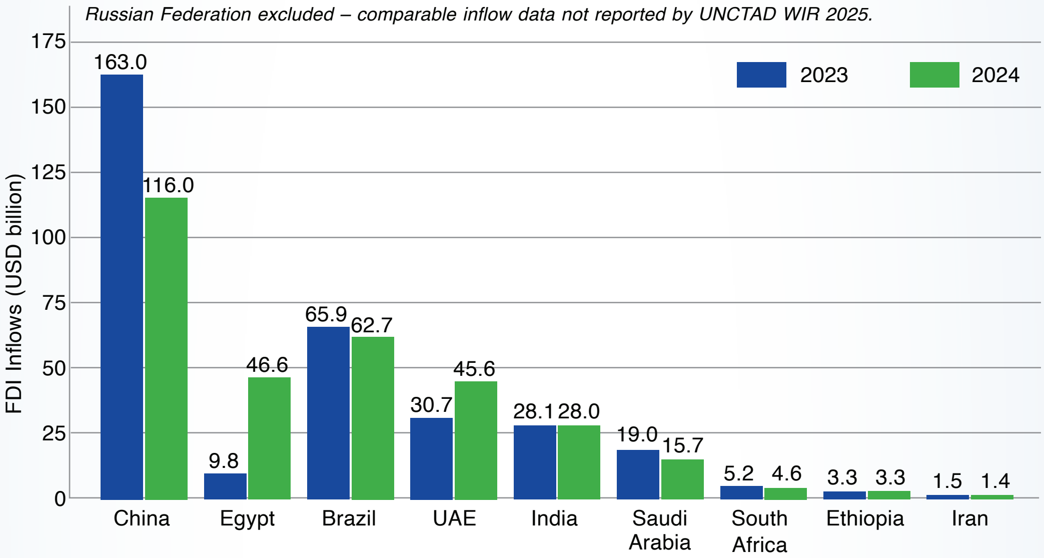
FDI Flows and Sustainable Development Outcomes in BRICS

The post-2030 sustainable development vision should address the empirical realities of how capital flows into and across BRICS economies. Global FDI flows have plateaued since 2022 amidst geopolitical fragmentation, rising tariffs, and supply chain reconfiguration, yet the BRICS economies remain important destinations for productive cross-border investment.[9]

While headline global FDI rose nominally by 4 percent in 2024 to US$1.5 trillion, after removing volatile financial-conduit flows routed through a handful of European economies, productive FDI—or investment in fixed assets, plant, and operating capacity rather than purely financial transfers—fell by 11 percent in 2024, the second consecutive year of decline. Against this backdrop, BRICS+ economies together absorbed approximately US$280 billion, close to one-fifth of global inflows. Headline figures, however, mask divergences among the bloc members where China's inflows contracted by 29 percent, while the UAE and Egypt registered record years. This was mainly due to Egypt's US$46.6-billion intake propelled by the UAE-backed

Ras El-Hekma deal under which sovereign investor ADQ (an Abu Dhabi sovereign holding company) committed US$35 billion to Egypt—US$24 billion for the development rights to a coastal economic zone on the Mediterranean, and US$11 billion converted from existing deposits for investment in prime projects across the country.[10]

Figure 2: FDI Inflows to BRICS+ Economies, 2023 vs 2024 (US$ Billion)



Source: UN Trade and Development (UNCTAD), World Investment Report 2025; UAE Ministry of Investment, FDI Report 2025; national balance-of-payments statistics.[11]

Three patterns merit attention. First, the sectoral composition of FDI in BRICS economies is shifting from extractive and low-value manufacturing towards digital infrastructure, renewables, and high-technology services. UN Trade and Development (UNCTAD) data (2025) reveals that greenfield project announcements within BRICS for renewables and information and communication technology (ICT) reached record levels in 2024, with India retaining a top five global rank in greenfield value and the UAE ranking second by number of announced greenfield projects.[12]

Second, intra-BRICS investment, although still modest relative to North–South flows, is gaining volume and strategic significance. It is concentrated in renewables, digital infrastructure, agricultural technology, and pharmaceuticals, with Gulf sovereign investors and Chinese and Indian firms emerging as the most active anchors.[13]

Third, the empirical link between FDI and inclusive growth is conditional rather than automatic. FDI transmits developmental benefits through four channels—productivity spillovers via technology transfer; employment creation in higher-wage tradeable sectors; fiscal contributions; and balance-of-payments support. The activation of these channels by host economies depends heavily on the latter's absorptive capacity (human capital and skills), regulatory quality, and the depth of domestic supplier ecosystems, as the Organisation for Economic Co-operation and Development (OECD)'s FDI Qualities Indicators demonstrate in BRICS and BRICS Partner country contexts.[14]

The intra-BRICS investment story merits closer attention, because it is where the bloc's developmental potential is being most redefined. UNCTAD (2023) finds that the potential for intra-BRICS investment remains promising, although much of this investment is routed through offshore centres that obscure origin and destination.[15] The 2024 Ras El-Hekma agreement propelled Egypt into the world's top ten FDI destinations and confirmed the Gulf members as anchor investors in the bloc.[16] Chinese and Indian firms have also expanded their outward footprints in renewables, digital infrastructure, and pharmaceuticals.[17] What distinguishes these flows from traditional North–South investment is that they are increasingly South-led, sovereign-backed, and aligned with member-state priorities—precisely the assets an innovation-led BRICS investment architecture should consolidate. Whether this architecture delivers ultimately depends on the conduct of the firms operating within it, which places the analytical spotlight squarely on the MNCs.

MNCs as Strategic Partners, Not Extractive Actors

The dominant twentieth-century template casts MNCs in developing economies as efficiency-seeking actors pursuing cost arbitrage, market access, or natural resource extraction.[18] That model is now obsolete due to three forces: the expansion of the global development agenda from a narrow growth lens to a multi-dimensional sustainability framework; the increasing dominance of intangible assets—data, AI, software, and standards—over physical capital in determining the productive value of an investment; and the demand from host BRICS economies for partnerships that build long-term productive capacity rather than enclaved export platforms.

A new generation of corporate engagement is therefore required, in which MNCs operate as strategic partners in long-term productive capacity-building, not as extractive actors that capture rents and repatriate value.

The intellectual basis for this shift is already in place—multinationals must move beyond compliance-based corporate social responsibility (CSR) towards active co-investment in development outcomes, anchored by multi-stakeholder partnerships and explicit accountability at the highest level for non-financial performance.[19] This argument resonates with the broader literature on the "purposeful corporation," in which long-term value creation is understood as inseparable from environmental and social outcomes.[20]

For BRICS, this model has three operational implications. First, instead of the gross volume of capital invested, MNCs must be measured against the depth of their local linkages—supplier development, skills transfer, and integration with micro, small, and medium enterprises (MSMEs).[21] Second, corporate governance frameworks should see development outcomes as strategic objectives, with board-level oversight and disclosure comparable to that for financial performance.[22] Third, partnerships should bring BRICS governments, multinationals, and domestic firms together, with the New Development Bank (NDB)—the BRICS-led multilateral development bank headquartered in Shanghai—and other BRICS-affiliated institutions acting as conveners and risk-sharers.[23]

This reframing is more than rhetorical; it alters how host governments will design investment policy and how MNCs design entry strategies. Yet, it leaves open a foundational question: if MNCs are to function as strategic partners, what is the substantive content of that partnership in a post-2030, AI-saturated economy? The answer lies in the technologies, data, and capabilities MNCs bring.

Technology Transfer, Data Sharing, and AI-Enabled Capacity Building

Operationalising MNC partnership frameworks begins with the intangible capabilities multinationals now control—technology, data infrastructure, and the organisational and regulatory expertise embedded in their operating models. These collectively determine the developmental value of investment in a digital economy far more than capital inflows. Competitive advantage today rests on cloud infrastructure, AI systems, proprietary data sets, and computing power, not solely on physical production, making sustainable investment a matter of capability enhancement rather than efficiency-seeking deployment. This shift is particularly consequential for BRICS economies, which are simultaneously centres of technological dynamism and reservoirs of unmet development needs. Technology transfer extends well beyond manufacturing relocation to encompass AI, digital public infrastructure, renewables, precision agriculture, fintech, and climate analytics. The BRICS challenge is to attract these technologies as well as embed them within domestic innovation ecosystems and workforce development strategies.

AI illustrates this transition, as its systems rely on compute infrastructure and access to sufficiently large, localised, and contextually relevant data sets. According to the World Bank, the effective deployment of AI in agriculture across many developing economies is constrained by fragmented data systems, weak digital infrastructure, interoperability challenges, and insufficient locally relevant training data.[24] These are particularly noteworthy for smallholder farming systems, where agricultural conditions, climate patterns, soil characteristics, and market structures often differ substantially from those represented in high-income Global North data sets.

The Institute for Agriculture and AI (IAAI) established at the Mohamed bin Zayed University of Artificial Intelligence (MBZUAI) in Abu Dhabi illustrates these limitations. The institute seeks to support AI-enabled agricultural transformation through localised data sets, technical training, and deployable advisory systems for smallholder farmers across the Global South. The IAAI was not built through FDI; it is an example of the broader institutional and innovation ecosystems increasingly required for AI-enabled development.[25] For MNCs, such institutions represent a signal as well as an entry point: they define the kinds of localised data assets, technical standards, and deployment challenges that multinational technology and agricultural technology (agri-tech) firms must engage with, if their investments are to generate genuine developmental value and not replicate extractive patterns.

Comparable dynamics are visible elsewhere across BRICS, such as in China's expansion of data centre and compute infrastructure under its Eastern Data Western Compute strategy. The initiative seeks to strengthen national AI capacity through large-scale investment in cloud systems, digital connectivity, and distributed computing resources.[26] Similar trends are emerging in Brazil, where agri-tech initiatives increasingly integrate digital extension services, remote sensing technologies, and localised agricultural data sets to support precision agriculture and improve productivity across tropical farming systems.[27]

MNCs can play an important complementary role within such ecosystems, by investing FDI and through strategic technology partnerships. Hyperscalers and cloud-service providers could invest in data centres, cloud infrastructure, and high-performance computing systems required to train and deploy AI models at scale. Firms operating across agriculture, telecommunications, satellite systems, logistics, and supply chains can also contribute localised and large-scale data sets necessary to build representative AI models relevant to Global South conditions. In this framework, FDI evolves from capital mobility to collaborative capability formation, the type of transition that BRICS economies increasingly require in the post-2030 innovation landscape.

The Case of the India–UAE Investment Corridor

The propositions discussed earlier acquire empirical shape when tested against a live partnership. The India–UAE corridor offers a contemporary, fast-evolving case in which trade liberalisation, sovereign-backed investment, payment interoperability, and emerging AI cooperation have been assembled within a single bilateral architecture grounded in rapid growth, regulatory innovation, and strategic sectoral alignment.

As a result, total bilateral trade between the two countries surged from US$43.3 billion in FY2020–21 to US$100.05 billion in FY2024–25, nearly doubling in three fiscal years after the Comprehensive Economic Partnership Agreement (CEPA) took effect on 1 May 2022 and reaching the original five-year goods-trade target of US$100 billion five years ahead of schedule. In early 2026, the target was doubled to US$200 billion by 2032.[28]

Negotiated in just 88 days, the CEPA granted Indian exports preferential market access on 97 percent of UAE tariff lines and opened 11 broad service sectors for reciprocal access, establishing the regulatory predictability and market openness that multinationals demand for long-term investment commitments. The agreement illustrates a broader principle for BRICS nations: trade liberalisation and investment attraction are not sequential but mutually constitutive. The depth of FDI in the corridor is partly a product of the legal and commercial certainty the CEPA created.[29]

The regulatory architecture is equally groundbreaking. A bilateral investment treaty (BIT) was entered into force on 31 August 2024, adding investor protections to the CEPA framework. The Local Currency Settlement System established in July 2023 enables rupee–dirham trade, and led to the first rupee-denominated oil transaction—purchase of one million barrels of oil by the Indian Oil Corporation from the Abu Dhabi National Oil Company (ADNOC)—as well as export of 25 kg of gold valued at INR 128.4 million. Payment interoperability is being advanced through integrating India's Unified Payments Interface (UPI) with the UAE's Aani instant-payment platform and India's RuPay card with the UAE's Jaywan. This will benefit the approximately 4.36 million-strong Indian diaspora in the UAE.

Investment flows reflect the corridor's depth. The UAE is India's seventh-largest investor, with a cumulative FDI of US$22.848 billion (April 2000 to March 2025), including US$3.35 billion in FY2023 alone. In October 2024, at the 12th India–UAE High Level Task Force on Investments, the UAE indicated that its investment commitment to India was on track to exceed US$100 billion—up from the US$75-billion pledge made in 2018—with targeted sectors spanning data centres, AI, renewable energy, transmission infrastructure, manufacturing, and dedicated food parks. India's cumulative outward direct investment in the UAE stands at US$16.54 billion, covering cement, building materials, textiles, engineering products, consumer electronics, tourism, hospitality, healthcare, education, and retail.[30]

Sectoral hotspots reveal a structural shift. In agri-tech, the UAE has committed approximately US$2 billion to develop dedicated food parks in India to serve UAE markets under a bilateral food corridor framework. Separately, Bharat Mart, a 100,000 metre^2 (2.7 million square feet) DP World logistics hub at the Jebel Ali Free Zone in Dubai, was announced in April 2025. It will house 1,500 showrooms and warehouse/office units, has attracted over 9,000 expressions of interest from Indian firms, and is set to open by end-2026.[31]

In clean energy, the state of Rajasthan and the UAE Ministry of Investment signed an investment agreement in October 2024 for a proposed 60 GW solar, wind, and hybrid project in the Thar Desert region in Rajasthan. It is reportedly valued at around INR 3 lakh crore (~US$35 billion).[32]

AI and digital infrastructure form the fourth and analytically most important pillar. A bilateral digital infrastructure MoU signed on 12 February 2024 between India's Ministry of Electronics and Information Technology and the UAE's Ministry of Investment committed to an initial data centre capacity of up to 2 gigawatts—nearly double India's then-total national capacity—an 8 exaFLOP AI compute cluster developed with Cerebras Systems, and bilateral research and development (R&D) collaboration on AI model development. Abu Dhabi-based G42 is the principal operational investor tied to this framework. G42 also launched NANDA, a 13-billion parameter Hindi-centric large language model developed with MBZUAI, signalling that the investment extends beyond hardware into localised AI capability development.[33]

The corridor thus models a next-generation approach to FDI by combining trade liberalisation (CEPA) with investment protection (BIT), integrating sovereign wealth with private entrepreneurship, and pioneering local currency settlements. However, it will not be easy to reproduce these across a BRICS-wide governance architecture. The India–UAE corridor benefits from high bilateral trust, geopolitical alignment, and a large diaspora providing people-to-people connectivity. These conditions do not extend across the entire 11-member bloc marked by geopolitical tensions—most notably between India and China—divergent regulatory traditions, and competing currency interests.

Transferability, therefore, should not mean replicating the corridor wholesale, but extracting certain modular principles that can be applied across BRICS selectively and sequentially. The CEPA shows that fast-tracked trade agreements can unlock a fair amount of trade; the rupee–dirham system offers a model for local currency settlements; the UPI–Aani linkage demonstrates cross-border payment interoperability; and the UAE sovereign investment provides a template for pooled BRICS capital aligned with development goals. Adopted incrementally and tailored by context, these principles offer a credible, if partial, blueprint for how BRICS economies can build more resilient and investment-rich partnerships that will incrementally reduce dollar dependency, even if full de-dollarisation remains a distant and structurally complex ambition.

Towards an Innovation-Led, SDG-Aligned BRICS FDI Governance Architecture

If the India–UAE corridor demonstrates next-generation FDI, the BRICS challenge is to scale that logic into a coherent governance architecture. The traditional FDI framework built around liberalisation, investor protection, and capital attraction is no longer adequate for an economy reshaped by AI, climate transition, and digital competition. For decades, investment policy in developing economies has emphasised these pillars, and while they facilitated integration into global markets, they also often generated limited technological spillovers and weak domestic innovation ecosystems.

BRICS economies need an innovation-led and SDO-aligned investment governance architecture centred on resilience, technological upgrading, and capability formation. The objective should not merely be to attract larger volumes of investment, but to shape the developmental character of investment itself. As the India–UAE corridor demonstrates, next-generation investment increasingly depends on integrating trade facilitation, digital infrastructure, sovereign financing, payment interoperability, and long-term ecosystem building rather than on low-cost production advantages alone.

An important step will be to redesign investment incentives. Traditional tax concessions and low-regulation strategies often encourage only short-term or enclave investment with limited developmental impact. Next-generation investment frameworks should instead link incentives to measurable contributions in areas such as local R&D partnerships, workforce training, renewable-energy adoption, MSME integration, and technology transfer.

This logic is particularly important in AI-intensive sectors, where key developmental bottlenecks include access to compute, cloud infrastructure, and localised data ecosystems. The emergence of hyperscale data-centre investments and cloud-computing platforms demonstrates how FDI is concentrating on digital infrastructure and AI capabilities.[34] Building on the technology-transfer mechanisms discussed earlier, the corresponding governance task is to formalise the architectures within which such partnerships operate.

Translating these principles into practice requires concrete institutional structures. The New Development Bank (NDB) is the most plausible convening body for a BRICS investment governance architecture, given its existing mandate, capitalisation, and member-state ownership. A dedicated Investment Governance Council within the NDB—comprising senior investment policy officials from each member state alongside representatives from the private sector and civil society—could serve as the principal decision-making body, setting quality standards for BRICS-eligible investment, reviewing member-state compliance, and approving conditional incentive frameworks.

Three instruments will be needed: First, a BRICS Investment Qualities Dashboard, modelled on the OECD FDI Qualities framework, could track a small set of standardised indicators, such as local linkage depth, R&D co-investment intensity, MSME integration, technology-transfer commitments, and contributions to compute and data infrastructure, against which incoming investment could be assessed and publicly reported. Second, a conditional incentives framework would make access to NDB co-financing, tax concessions, and land allotments contingent on verifiable performance against these indicators, creating binding rather than voluntary commitments for participating MNCs. Third, a BRICS Digital Infrastructure Fund, jointly capitalised by member-state sovereign wealth vehicles and the NDB, could provide concessional financing specifically for compute infrastructure, data centre development, and AI capability-building projects that meet the quality thresholds established by the dashboard.

Governance frameworks should encourage trusted data-sharing partnerships, compute access arrangements, university–industry collaboration, and joint innovation platforms. A BRICS Cross-Border Data Trust Protocol could be established, modelled on existing frameworks, such as the EU's data governance architecture, but adapted to the heterogeneous regulatory environments of BRICS members. It would establish common standards for data localisation, interoperability, and AI training data access, with a dispute-resolution mechanism housed at the NDB. Decision-making should be tiered: BRICS-wide standards set by the Investment Governance Council, bilateral or sub-group implementation agreements negotiated between member pairs or regional clusters, and national regulatory adaptation managed by designated focal-point ministries in each member state. This approach would acknowledge the geopolitical heterogeneity of the bloc—particularly the tensions between India and China—while preserving the possibility of meaningful coordination at the sub-group level where trust and alignment are sufficient.

Ultimately, the significance of a BRICS investment architecture extends beyond economics alone. It reflects a broader effort to shape a more inclusive and development-oriented model of globalisation centred on the diffusion of innovation, technological resilience, and the formation of collaborative capabilities. The institutional scaffolding proposed is not meant to be adopted wholesale or simultaneously; rather, it offers a modular architecture that member states can engage with selectively and build upon incrementally as trust, capacity, and political will develop.

Policy Recommendations and Conclusion

In the post-2030 landscape, BRICS economies sit at the intersection of growth and unmet development needs, making investment governance more consequential than the amount attracted. Traditional FDI approaches are increasingly inadequate for a digital and AI-driven economy, where developmental value hinges on technological capability, access to compute, data infrastructure, workforce development, and domestic innovation ecosystems.

It is important to distinguish AI-development ecosystems that build capability through data sets, training, and advisory systems, such as MBZUAI's Institute for Agriculture and AI, from large-scale hyperscale data-centre investments such as G42's planned data centre infrastructure. Recognising this distinction will allow BRICS policy frameworks to design complementary instruments for each.[35]

Three operational recommendations follow from this analysis. First, BRICS-wide investment metrics should be redesigned around a small set of quality indicators—local linkage depth, R&D co-investment, MSME integration, technology-transfer intensity, and contribution to compute and data infrastructure—anchored institutionally in a BRICS Investment Qualities Dashboard.[36]

Second, member states should adopt a *conditional-incentives* framework: NDB co-financing, tax holidays, land allotments, and concessional finance contingent on verifiable contributions to local cloud or compute capacity, workforce upskilling, and supplier development.

Third, BRICS should establish a layered digital governance architecture comprising three interlocking instruments: a Digital Infrastructure Fund providing concessional financing for compute and AI capability-building projects; a Cross-Border Data Trust Protocol that establishes common standards for data localisation, interoperability, and AI training data access with a dispute-resolution mechanism; and a tiered decision-making model operating at bloc-wide, bilateral, and national levels to accommodate the geopolitical heterogeneity of the bloc that enables trusted data flows for AI training while safeguarding cyber resilience and balanced IP rights.

These recommendations reflect the evolving post-2030 development landscape outlined earlier in this article, in which resilience, technological sovereignty, digital inclusion, and adaptive institutional capacity increasingly become determinants of sustainable development outcomes. The institutional scaffolding proposed here is not designed to be adopted wholesale or simultaneously; rather, it offers a modular architecture.

Ultimately, BRICS has an opportunity to do more than just participate in the next phase of globalisation; it can shape a resilient and development-oriented model of technological cooperation centred on sustainability, capability formation, and inclusive innovation. The transition this chapter has traced—from capital to capability—is, in the end, the difference between an FDI regime that absorbs investment and one that compounds it into a durable national advantage.

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Endnotes

1 IMF, *World Economic Outlook Database, April 2025*, Washington DC, International Monetary Fund, 2025, https://www.imf.org/en/publications/weo/weo-database/2025/april.

2 United Nations, *The Sustainable Development Goals Report 2025*, New York, United Nations Department of Economic and Social Affairs, 2025, https://unstats.un.org/sdgs/report/2025/.

3 "The Sustainable Development Goals Report 2025".

4 Jeffrey D. Sachs et al., *Sustainable Development Report 2025: Financing Sustainable Development to 2030 and Mid-Century* (Paris: SDSN; Dublin: Dublin University Press, 2025), https://dashboards.sdgindex.org/.

5 Sachs et al., *Sustainable Development Report 2025: Financing Sustainable Development to 2030 and Mid-Century*.

6 United Nations High-Level Advisory Board on Effective Multilateralism, *A Breakthrough for People and Planet: Effective and Inclusive Global Governance for Today and the Future* (New York: United Nations University, 2023), https://highleveladvisoryboard.org/breakthrough/.

7 World Economic Forum, *The Future of Jobs Report 2025*, Geneva, World Economic Forum, 2025, https://www.weforum.org/publications/the-future-of-jobs-report-2025/.

8 World Intellectual Property Organization, *WIPO Patent Landscape Report: Generative Artificial Intelligence,* Geneva, WIPO, 2024, https://www.wipo.int/.

9 UNCTAD, *World Investment Report 2025: International Investment in the Digital Economy*, Geneva, UNCTAD, 2025, https://unctad.org/publication/world-investment-report-2025.

10 "World Investment Report 2025: International Investment in the Digital Economy"; "Egypt and UAE Sign $35bn Deal to Develop Ras El Hekma Area," *Investment Monitor*, February 2024; ADQ, "ADQ-Led Consortium to Invest USD 35 Billion in Egypt," February 23, 2024, https://www.adq.ae/newsroom/adq-led-consortium-to-invest-usd-35-billion-in-egypt/.

11 UNCTAD, *World Investment Report 2025*; UAE Ministry of Investment, *UAE Foreign Direct Investment Report 2025*, Abu Dhabi, MoI, 2025, https://www.investuae.gov.ae/; "national Balance-of-Payments Statistics for the Listed Economies," UNCTADstat Data Centre, https://unctadstat.unctad.org/datacentre/reportInfo/US.FdiFlowsStock.

12 "World Investment Report 2025".

13 NDB, *General Strategy for 2022–2026: Scaling Up Development Finance for a Sustainable Future*, Shanghai, New Development Bank, 2022, https://www.ndb.int/.

14 Roshan Saha and Soumya Bhowmick, "Foreign Direct Investments in Indian States: The SDG Cornerstones," Observer Research Foundation, September 2020, https://www.orfonline.org/research/foreign-direct-investments-in-indian-states-the-sdg-cornerstones; and Organisation for Economic Co-operation and Development (OECD), *FDI Qualities Indicators 2024: Assessing the Sustainable Development Impact of Foreign Direct Investment*, Paris, OECD, 2024, https://www.oecd.org/investment/fdi-qualities-indicators.htm.

15 UNCTAD, *BRICS Investment Report*, Geneva, UNCTAD, 2023, https://unctad.org/publication/brics-investment-report.

16 "World Investment Report 2025".

17 UNCTAD, *BRICS Investment Report*, Geneva, UNCTAD, 2023; Ministry of Commerce of the People's Republic of China, *2023 Statistical Bulletin of China's Outward Foreign Direct Investment* (Beijing: MOFCOM, 2024); and Reserve Bank of India, "Overseas Direct Investment Data," 2024, https://www.rbi.org.in/.

18 John H. Dunning and Sarianna M. Lundan, *Multinational Enterprises and the Global Economy*, 2nd ed. (Cheltenham: Edward Elgar, 2008), 95–110.

19 S. Ben Jaafar and Joe Y. Battikh, "5 Ways Multinationals Can Have a Greater Impact on the SDGs," World Economic Forum, September 17, 2021, https://www.weforum.org/stories/2021/09/5-ways-multinational-corporations-can-have-greater-impact-on-the-sdgs-sustainable-development-goals-mncs/.

20 British Academy, *Principles for Purposeful Business: How to Deliver the Framework for the Future of the Corporation* (London: British Academy, 2019), https://www.thebritishacademy.ac.uk/publications/future-of-the-corporation-principles-for-purposeful-business/.

21 UNCTAD, *World Investment Report 2023: Investing in Sustainable Energy for All*, Geneva UNCTAD, 2023, https://unctad.org/publication/world-investment-report-2023.

22 International Sustainability Standards Board, *IFRS S1 General Requirements for Disclosure of Sustainability-related Financial Information and IFRS S2 Climate-related Disclosures*, London, IFRS Foundation, 2023, https://www.ifrs.org/issued-standards/ifrs-sustainability-standards-navigator/.

23 "General Strategy for 2022–2026".

24 World Bank, *Harnessing Artificial Intelligence for Agricultural Transformation*, Washington DC, World Bank Group, 2025, https://openknowledge.worldbank.org/entities/publication/d25d88ce-c59f-4243-b6bf-ae15b900b886.

25 Mohamed bin Zayed University of Artificial Intelligence, "Institute for Agriculture and AI (IAAI)," https://mbzuai.ac.ae/iaai/.

26 Ning Zhang et al., "The 'Eastern Data and Western Computing' Initiative in China Contributes to Its Net-Zero Target," *Engineering* 52 (2025): 256–261, https://doi.org/10.1016/j.eng.2024.08.010.

27 Embrapa, "Automação e agricultura de precisão," *Portal Embrapa*, https://www.embrapa.br/tema-automacao-e-agricultura-de-precisao.

28 "UAE-India Bilateral Trade Push Eyes $200 Billion by 2032," *Khaleej Times,* January 20, 2026, https://www.khaleejtimes.com/business/uae-india-bilateral-trade-push-eyes-200-billion-by-2032.

29 Ministry of Commerce and Industry, Government of India, https://www.pib.gov.in/PressReleasePage.aspx?PRID=1821785&reg=48&lang=2.

30 Consulate General of India, Dubai, "Overview of India–UAE Commercial Relations," Government of India, https://www.cgidubai.gov.in/page/overview-of-india-uae-commercial-relations/.

31 Doordarshan News, "India and UAE to Interlink Payment Systems for Smooth Cross-Border Transactions," *DD News,* 2024, https://ddnews.gov.in/en/india-and-uae-to-interlink-payment-systems-for-smooth-cross-border-transactions/; Ministry of Commerce and Industry, Government of India, https://www.pib.gov.in/PressReleasePage.aspx?PRID=2062903.

32 UAE Ministry of Investment, "UAE & The Government of Rajasthan Sign Investment Memorandum for 60 GW Renewables in India," October 22, 2024, https://www.invest.gov.ae/en/media-news/uae-and-the-government-of-rajasthan-sign-investment-memorandum-to-explore-60-gw-renewable-energy-project-in-india.

33 “India FDI Crosses $1 Trillion; UAE Commits $100 Billion Investment,” *Industrial Automation*, 2024, https://industrialautomationindia.in/news/india-fdi-crosses-1-trillion-uae-commits-100-billion-investment; Carrington Malin, “G42 to deploy 2GW Data Centre and Supercomputer in India,” *Middle East AI News,* September 11, 2024, https://www.middleeastainews.com/p/g42-to-deploy-2gw-data-centre-in-india; Anwar Gargash Diplomatic Academy, *Connectivity and Re-globalization: The India–Middle East–Europe Economic Corridor and Its Potential Digital Future*, Abu Dhabi, AGDA, 2024, https://www.agda.ac.ae/research/publications-multimedia-events/publication-details/connectivity-and-reglobalization-india-middle-east-europeeconomic-corridor-and-itspotential-digital-future.

34 UNCTAD, *International Investment in the Digital Economy: A Policy Toolkit for Policymakers*, Geneva, UNCTAD, 2025, https://unctad.org/publication/international-investment-digital-economy-toolkit-policymakers; Dan Swinhoe, “US and UAE Plan to Build 5GW AI Data Center Campus Run by G42 and American Hyperscalers,” *Data Center Dynamics*, May 2025, https://www.datacenterdynamics.com/en/news/us-and-uae-plan-to-build-5gw-ai-data-center-campus-run-by-g42-and-american-hyperscalers/.

35 Swinhoe, “US and UAE Plan to Build 5GW AI Data Center Campus.”

36 OECD, *FDI Qualities Policy Toolkit*, Paris, OECD, 2022, https://www.oecd.org/investment/fdi-qualities-policy-toolkit.htm.

III.

Scaling Sustainability: Energy, Infrastructure, and the SDGs

Financing SDG 17 through BRICS: Connectivity Infrastructure and Sovereign Sustainable Bonds

Thaíse Kemer and Morteza Damanpak Jami

Abstract

ACHIEVING THE SUSTAINABLE DEVELOPMENT GOALS (SDGs) requires substantial financial resources and international cooperation, particularly for developing countries dealing with monetary constraints. This article explores cooperation opportunities on sustainable development finance within Brazil, Russia, India, China, and South Africa (BRICS) framework in Iran and Brazil, focusing on the experiences of each country in specific areas. It examines the role of connectivity infrastructure financing in promoting regional integration, economic development, and sustainable growth in Iran, and analyses Sovereign Sustainable Bonds for Brazil. The chapter argues that these experiences offer relevant lessons for all BRICS nations as they demonstrate the value of knowledge-sharing, institutional cooperation, and innovative financing mechanisms. Strengthening collaboration in these themes can help narrow financing gaps and advance SDG implementation.

Introduction

Goal 17 of the Sustainable Development Goals (SDGs) emphasises the importance of a global partnership for sustainable development, including both developed and developing countries.[1] SDG 17 is central to advancing sustainable development, especially given the challenges faced by developing countries in accessing the resources to meet the SDGs.[2] In 2023, low- and middle-income countries faced an annual investment gap of US$4 trillion in achieving the SDGs, a situation that was worsened by debt-servicing costs of US$1.4 trillion.[3]

This article advances the debate on avenues for sustainable finance cooperation, by discussing the experiences of Brazil and Iran in the field of sustainable development finance. Despite operating in distinct economic and regulatory environments, Brazil and Iran share a common interest of advancing the debate of finance mobilisation for sustainable development. Their experiences offer a valuable opportunity to identify complementary lessons and explore how intra- forum dialogue by Brazil, Russia, India, China, and South Africa (BRICS) can foster the achievement of the SDG 17 objectives.

Financing Connectivity Infrastructure: Iran's Experience

The Global Status

Infrastructure development plays an essential role in achieving the SDGs. The 17 SDGs aim to address a wide range of global issues, including those directly related to infrastructure through SDGs 6, 7, and 9.[4] SDG 9 emphasises on building resilient infrastructure, promoting inclusive and sustainable industrialisation, and fostering innovation.[5] These are critical drivers of economic development in emerging and developing economies (EDEs). However, BRICS Plus[a] countries face challenges in implementing certain SDGs. In a rapidly changing global economy dealing with disease

a 'BRICS Plus' refers to the original BRICS members and five new countries invited to join the bloc at the 16th Summit in 2023; namely Iran, Saudi Arabia, United Arab Emirates, Egypt, and Ethiopia. Indonesia also joined BRICS in 2025.

outbreaks, destructive rivalries, conflicts, and increasing regional inequalities, sustainable growth has come under pressure. Even before the COVID-19 pandemic, global manufacturing, as the engine of overall economic growth, had been steadily declining due to tariffs and trade tensions. The transportation constraints and supply chain disruptions caused by the pandemic further impacted the global economy.

The post-pandemic era presents a more complicated situation for the global economy and SDG achievement due to high inflation, energy price shocks, persistent disruptions in the supply of raw materials and goods, inadequate financing, and worldwide economic deceleration.[6] Among the most detrimental factors are wars and interventionist behaviour by the global powers. The current US administration, for example, is making efforts to replace the international liberal order with a "recalibrated" world order[b] to better serve the US interests by leveraging its "peace through strength" strategy and placing high tariffs on Global South countries.[7] A recent example of what sociologists Amlinger and Nachtwey describe as *zerstörungslust* or "a new lust for destruction"[c] is the recent US–Israel conflict with Iran, and its subsequent impact on world energy trade, supply chains, and market accessibility.[8] Consequently, economic growth worldwide is adversely affected, and SDGs have been overshadowed by military operations.

The Importance of Connectivity in West Asia

The ongoing transitional world order is witnessing a shift in power and wealth from the West to the East and the Global South. A notable sign of this is the striking economic growth of emerging and regional economies, such as China, India, Brazil, South Africa, and other BRICS/South countries, along

b Term used by US Secretary of State Rubio as he said in December 2025, "One of the reasons why President Trump was elected is sort of an understanding among the American people that our foreign policy was in need of a complete recalibration […] because the world has dramatically changed. Many of the institutions, policies, assumptions that our foreign policy was operating under were built upon a world that no longer existed" See: https://perma.cc/EED4-NUC8.

c *Zerstörungslust,* or a lust for destruction refers to President Trump's belief that meaningful changes in the global order requires demolition rather than repair. This phenomenon has become increasingly prevalent in postmodern societies.

with their increasing shares in global value and supply chains. This has led to increasing dependency of consumer markets in Europe and the West on raw materials, food, manufactured products, and technologies from these emerging markets.[9]

Meanwhile, apart from conflicts and tensions between small and large actors and increasing feuds for power and influence as suggested by Zarif,[10] the traditional world order also faces competition to build connectivity infrastructure between regional and global powers in various regions, especially the Indian Ocean, South China Sea, Caspian Sea, Black Sea, the Mediterranean, and the Persian Gulf.[11] West Asia is thus at the centre of a 'corridor dilemma', where the role of emerging economies such as India and China in the global production and supply chain has increased and the east–west and north–south routes are the main directions of trade flows.[12]

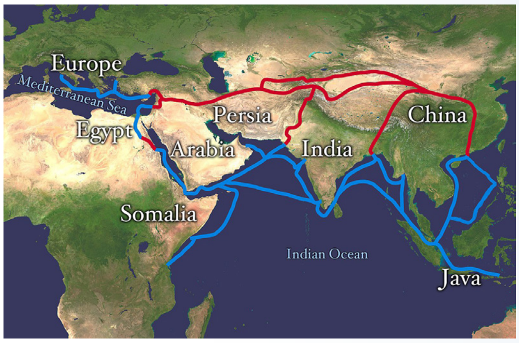
Connectivity, as a concept, does not solely pertain to transit and transport. Most of the existing corridors in the regions mentioned above, are multidimensional, incorporating various infrastructure projects. Examples include the Belt and Road Initiative (BRI), the India-Middle East-Europe Economic Corridor (IMEC), the Trans-Caspian Corridor, the International North-South Transport Corridor (INSTC), and the Development Road project. In a competitive and conflict-ridden environment, 'the power of connectivity' has become an important asset for economic powers to access trading partners in different regions. Consequently, the facilitating rapid and secure shipments of commodities and goods to consumer markets through various corridors is a priority for various countries and economic blocs, including the Group of Seven (G7), Group of Twenty (G20), European Union (EU), and BRICS. Therefore, connectivity initiatives are the latest tool for advancing influence in international relations and diplomacy.[13]

Iran: The Hub of Connectivity in West Asia

Iran's geopolitical advantages, its strategic location on the east–west and north–south routes, along with its natural connection to Central Asia, the Indian subcontinent, Eurasia, and the Middle East position it at the heart of regional and international corridors.[14] This is further enhanced by its proximity to 15 neighbouring countries by land and sea, and its position between two vital waterways and leading energy producers in the Persian Gulf and the Caspian Sea.

Figure 1: Iran’s Historical Role in West Asia Connectivity

Iran in the Middle of the Ancient Silk Road



Iran in the Heart of Strategic Corridors in Eurasia

Sources: Ancient History Encyclopaedia and Nour news[15]

Iran has thus served as a reliable bridge between the East and West, from the time of the Silk Roads to the present (see Figure 1). Today, despite obstacles and challenging circumstances due to unilateral sanctions imposed upon it and two consecutive wars, Iran’s involvement in regional connectivity projects exemplifies a constructive model of cooperation.

Relying on its unique geographic location and historical role as a regional connector, it has advocated years ago for strategic partnership in connectivity in West Asia. Initiatives and projects such as the railway connection between landlocked Central Asia and Iran in 1996, the International North-South Transport Corridor (INSTC) initiated in 2000, and the development of the Chabahar Port[d] that aims to link India and Southeast Asia to Afghanistan and Central Asia, offer successful models of cooperation.

d Chabahar is a port city in the Sistan and Baluchestan province, southeast of Iran. It is a free port (free-trade zone) situated on the coast of the Oman Sea and Iran’s only deep-water port in the region.

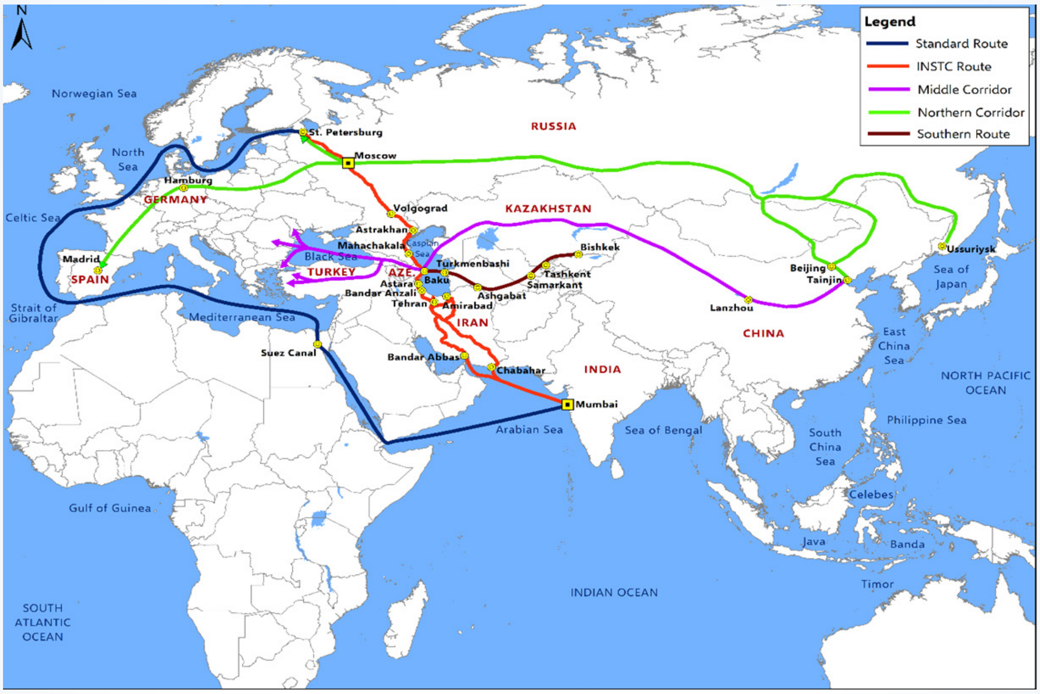
Additionally, Iran's extensive oil and gas reserves—about 18 percent of the world's gas reserves and 10 percent of global oil reserves—makes it a leading energy supplier, both regionally and globally. Iran is centrally located in an area with a concentration of important oil and gas resources, termed by Geoffrey Kemp (1997) as the "energy ellipse."[e] This, along with its control of the strategic Hormuz Strait, makes the country a key hub of the oil and gas supply and transit network in the region.

Iran has also a robust port infrastructure on its northern and southern coasts, as well as an extensive cross-country railway network exceeding 1,5000 kilometres in length with regional connections.

Against this backdrop (see Figure 2), the INSTC is the fastest and cheapest multimodal route connecting Southeast Asia with Russia, Central Asia, the Caucasus, and Europe via Iran. It offers several advantages compared to other East–West routes, particularly traditional oceanic ones. For instance, the oceanic route from Mumbai to Moscow is 16,000 km, with a travel time of 45–60 days while Mumbai to Moscow via the INSTC is only 5,600–7200 km, and the journey takes 15–20 days. Since the INSTC's establishment, 13 countries have joined it. Once operationalised, it will reduce the shipping distance between Southeast Asia and Europe by at least 40 percent and transportation costs by around 30 percent.[16]

e The term 'strategic energy ellipse' coined by Geoffrey Kemp refers to two oil and gas basins in the Caspian Sea and the Persian Gulf areas; parts of Iraq, Turkey, Armenia, Azerbaijan, Georgia in the West; and the Caspian Sea south of Russia, where about 70 percent of the world's proven oil and gas reserves are concentrated.

Figure 2: INSTC and the Network of Basic Corridors in Eurasia/West Asia



Source: Observer Research Foundation (ORF)[17]

Another important connectivity and infrastructure project that is vital for West Asian cooperation is the Chabahar International Transport Corridor, the agreement for which was signed between Iran and India in 2016. Chabahar is the fulcrum of the north–south corridor and its complementary arm in Iran's eastern axis. For India, Chabahar is a golden gateway to escape the geographical suffocation on its land route to Afghanistan, Central Asia, and Europe. Chabahar Port also presents a unique connection opportunity between countries in the Far East and across the Indian Ocean and Eurasia. It is a symbol of a sustainable and strategic partnership between BRICS members Iran, India, and Russia and other countries in West Asia. Its objective is to increase the loading and unloading capacity of Chabahar Port to 33 million tons in subsequent phases. Once completed, it will provide India much greater access to Central Asia, Eurasia, and Europe in the shortest possible time.[18]

Both these corridors, especially Chabahar, hold immense potential for other countries in West Asia and neighbouring regions, especially the landlocked Central Asian nations.

BRICS Involvement in West Asia Connectivity Infrastructure

BRICS plays a critical role in the global economy in terms of total economic output, investment capital, and the potential supply and consumer markets. The capacities and advantages of the BRICS Plus group have made it the largest supplier of manufactured goods, raw materials, agricultural resources, energy, and services.[19] Strengthening connectivity between production and consumption markets in BRICS countries and the global South, therefore, is necessary. In this regard, improving upon existing and developing new infrastructure such as ports, roads, bridges, railways, and power grids are priorities for BRICS Plus members. Given the common challenges associated with financing development projects, BRICS aims to mobilise its own resources and has established alternative mechanisms for financing sustainable development, with the New Development Bank (NDB) serving as the principal institution.[f]

The NDB reallocates long-term capital to sectors with high multiplier effects,[g] such as clean energy, water supply, and environmental infrastructure.[20] Since its inception in 2015, it has approved over 120 projects worth about US$40 billion in India, Brazil, Russia, South Africa, as well as some non-BRICS countries.[21] However, the scope of its activities should be further widened to cover more infrastructure projects in member countries. NDB, along with other multilateral development banks (MDBs), has a potentially strong role to play in financing connectivity across BRICS countries, particularly in West Asia.

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f According to its status, "The Bank shall mobilize resources for infrastructure and sustainable development projects in BRICS and other emerging economies and developing countries, complementing the existing efforts of multilateral and regional financial institutions for global growth and development." (NDB, 2015).

g In economics and finance, sectors with high multiplier effects are those where an initial investment generates additional rounds of economic activities through employment, productivity gains, trade, tax revenues, or private investments. Of the strongest multiplier sectors, are transport, energy grids, water supply and sanitation.

Challenges and Obstacles

The full operationalisation of the regional corridors in Iran and other connectivity infrastructure projects in West Asia is largely dependent on overcoming certain obstacles. The most important challenges include inadequate financial resources, insecurity caused by regional conflicts, sanctions, political instability, and geopolitical rivalries. For example, India has not been able to procure the required investment for developing the next stages of port facilities at Chabahar due to US sanctions. The corridor currently has some missing routes, such as Chabahar–Khash,[h] due to insufficient funds. The 640-km route that will connect Chabahar to the national Iranian railway network is under construction but requires US$1.5 billion to reach completion. The US attacks on Iran's infrastructure, including the Chabahar Port, may further delay its full operationalisation.

Within the INSTC, currently, the only missing railway link is the Rasht–Astara[i] route, which is about 170-km-long. Currently under construction, it requires financial support of up to US$1 billion to expedite the process, which is unviable for the sanction-affected and war-torn Iranian economy. NDB financing could be of great help to complete such projects.

This analysis illustrates how connectivity and infrastructure projects are central to achieving the SDGs, depending on the availability of adequate and sustained financing. It also reinforces the argument that mobilising stable, diverse, and innovative financing mechanisms is essential to translate infrastructure potential into tangible development outcomes. The challenges discussed here reflect broader issues faced by BRICS and Global South countries alike, namely, the need to expand the repertoire of available financing instruments and to learn from one another's approaches.

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h The Chabahar–Khash railway is a key segment of Iran's Chabahar–Zahedan rail project, spanning approximately 634 km and expected to be operational by March 2027. Passing through Khash and Iranshahr, it will enhance connectivity between Iran's southeastern ports and the broader regional rail network.

i The Astara–Rasht railway route, spanning approximately 164 km in Iran's Gilan Province, is a key component of the INSTC. It connects Iran's rail network with those of Azerbaijan and Russia, offering a promising alternative to the Turkey-based route for Iran's trade with the EU and caucuses.

Sovereign Sustainable Bonds (SSBs) and Brazil's Experience

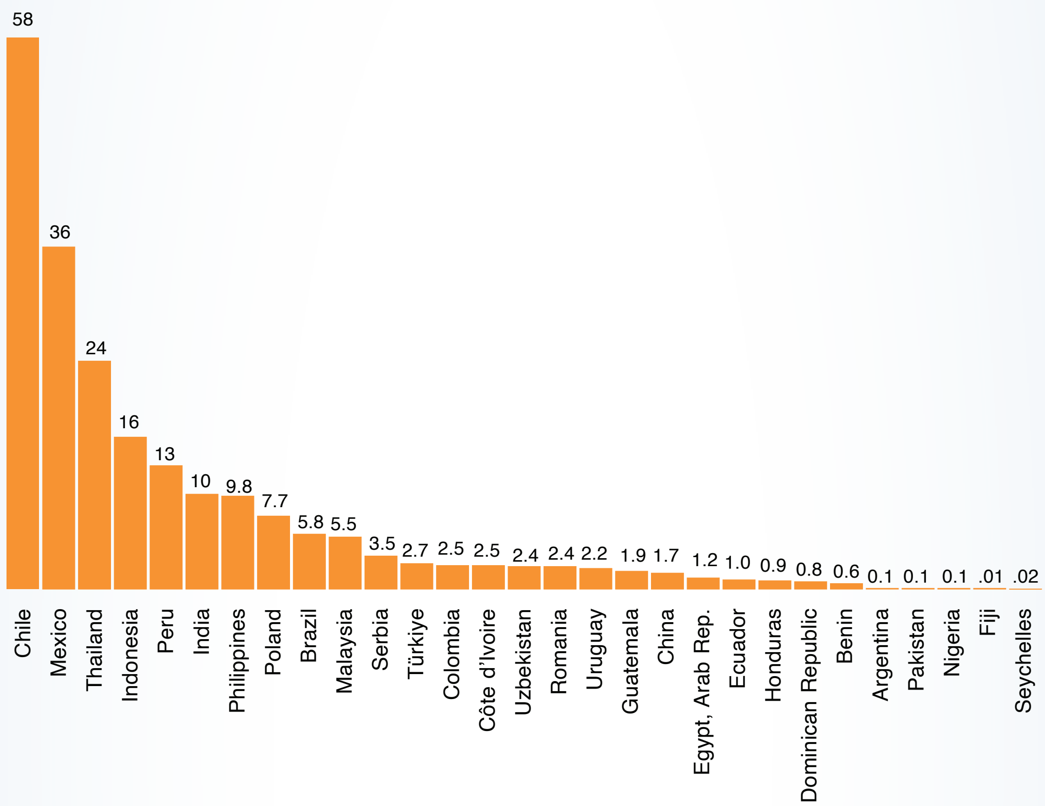
The issuance of Sovereign Sustainable Bonds (SSBs) in Brazil began in 2023 as part of the New Brazil Ecological Transformation Plan (ETP). The ETP is a national public policy framework to promote sustainable and technological development that was launched at the UN Climate Change Conference of the Parties (COP28).[22]

According to the World Bank, Brazil's transition to a low-carbon development pathway will require additional investments of approximately BRL1,781.4 billion (around US$356 billion) in total over 2022–2050, corresponding to an average of about 1.2 percent of its annual gross domestic product (GDP).[23] Meeting these investment needs requires a national climate strategy with multiple sources of financing.[24] In this light, the Brazilian experience with SSBs provides insights into financing cooperation among BRICS countries.

According to Costa (2024), sustainable bonds belong to the thematic bonds category, comprising instruments backed by debt assets that are linked to financing sustainability projects. SSBs can be classified as green, social, and sustainability bonds that finance projects that generate, environmental, or social benefits, or both, respectively.

Figure 3 illustrates how other BRICS countries such as China, Egypt, Indonesia, and India, are also issuing SSBs.[25] In 2020, Egypt was the first Middle East and North Africa Region (MENA) country to issue a sovereign green bond of US$750 million with a rate interest of 5.25 percent.[26] In 2025, China published a framework for sovereign green bonds to achieve its environmental goals.[27]

Figure 3: Emerging Market Sovereign Labelled Sustainable Bond Issuers, US$ Billion Total to Date



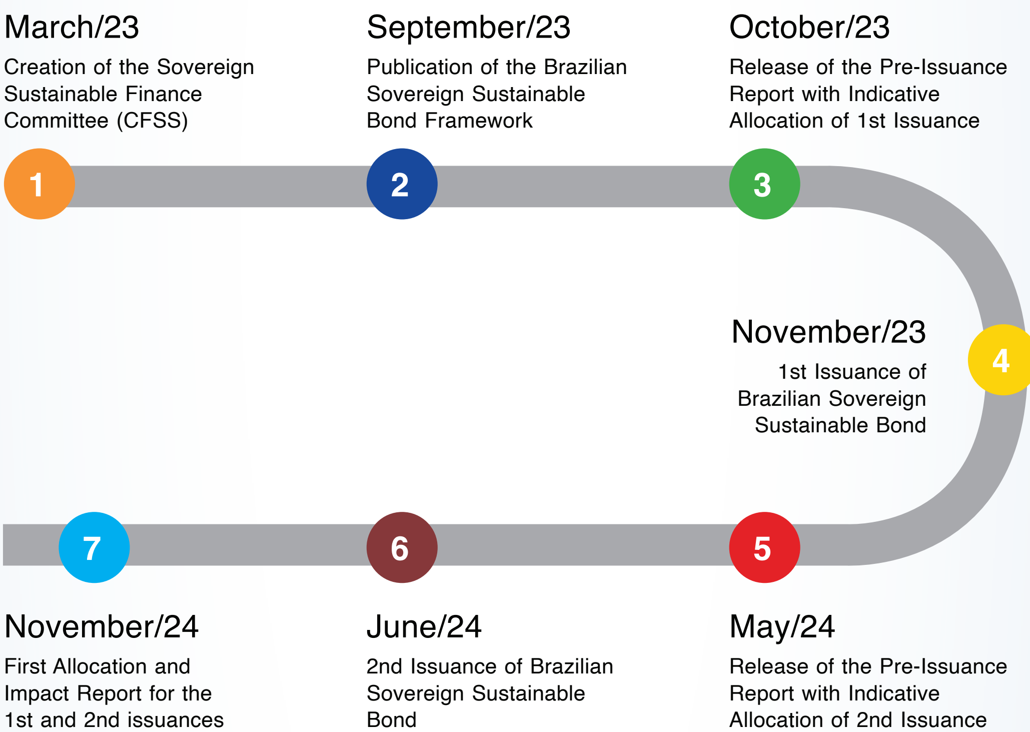
Source: World Bank[28]

Despite growing SSB issuance among emerging market and developing economies (EMDEs), by the end of 2024, these nations accounted for only 18 percent of all SSBs, while advanced economies led the category with 45 percent of SSBs issued by four countries (France, Germany, the UK, and Italy).[29] Although SSBs are increasingly being adopted to finance public policies,[30] the experience of countries that have already entered this market reveals difficulties. According to an Organisation for Economic Co-operation and Development (OECD) survey, out of 41 OECD and accession countries, 27 identified impact reporting as the main challenge, showing the difficulties in translating sustainability commitments into measurable results.[31] These countries also highlighted additional operational costs and regulatory changes.[32]

The Brazilian experience with SSBs needs to be studied against this background. The development of the Brazilian SSB programme included consultations with sectoral bodies to define its guidelines.[33] The Brazilian National Treasury also engaged with other countries with experience in this regard, and a working group was organised with the support of the World Bank and the Inter-American Development Bank.[34]

The OECD[35] has highlighted five stages for the SSB issuance process: (a) the development of an SSB framework; (b) the organisation of a third-party verification; (c) bond issuance; (d) allocation reports and (e) impact reporting. Figure 4 is a pictorial representation of the process in the case of Brazil, which also included as its initial step the creation of a dedicated SSB Committee.

Figure 4: SSB Implementation in Brazil: A Timeline



Source: Translated from Brazilian National Treasury[36]

Only the first four stages of Figure 4 have been discussed in this chapter, as stages 3 and 4 are repeated thereafter. As the first step in the Brazilian process, a Sovereign Sustainable Finance Committee (SSFC) was established in 2023,[37] defining the SSFC as a permanent collegiate body created to plan, implement, and monitor the Brazilian SSB Framework and bond issuance. The secretary of the National Treasury of the Ministry of Finance chaired the Committee, and representatives from different Brazilian ministries and secretariats were members.[38]

The second step involved the development of the Brazilian SSB Framework, a reference document published in 2023 that presents the obligations to be fulfilled by Brazil as an SSB issuer.[39] The Framework encompasses four dimensions:

- **Use of proceeds:** The net proceeds from the issuance of the SSBs must be used to finance expenses that have been previously identified.
- **Evaluation and selection process:** The definition of the expenses to be financed.
- **Management of proceeds:** The mechanisms to track and manage the use of net proceeds and avoid double counting of projects.
- **Reporting:** Issuing regular reports on the use of net proceeds[40].

The Framework was submitted for an independent external review by Sustainalytics, a second-party opinion company,[41] to confirm its alignment with International Capital Market Association guidelines.[42] As the third step, a Pre-Issuance Report was released in 2023 outlining the composition for the allocation of social and environmental expenditures.[43] The fourth step was issuing the first SSB in Brazil in the same year. To date, the Brazilian government has issued three SSBs. The first two, as shown in Table 1, amount to US$4 billion.

Table 1: Overview of the First Two SSB Issuances

	First Issuance Global 2031	Second Issuance Global 2032
Issuance	13 November 2023	20 June 2024
Maturity	18 March 2031	22 January 2032
Coupon (per year)	6.25 percent	6.13 percent
Yield rate (per year)	6.50 percent	6.38 percent
Amount issued (US$ billion)	2,00	2,00
Net proceeds from issuance (US$ billion)	1.97	1.97
Exchange rate	4.89	5.51
Net proceeds from issuance (BRL billion)	9.62	10.83

Source: Data from the Brazilian National Treasury[44]

In 2025, Brazil completed its third SSB issuance, with a seven-year sustainable bond, the Sustainable Global 2033 that will mature on 4 February 2033.[45] The bond US$1.5 billion and will pay investors an annual interest rate of 5.5 percent. It was issued at 98.515 percent of its face value, resulting in an investor yield of 5.75 percent per year.[46]

Chavarría-Flores and Warren (2024) note that sovereign climate-aligned bonds offer benefits by signalling a commitment towards international climate agendas and improving transparency in public budget management. Regarding the latter, the Brazilian National Treasury[47] underscores the role of impact measurement to ensure transparency throughout the bond issuance process. In Brazil's case, impact indicators are aligned with the objectives of the Multi-Year Plan (PPA) 2024–2027, the country's main medium-term planning instrument.[48]

Brazilian SSBs have also contributed to the financing of the National Fund on Climate Change (Climate Fund), which finances climate mitigation and adaptation projects in Brazil.[49] In 2024, BRL 10.2 billion was approved for the Climate Fund, of which BRL 10 billion came through SSB offerings.[50] This helped position the Climate Fund among the world's largest climate, and approached the BRL 12.3 billion approved that year by the Green Climate Fund, the UN's largest multilateral climate finance fund.[51] The Brazilian experience can thus contribute to expanding dialogue and strengthening climate finance across the bloc.

Policy Recommendations

The earlier sections have highlighted the experiences of Iran and Brazil in mobilising financial resources to support national development priorities. While the Iranian case addressed infrastructure financing, the Brazilian experience showcased SSBs as an instrument for financing sustainable development. Together, they illustrate the value of knowledge-sharing on context-specific financing mechanisms.

The following recommendations identify opportunities to strengthen cooperation among BRICS members. The first set draws on the Iranian case to address connectivity infrastructure in West Asia, where BRICS cooperation could prove decisive. The recommendations operate at two levels: the financial architecture needed to narrow the investment gap facing regional projects such as the INSTC, and the operational measures required to make existing corridors fully functional.

At the first level, the role of the NDB and the importance of global economic governance reform should be highlighted. Financing the connectivity infrastructure in West Asia could be prioritised by BRICS, with institutions such as the ADB and the Asian Infrastructure Investment Bank (AIIB) playing an important role in narrowing the financial gap facing multifaceted regional projects such as the INSTC. The NDB is at the centre of any BRICS initiative to enhance sustainable development and climate finance. It has achieved impressive milestones in less than 10 years, highlighting how much can be achieved with will and vision.

By building on the NDB's strengths and potential for further activity, there is a wide variety of initiatives that BRICS countries can undertake to improve the availability of affordable connectivity and intrastate finance:

- Scaling up lending for connectivity projects and expanding the NDB's balance sheet to increase long-term, low-interest financing for member countries.
- Adapting policy frameworks and conditions to ensure that sovereign borrowers have adequate fiscal space for broader investment-led growth and ensure that the SDGs are achieved in tandem with development and broader social inclusion objectives.
- Strengthening the NDB's credit enhancement and risk management toolkits to support borrowers in bringing down costs, for example, with a Guarantee Facility, and expanding the use of local currency lending.
- Increasing climate financing across BRICS-led Multilateral Development Banks (MDBs) and the 80 strong networks of public development banks in BRICS countries. Aligning development models and policy frameworks with SDG goals.

Beyond the NDB's role, it is also relevant to advocate for a global economic governance reform. SDG achievement has been constrained due to lack of projected financing from potential donors, especially Annex II countries[j] and MDBs. In 2022, global climate finance reached US$1.46 trillion, far short of the estimated US$7.4 trillion needed annually to meet the Paris Agreement targets.[52] With multilateralism under unprecedented strain, collective efforts to advance the SDGs are necessary, and mounting calls for reform have led to several initiatives to transform global economic governance. In this context, BRICS innovation in SDG finance can yield more reliable climate funding and stronger strategies across developing countries.

Regarding the second level, beyond financing and the broader reform of global economic governance, the full functioning of regional corridors also depends on operational measures. These will complement the financial recommendations discussed earlier by addressing physical and regulatory bottlenecks:

j 'Annex II countries' are a specific group of developed nations recognised under the United Nations Framework Convention on Climate Change (UNFCCC) that have particular financial and technological responsibilities within the international climate regime.

Expand Loading and Unloading Capacity

At full first-phase capacity, the INSTC can move seven to eight million tons of goods annually, which requires tens of thousands of containers and an equipped rail fleet. Participating countries should coordinate planning to handle this anticipated expansion as a necessary stage of the corridor's development.

Promote Harmonisation of Laws and Regulations

Participating countries should harmonise rules and regulations related to customs duties, transit tariffs, passage permits, and other bureaucratic processes. BRICS agreements in these areas might facilitate the implementation of regional processes in these initiatives.

Ensure Inclusiveness in Participation

In line with principles of inclusiveness and flexibility, the INSTC's BRICS members should encourage broader participation by regional countries and other interested parties. So far, 13 countries across the Caucasus, Central Asia, and the Persian Gulf, including the three original signatories, have joined or expressed interest in the INSTC.

The BRICS countries of Eurasia and West Asia face two choices amid ongoing developments to shape the international order within their region. They can opt for the geopolitical path of power competition dynamics, in which destabilising actors will gain leverage and partner strategies will increasingly be shaped by mutual distrust. The other option is to pursue a geoeconomic path oriented towards shared development that will foster cooperative regional stability and progress. If the latter option is chosen, leaders must acknowledge the priorities of their partner countries. A regional partnership for connectivity should aim to:

- Build a broad-based model of cooperation among different projects
- Promote complementarity among the infrastructures being created
- Rely on regionally built solutions for collaboration
- Ensure security and development are fostered equitably
- Favour cooperative multilateralism over competitive approaches

The Brazilian experience with SSBs has generated practical insights into areas such as governance, implementation, monitoring, and reporting. Building on these lessons, BRICS countries could expand opportunities for knowledge-sharing regarding SSBs. Attention should be paid to impact reporting, which remains one of the most challenging aspects of SSB implementation worldwide, through structured discussions and technical workshops on topics such as methodologies and monitoring systems. Such cooperation could also include direct engagement among the public institutions involved in their operationalisation, such as ministries of finance, treasuries, environmental authorities, and planning agencies.

The two case studies presented in this article indicate an encouraging lesson: The BRICS' comparative advantage lies in the diversity of its members' trajectories which, while coming from distinct contexts, can yield lessons of mutual relevance. Sharing such experiences can be a fundamental BRICS contribution to sustainable development financing.

Conclusion

Achieving the SDGs will require scaling up of financial resources, particularly in developing countries, where funding gaps remain substantial. This challenge lies at the core of SDG 17, which emphasises the importance of strengthening the means of implementation and revitalising global partnerships for sustainable development. BRICS countries are increasingly well positioned to contribute to the implementation of SDG 17 by sharing experiences and strengthening South–South cooperation.

Drawing on the contributions from Iran and Brazil, this article offered insights into sustainable development financing challenges and how to address them. The Iranian experience highlighted the importance of connectivity infrastructure as a driver of regional integration and economic development, while underscoring the critical role that multilateral cooperation plays in supporting large-scale infrastructure projects. The Brazilian experience demonstrated the potential of SSBs to mobilise resources towards sustainable development objectives, and provide insights on governance, implementation, and impact reporting.

Both cases reiterate one of SDG 17's core messages: sustainable development challenges require collaborative solutions and cross-country partnerships combining financial resources, and institutional and technical capacities. They also highlight the value of strengthening cooperation among BRICS members, both through financial institutions, such as the NDB, as well as broader mechanisms for policy dialogue and institutional learning.

As BRICS countries continue to expand their role in shaping the global sustainable development agenda, greater collaboration on infrastructure finance and sustainable finance initiatives can contribute to narrowing financing gaps. The experiences examined in this article suggest that enhanced cooperation within the BRICS framework demonstrate how cooperation and knowledge exchange can help advancing the broader achievement of the Sustainable Development Goals.

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The authors used Opus 4.8 (Claude) and GLM-5.2 (Z.ai) to check for language refinements. Opus 4.8 (Claude) was also used to generate Figure 5.

Endnotes

1 United Nations, "Goal 17: Revitalize the Global Partnership for Sustainable Development," https://www.un.org/sustainabledevelopment/globalpartnerships/; Ipea, "Objetivos de Desenvolvimento Sustentável — ODS 17," https://www.ipea.gov.br/ods/ods17_card.html.

2 United Nations, "Goal 17: Revitalize the Global Partnership for Sustainable Development," https://www.un.org/sustainabledevelopment/globalpartnerships/.

3 United Nations, "Goal 17."

4 Yuan Xiao, Devin D'Angelo, and Nghi -Piotr Trong Lê, "Infrastructure Investment and the Sustainable Development Goals", International Monetary Fund, 2020, 50-66, 2020, https://www.elibrary.imf.org/display/book/9781513511818/ch004.xml.

5 United Nations, *The Sustainable Development Goals Report*, Department of Economic and Social Affairs, (New York, 2025), https://unstats.un.org/sdgs/report/2025/.

6 United Nations Department of Economic and Social Affairs, "World Economic Situation and Prospects" (New York: United Nations Publication, 2023), https://desapublications.un.org/publications/world-economic-situation-and-prospects-2023.

7 The US Department of War, National Defense Strategy, January 25, 2026. https://media.defense.gov/2026/Jan/23/2003864773/-1/-1/0/2026-NATIONAL-DEFENSE-STRATEGY.pdf.

8 Tobias Bunde and Sophie Eisentraut, "Under Destruction: Munich Security Report," February 2026, 12, https://securityconference.org/assets/02_Dokumente/01_Publikationen/2026/MSR2026/Under_Destruction–Munich_Security_Report_2026.pdf.

9 UNCTAD, "Trade and Development Report: Rethinking development in the age of discontent," 2024, https://unctad.org/system/files/official-document/tdr2024_en.pdf.

10 Javad Zarif and S.M. Kazem Sajjadpour, International Order in Post-Western Era (in Farsi), (Tehran: IPIS, 2017).

11 Hans-Peter, Brunner, "What is Economic Corridor Development and What Can It Achieve in Asia's Subregions?," Asian Development Bank (ADB), July 2013. https://www.adb.org/publications/economic-corridor-development-and-what-it-can-achieve-in-asia-subregions.

12 OECD-WTO-UNCTAD Report to G20, "Global Value Chains offer major opportunity for growth and progress in advanced and developing economies," 2013, http://www.wto.org.

13 Christian Echle, "Responding to the Geopolitics of Connectivity: Asian and European Perspectives," Konrad-Adenauer-Stiftung, 2020, https://www.clingendael.org/sites/default/files/2020-11/Panorama%20publication.pdf

14 Morteza Damanpak Jami, *Economic Diplomacy of Iran* (Book in Persian), (Tehran: IPIS Publication, 2018), 670.

15 Ancient History Encyclopaedia, "The Ancient overland Silk Road (depicted in red lines) and maritime Silkroad (depicted in blue lines) trade routes map", March 2018, https://www.ancient.eu/image/8327/map-of-the-silk-road-routes. Also see: Nour news Network, "Strategic corridors of Iran," June 8, 2026, https://nournews.ir/en/news/208607/Strategic-corridors-of-Iran-Great-game-in-global-order.

16 Arta Rail, "INSTC: A Strategic Assessment of Opportunities and Challenges for Iran," May 2026, https://artarail.com/fa/north-south-corridor-opportunities-challenges/.

17 Ayjaz Wani, "The Middle Corridor: Reviving Connectivity for EU-Central Asia Trade and India's Strategic Imperative," Observer Research Foundation, 2024, https://www.orfonline.org/research/the-middle-corridor-reviving-connectivity-for-eu-central-asia-trade-and-india-s-strategic-imperative.

18 Damanpak Jami, 2018, 678.

19 UNCTAD, 2024, "Trade and Development Report: Rethinking development in the age of discontent," 2024, https://unctad.org/system/files/official-document/tdr2024_en.pdf.

20 NDB, "Agreement on the New Development Bank," Shanghai: New Development Bank, 2015. Article 2.

21 Elizabeth Smolovik, 2026, BRICS, "Cooperation in Sustainable Development," BRICS Expert Council Russia, May 2026, https://bricscouncil.ru/en/analytics/sotrudnichestvo-stran-briks-v-oblasti-ustoychivogo-razvitiya. Accessed 18 May 2026.

22 Brazilian National Treasury, *Questions and Answers (Q&A): Brazil's Sovereign Sustainable Bonds* (2024), 14, https://www.gov.br/tesouronacional/en/federal-public-debt/sustainable-bonds; Brazil, *Novo Brasil Ecological Transformation Plan*, 6, https://www.gov.br/fazenda/pt-br/acesso-a-informacao/acoes-e-programas/transformacao-ecologica/biblioteca/publicacoes/novo-brasil-cartilha-ingles.pdf.

23 World Bank, *Grupo Banco Mundial: Relatório sobre Clima e Desenvolvimento para o País* (2023), 64, https://openknowledge.worldbank.org/server/api/core/bitstreams/af026935-5f2d-4edd-b19e-d8fb66f6e9da/content; World Bank, *Brazil Can Be Both Richer and Greener* (2023), https://www.worldbank.org/en/news/press-release/2023/05/04/brazil-can-be-both-richer-and-greener-world-bank-group-outlines-opportunities-for-climate-action-and-growth.

24 World Bank, *Relatório sobre Clima e Desenvolvimento*, 64–65.

25 World Bank, "Sovereign Sustainable Bonds: Trends and Challenges from a PDM Perspective" (2025), 2, https://thedocs.worldbank.org/en/doc/facb3fde936ff93fcee3c74679837875-0360072025/original/OECD-slides-for-the-session-on-sustainable-bonds-at-the-15th-DMF-Stakeholders-Forum.pdf; World Bank, *Labelled Sustainable Bonds: Quarterly Market Update* (2026), https://thedocs.worldbank.org/en/doc/25f3886e31239aebd5a834c3c8ae7430-0340012026/original/WBG-TRE-Labeled-Sustainable-Bonds-Market-Update-2026-Q1.pdf.

26 BTTNF, *National Climate Finance Assessment: Concessional Resources and Innovative Financial Mechanisms* (BRICS Think Tank Initiative Network for Finance, 2025).

27 China, *China Releases Framework for Sovereign Green Bonds* (2025), https://english.www.gov.cn/news/202502/21/content_WS67b7b7e4c6d0868f4e8efd8e.html.

28 World Bank, *Labelled Sustainable Bonds: Quarterly Market Update* (2026), 6, https://thedocs.worldbank.org/en/doc/25f3886e31239aebd5a834c3c8ae7430-0340012026/original/WBG-TRE-Labeled-Sustainable-Bonds-Market-Update-2026-Q1.pdf.

29 World Bank, "Sovereign Sustainable Bonds," 4.

30 Jéssica Dias Miranda, *O papel das emissões de títulos soberanos no financiamento de políticas públicas sustentáveis: uma análise comparativa entre Brasil e China* (Cadernos do Tesouro Nacional, 2025), 5, https://publicacoes.tesouro.gov.br/index.php/cadernos/article/view/270/334.

31 OECD, *OECD Sovereign Borrowing Outlook 2023* (2023), 83, https://www.oecd.org/content/dam/oecd/en/publications/reports/2023/05/oecd-sovereign-borrowing-outlook-2023_6de70196/09b4cfba-en.pdf.

32 OECD, *Sovereign Borrowing Outlook 2023*, 83.

33 Brazilian National Treasury, *Brazil's Sovereign Sustainable Bond Framework* (2023), https://www.gov.br/tesouronacional/en/federal-public-debt/sustainable-bonds-files/FW-EN.

34 Brazilian National Treasury, *Sovereign Sustainable Bond Framework*.

35 OECD, *Sovereign Borrowing Outlook 2023*, 75.

36 Brazilian National Treasury, *Questions and Answers (Q&A)*, 13.

37 Brazil, "Decreto Número 11.532, de 16 de Maio de 2023" (Brasília: Presidência da República, 2023), https://www.planalto.gov.br/ccivil_03/_ato2023-2026/2023/decreto/d11532.htm.

38 Brazilian National Treasury, *Questions and Answers (Q&A)*, 6–7.

39 Brazilian National Treasury, *Sovereign Sustainable Bond Framework*.

40 Brazil, *Brazil's Sovereign Sustainable Bond Framework* (Brasília: Secretaria do Tesouro Nacional, 2023), 20, https://www.gov.br/tesouronacional/en/federal-public-debt/sustainable-bonds-files/FW-EN.

41 Brazil, *Sovereign Sustainable Bond Framework*, 39.

42 Brazilian National Treasury, *Questions and Answers (Q&A)*, 2024.

43 Brazilian National Treasury, *Treasury Releases Report with Indicative Resource Allocation for Sovereign Sustainable Bonds* (2023), https://www.gov.br/tesouronacional/pt-br/noticias/treasury-releases-report-with-indicative-resource-allocation-for-sovereign-sustainable-bonds.

44 Brazilian National Treasury, *Brazil's Sovereign Sustainable Bonds: Allocation and Impact Report* (2025), 11, https://thot-arquivos.tesouro.gov.br/publicacao/53182.

45 Brazilian National Treasury, *Brazil anuncia resultado de sua terceira emissão de título sustentável em dólares* (2025), https://www.gov.br/tesouronacional/pt-br/noticias/brasil-anuncia-resultado-de-sua-terceira-emissao-de-titulo-sustentavel-em-dolares.

46 Brazilian National Treasury, *Brazil anuncia resultado… terceira emissão*.

47 Brazilian National Treasury, *Allocation and Impact Report*, 30.

48 Brazilian National Treasury, *Allocation and Impact Report*, 30.

49 Brazil, *Lei nº 12.114, de 9 de dezembro de 2009* (Brasília: Presidência da República, 2009)

50 Gabriel Marino Daudt, Luiz Daniel Willcox de Souza, and Felipe Silveira Marques, "O novo Fundo Clima: potencializando o papel do BNDES no combate à emergência climática," *Revista do BNDES* 30, no. 60 (2024): 196.

51 Daudt et al., "O novo Fundo Clima," 196–197.

52 UNCTAD, *A BRICS Agenda for Enhancing Climate Finance*, Document No. UNCTAD/TCS/GDS/INF/2025/1 (2025), https://unctad.org/system/files/official-document/tcsgdsinf2025d1_en.pdf.

Scaling Sustainability: Energy, Infrastructure, and AI for Development

Anna Sytnik and Ashwitha Tunga

Abstract

WITH NEW MEMBERS FROM Africa, West Asia, and Southeast Asia, BRICS now carries greater demographic, economic, trade, and energy weight. Its members encompass fossil-fuel producers, rapidly industrialising economies, renewable-energy leaders, and digitalising states, making sustainability a complex development challenge rather than a uniform decarbonisation agenda. This article examines the bloc's energy emissions dilemma, the infrastructure and financing constraints, institutional capacity, and the growing role of artificial intelligence in shaping the post-2030 sustainability agenda. It argues that BRICS can advance a more balanced and development-oriented model by implementing its Energy Cooperation Roadmap 2025–2030, expanding infrastructure finance, building common standards and monitoring tools, and linking energy, digital, and industrial cooperation in ways that strengthen resilience, technological capacity, and progress towards the Sustainable Development Goals across the Global South.

Introduction

The expansion of BRICS in recent years has accelerated its transformation from a five-member grouping of emerging economies to a broader platform for Global South coordination. With Egypt, Ethiopia, Iran, Saudi Arabia, the United Arab Emirates (UAE), and Indonesia joining the original members, it now represents 48.5 percent of the world's population, around 39 percent of global gross domestic product (GDP) in purchasing power parity (PPP) terms, and 24 percent of global trade.[1] It also accounts for 43.6 percent of global oil production, 36 percent of natural gas production, and 78.2 percent of coal production, underlining its influence in global energy markets. The BRICS countries collectively represent roughly half of the global energy supply and more than half of energy-related emissions in 2024.[2] This scale makes the grouping central to debates on sustainable development.

Yet, for BRICS countries, sustainability cannot be reduced to a single model of decarbonisation. It is a broader development challenge that requires balancing economic growth, energy security, industrial modernisation, climate resilience, technological capacity, and progress towards the Sustainable Development Goals (SDGs). The diversity of BRICS members, from prominent energy exporters and coal-dependent economies to leaders in renewable energy and rapidly digitalising states, makes nationally determined and development-oriented pathways essential. It also raises questions about how common priorities can be translated into practical cooperation without overlooking differences in national resources, institutional capacities, and stages of development.

This article explores how the expanded BRICS can meet growing energy demand while managing emissions and addressing fiscal, institutional, and infrastructure constraints, including those associated with the increasing role of artificial intelligence in the post-2030 sustainability agenda. It adopts a policy-oriented approach, drawing on official BRICS documents, national and international statistics, and recent research on energy, infrastructure, sustainable finance, industrial policy, and digital technologies. The analysis highlights shared challenges and differences among member states and considers how existing BRICS commitments can support practical cooperation.

Current Challenges

For BRICS countries, a transition towards more sustainable energy systems is a complex development process.[3] As the global energy landscape evolves under the influence of the Paris Agreement, BRICS countries will be affected by changing technology costs, shifts in global energy demand and supply, domestic policy adjustments, and growing pressure on public budgets. The Intergovernmental Panel on Climate Change (IPCC) identifies several BRICS members—such as India, South Africa, Brazil, Egypt, and Ethiopia—as climate vulnerability hotspots.[4] Despite relatively low historical and per capita emissions (the latter for countries such as India), these nations face disproportionately high risks from extreme weather events, highlighting the inequitable distribution of climate impacts.[5]

The recent energy crisis resulting from the ongoing conflict in the Middle East, reported by the International Energy Agency (IEA) as the "largest supply shock in the history of the global oil market," highlighted the fossil fuel dependency of BRICS economies, with India and Indonesia being the most exposed.[6]

The Energy–Emissions Dilemma and Path Dependence

The fossil fuel dependence creates a dilemma. On the one hand, BRICS countries need to increase energy supply to support urbanisation, industrialisation, digitalisation, and poverty reduction; on the other, they must do so under conditions of growing climate pressure, unstable energy markets, and limited access to affordable long-term finance. Coal, natural gas, and oil continue to meet most of the energy demand. Fossil fuel demand currently accounts for about 80 percent of global energy requirements, with emerging economies as its leading consumers accounting for 45 percent of worldwide energy use.[7]

While the clean energy transition might generate long-term economic benefits, these gains will be distributed unevenly across countries and sectors. Countries relying on fossil fuel extraction will be particularly susceptible to transition risks, especially those that are heavily engaged in hydrocarbon export. Russia, for example, remains a leading fossil fuel exporter, while India, China, and South Africa still depend considerably on coal production.[8]

Such differences make these three vulnerable to price and supply-chain volatility, while creating additional challenges in climate negotiations, strategy coordination, and policy formulation. BRICS countries have also become leaders in the deployment of renewables, which account for increasing investments in clean energy technologies.[9] However, this expansion has largely occurred alongside, rather than in place of, fossil fuel growth. BRICS' renewable energy capacity will nearly triple by 2030 and its share of fossil fuel power capacity is starting to decline towards approximately 50 percent. Yet, all its members are simultaneously building additional coal, oil, or gas plants, except for Ethiopia.[10] Thus, during their transition, they remain structurally dependent on fossil fuels, particularly coal.

This paradox is reinforced by path dependence in infrastructure and industrial systems. Legacy coal plants, fossil-based refineries, and industrial clusters have created an environment of long asset lives and high switching costs, slowing the pace of transition. As a result, legacy assets will coexist with new technologies, leading to a layered rather than linear transition.[11] For policymakers, this implies that energy transition strategies must not only address future investments but also manage the phase-down or repurposing of existing fossil infrastructure.

Pending Fiscal Commitments and Fragmented Governance

One of the biggest constraints on the fiscal and political economies of BRICS nations is their 'carbon entanglement', which includes budget deficits. Fossil fuel earnings still comprise a substantial proportion of public revenue in many member states, ranging from 17.8 percent in India to 23.6 percent in Russia, creating a strong structural disincentive to rapid decarbonisation. Much of the fossil fuel sector is owned by state-owned enterprises (SOEs) and joint ventures, and therefore governments bear much of the risk of asset stranding. A rapid decline in asset value could increase fiscal pressures and a need to divert public resources towards supporting these entities.[12] Advanced economies have been able to mitigate this disincentive more effectively than BRICS nations primarily because their energy investment landscape is far less state-dependent.[13]

This renders any political and economic transition sensitive. The challenge is not to make a sudden pivot, but to slowly shift investment towards the modernisation of infrastructure and energy, energy efficiency, renewable energy, and social protection, while maintaining energy security and fiscal stability.

Another challenge is the gap between political commitments, governance, and implementation capacity. Energy, climate, infrastructure, industrial policy, and digital transformation are often managed by separate institutions in BRICS countries, which weakens coordination and slows project delivery.[14] Across the bloc, differences in national priorities, energy profiles, and development models make common action difficult. At the international level, insufficient finance, unequal access to technology, lack of transparent data on SOEs, and legacy governance structures continue to constrain emerging economies.[15]

For this reason, BRICS sustainability cooperation should focus on coordination mechanisms, shared data systems, project pipelines, and financial tools that can turn broad commitments into practical development outcomes.[16]

Infrastructure, Energy, and AI: The New Bottleneck for BRICS Sustainability

Energy and digital infrastructure comprise a single strategic bottleneck for BRICS development. Renewable energy, digital systems, and AI have the same material requirements: reliable electricity grids, storage, cross-border interconnections, data centres, cooling, computing capacity, and competent employees. AI and digital infrastructure also create water- and land-use constraints—data centres consume water directly for cooling and indirectly through electricity generation, while their siting can create local trade-offs with urban infrastructure, agricultural land, ecosystems, and climate-adaptation needs. While AI can be used for climate modelling, agriculture, health diagnostics, logistics, and public administration, it requires more electricity, chips, cloud platforms, secure data infrastructure, cooling capacity, water resources, and land.[17]

AI can contribute to sustainable development only if developing countries, including BRICS member states have the capacity to build, adapt, and govern it rather than only adopting external platforms. This makes digital public infrastructure central to the sustainability agenda. The Indian experience with Aadhaar and United Payments Interface (UPI) illustrates how digital identity and payment systems can expand access to public services, banking, small business activity, and innovation. Within BRICS, this infrastructure might facilitate the integration of inclusive development and digital transformation, while open-source AI can be used to make technology more accessible, adaptable, and less dependent on closed external platforms.[18]

BRICS should avoid treating sustainable AI infrastructure as a uniform agenda. The grouping has the scale to shape this field, but its internal asymmetries could reproduce new forms of dependency.[19] China already holds strong positions in solar manufacturing, electric vehicles, batteries, and large-scale infrastructure deployment. India's renewable energy capacity still faces import dependencies in advanced manufacturing. Russia has energy resources and engineering expertise. Brazil brings renewable potential and a social-environmental agenda. And South Africa highlights the developmental challenge of electricity reliability.

The risk is that some BRICS members become suppliers of platforms, equipment, models, standards, and infrastructure, while others remain consumers of imported green and digital technologies.[20] This dependency manifests through specific economic channels: import bills for hardware and chips; licensing fees for proprietary software; cloud and platform subscription payments; dependence on foreign-owned data sets and models; limited access to compute; external standards and certification systems; and the concentration of patents, design, research and development (R&D), and maintenance capabilities within a small number of firms and countries.

As recent research on inclusive AI development shows, technological divides are increasingly structured around infrastructure, data, and skills, while AI development remains concentrated in a few countries and companies.[21] BRICS cooperation should therefore shift from general technology-sharing to distributed capacity-building mechanisms, such as local manufacturing, sharing of research facilities, sharing of datasets, regional cloud infrastructure, skills development, and joint standard-setting.

Recommendations for BRICS: Scaling Sustainability

Scaling sustainability in BRICS requires the adoption of a dual-return approach, one that brings both environmental and socioeconomic benefits while balancing energy security with a commitment to the SDGs. BRICS can transition from coordination to implementation by operationalising the Energy Cooperation Roadmap 2025–2030 and linking it with infrastructure finance, digital transformation, and industrial modernisation. Rather than promoting a single model of transition, the grouping can support nationally determined pathways that combine energy security, technological development, climate resilience, and progress towards the SDGs. Sustainable energy infrastructure, digital public infrastructure, and AI systems could form a practical agenda for BRICS cooperation in the post-2030 development framework.

The following recommendations identify key areas where the bloc can strengthen its collective capacity to scale sustainable development.

a. **Treat energy infrastructure as the backbone of green and digital development.**

BRICS should prioritise smart grids, storage, demand management, and cross-border transmission as core conditions for renewable energy deployment, digital growth, and energy security. Cooperation between the New Development Bank (NDB) and State Grid Brazil Holding on the Graça Aranha–Silvânia Energy Transmission Project shows that grid modernisation is essential to reduce bottlenecks and integrate renewable energy at scale.[22]

BRICS energy and digital cooperation tracks should be more closely aligned. AI expansion, data centres, digital public infrastructure, and high-performance computing will increase demand for electricity, cooling, connectivity, and secure data storage,[23] making it necessary to link data centres, compute facilities, grid planning, cooling systems, and renewable energy sourcing. This would help prevent fragmented investment and make digital transformation compatible with energy security and sustainability goals.

b. **Mobilise finance for implementation.**

A serious bottleneck in achieving sustainable energy and infrastructure at scale for BRICS nations is the lack of affordable, long-term investment and a bankable project pipeline. The NDB has become an important source of financing infrastructure and energy investments but should evolve beyond financing single projects to facilitating platform-based, programmatic implementation. This entails connecting financing to the facilitation of joint project preparation, establishing common monitoring mechanisms, and establishing SDG-aligned outcome indicators, as well as improving links between existing and disjointed cooperation streams such as energy, digital infrastructure, and science and technology.

Three complementary actions should be prioritised by BRICS to support this transition:

- Implement a 'subsidy swap' mechanism to redirect public financial flows from fossil fuels (specifically petroleum products, kerosene, and coal) towards renewable energy innovation, grid modernisation, and enabling infrastructure. The protection of poor households can be ensured by sequencing the reform through a 'remove, target, and swap' framework: first, phase out inefficient subsidies that do not support energy access, then better target support towards the most vulnerable, and finally reallocate savings into affordable clean alternatives, such as kerosene-to-solar lanterns or programmes like India's *'Saubhagya'* scheme. To mitigate losses for the fossil fuel industry and its workforce, the strategy must incorporate clearly communicated timelines, active labour market policies, and retraining programmes to prevent social backlash and ensure a smooth transition.[24]
- Increase local currency financing via the NDB to lower exchange rate risk and enhance the viability of long-term infrastructure investments. By aligning financing with domestic revenue streams, local-currency lending of energy sector loans lowers debt-servicing uncertainty, improves project bankability, and helps mobilise investment in renewable energy, grids, and other sustainable infrastructure.

- Utilise bilateral 'fast-track' investment cooperation with other countries and extend the use of multilateral cooperation so as to facilitate meeting high capital investment requirements of member-state projects through strategic cooperation between bilateral countries, while preserving the legitimacy and scale of BRICS cooperation platforms.

These measures will collectively enhance the financial architecture required to shift BRICS cooperation financing from single-project-based to a coordinated model that leads to system-level financial sustainability outcomes.

c. **Develop a prominent Action Plan for sustainable transition, coordinated action, and implementation.**

BRICS will need to enhance investment, as well as the institutional framework, to facilitate implementation. It should create common criteria for sustainable infrastructure and energy-intensive digital systems, as well as a monitoring mechanism with harmonised indicators for emissions, infrastructure, energy transition, digital capacity, and SDG progress. These common metrics will help enhance transparency, peer learning, and national direction towards collective goals.

Simultaneously, BRICS should address the fiscal and social aspects of decarbonisation. Since many member economies continue to depend on fossil fuel revenues, subsidies, and SOEs, a dedicated Just Transition Framework can facilitate a phased transition towards green industrialisation and social protection, encourage workforce reskilling, and foster regional economic diversification and best practices on subsidy reform. Beyond portfolio diversification, transition road maps and dedicated clean-energy subsidiaries should help future-proof SOEs by creating structured pathways to shift investment from fossil fuels towards growth sectors such as renewable energy, storage, and low-carbon infrastructure. This will allow SOEs to manage stranded asset risks proactively while maintaining their strategic role in national development.

Together, these measures would help BRICS move from a forum for dialogue to a forum for coordinated and measurable action.

Conclusion

BRICS countries are becoming central to the future of global sustainable development. Their growing economic weight, energy demand, infrastructure needs, and expanding use of digital technologies mean that their choices will shape not only national development trajectories, but also the broader global progress towards the SDGs. For member economies, however, sustainability cannot be reduced to just decarbonisation; it is a broader mandate to combine economic growth, energy security, industrial modernisation, social inclusion, and climate resilience.

This article has argued that the primary challenge for BRICS is not the lack of sustainability goals, but the need to build the material and institutional capabilities required to achieve them. Energy systems, infrastructure, digital platforms, and AI are increasingly interconnected, forming the practical foundation of future development. Without reliable grids, resilient infrastructure, technological capacity, and coordinated governance, sustainability risks remain a declaratory agenda rather than a development reality. Further research is required to examine the specific financial instruments, institutional mechanisms, and sectoral pathways through which BRICS countries and BRICS institutions can translate these broad priorities into practical implementation.

BRICS is well-positioned to offer a more development-oriented approach towards sustainability. Its diversity is often seen as a constraint, but it can also become a source of policy innovation. The grouping brings together prominent energy exporters, industrial economies, renewable-energy leaders and rapidly digitalising states, making it possible to formulate approaches that do not impose a single transition model, but reflect different national circumstances, resource endowments, and development priorities.

The post-2030 sustainability agenda will require such flexibility. It will need to move beyond universal targets towards practical capabilities: financing, infrastructure, technology, skills, institutions, and implementation mechanisms. In this context, BRICS can amplify the voice of the Global South by showing how sustainable development can be scaled without separating climate goals from the right to development, energy security, and technological sovereignty.

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Endnotes

1 BRICS Brazil, "BRICS Data," January 20, 2025, https://brics.br/en/about-the-brics/brics-data.

2 Energy Institute (Statistical Review of World Energy), "Statistical Review of World Energy 2025," 2025, https://www.energyinst.org/statistical-review/resources-and-data-downloads.

3 UNDP, "What Is the Sustainable Energy Transition and Why Is It Key to Tackling Climate Change? I UNDP Climate Promise," February 29, https://climatepromise.undp.org/news-and-stories/what-sustainable-energy-transition-and-why-it-key-tackling-climate-change; Written Ivetta Gerasimchuk et al., "Beyond Fossil Fuels: Fiscal Transition in BRICS," International Institute for Sustainable Development (2019).

4 IPCC, *Summary for Policymakers*, Intergovernmental Panel on Climate Change, 2022, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf.

5 Leandro Vigna et al., "Charts Explain Per Capita Greenhouse Gas Emissions by Country," World Resource Institute, August 5, 2023, https://www.wri.org/insights/charts-explain-per-capita-greenhouse-gas-emissions.

6 Nicholas Wagner et al., "How the Middle East War Hits Asia's Energy Transition," World Economic Forum, May 6, 2026, https://www.weforum.org/stories/2026/05/transition-how-middle-east-war-reshaping-asia-energy-equation/.

7 Azka Amin et al., "Towards Sustainable Development and Net-Zero Emissions in BRICS: Empirical Perspectives on Renewable and Fossil Fuel Energy Consumption, Green Technological Innovation, and Institutional Quality," *Energy Strategy Reviews* 65 (May 2026): 102228, https://doi.org/10.1016/j.esr.2026.102228.

8 Gerasimchuk et al., "Beyond Fossil Fuels: Fiscal Transition in BRICS".

9 James Norman et al., "Energy in the BRICS I Global Energy Monitor," *Global Energy Monitor*, https://globalenergymonitor.org/research/energy-brics.

10 Norman et al., "Energy in the BRICS I Global Energy Monitor".

11 Gerasimchuk et al., "Beyond Fossil Fuels: Fiscal Transition in BRICS".

12 Gerasimchuk et al., "Beyond Fossil Fuels: Fiscal Transition in BRICS".

13 Richard Halsey et al., "State of Transition: How State-Owned Power Companies Can Drive Energy Transition in Emerging Economies," International Institute for Sustainable Development, 2025, https://www.iisd.org/publications/report/state-power-companies-energy-transition.

14 Kulvir Kaur et al., "Implementing SDGs in BRICS Nations: Challenges, Opportunities and Recommendations," *ResearchGate*, 2025, https://doi.org/10.62823/IJEMMASSS/7.2(II).7698.

15 Halsey et al., "State of Transition: How State-Owned Power Companies Can Drive Energy Transition in Emerging Economies".

16 Mihaela Papa, "Can BRICS Lead the Way to Sustainable Development?," *Sustainable Goals UK*, 2017, https://www.sustainablegoals.org.uk/wp-content/uploads/2017/03/116-117-SDG-PAPA.pdf.

17 Walter Leal Filho et al., "The Contribution of Artificial Intelligence to Achieving the United Nations Sustainable Development Goals," *Environment, Development and Sustainability*, March 9, 2026, https://link.springer.com/article/10.1007/s10668-026-07415-0; Yu Sheng et al., "Power for AI Data Centers: Energy Demand, Grid Impacts, Challenges and Perspectives," *Energies* 19, no. 3 (2026): 722, https://doi.org/10.3390/en19030722.

18 Igor Makarov et al., "The Post-2030 Agenda for Sustainable Development: Possible Forks in the Road," May, 2026, https://globalaffairs.ru/articles/povestka-2030-makarov/.

19 Haryono, "BRICS in the Digital Age: Investigating Technological Innovation and Knowledge Sharing as Catalysts for Economic Transformation," *The Eastasouth Journal of Information System and Computer Science* 2, no. 2 (2024): 84–91, https://doi.org/10.58812/esiscs.v2i02.399.

20 Charles Shaaba, "Artificial Intelligence (AI)-Poverty-Economic Growth Nexus in Selected BRICS-Plus Countries: Does the Moderating Role of Governance Matter?," *AI & Society* 40, no. 6 (2025): 4729–63, https://doi.org/10.1007/s00146-025-02213-0.

21 UNCTAD, *Technology and Innovation Report 2025: Inclusive Artificial Intelligence for Development. Chapter III*, 2025, https://unctad.org/system/files/official-document/tir2025ch3_en.pdf.

22 NDB, "New Development Bank and State Grid Brazil Holding Sign Memorandum of Understanding to Boost Brazil's Energy Capacity," New Development Bank, 2025, https://www.ndb.int/news/new-development-bank-and-state-grid-brazil-holding-sign-memorandum-of-understanding-to-boost-brazils-energy-capacity/.

23 BRICS Brazil, "Cooperation in Information and Communication Technologies (ICTs)," 2025, https://infobrics.org/files/country/russia/documents/2025/science_technology_and_innovation/Cooperation_in_Information_and_Communication_Technologies_ICTs_Working_Group_ISSUES_NOTE.pdf; Sheng et al., "Power for AI Data Centers: Energy Demand, Grid Impacts, Challenges and Perspectives".

24 Gerasimchuk et al., "Beyond Fossil Fuels: Fiscal Transition in BRICS"; Richard Bridle et al., "Fossil Fuel to Clean Energy Subsidy Swaps: How to Pay for an Energy Revolution. International Institute for Sustainable Development," 2019, https://www.iisd.org/system/files/publications/fossil-fuel-clean-energy-subsidy-swap.pdf.

Harnessing BRICS Cooperation for Differentiated, Just, and Sustainable Energy Transitions

Mulugeta Getu Sisay and Siphamandla Zondi

Abstract

This article argues that, for BRICS to advance from mere commitment to energy transition to just and sustainable energy transition in practice, it will need a differentiated energy governance framework that balances common goals with country-specific energy needs, capabilities, and transition pathways, while strengthening cooperation in finance, technology, innovation, capacity building, and institutional coordination. While BRICS has established shared commitments on energy security, equity, and sustainability, a one-size-fits-all approach is unlikely to succeed. As BRICS countries have become increasingly important actors in advancing sustainable energy transitions, though they differ in their levels of energy access, resource endowments, technological capabilities, and development priorities, they could advance sustainable energy transformation through their growing financial, technological, and industrial capabilities. This context reflects patterns in the broader global context.

Introduction

This article explains how BRICS can develop a coherent energy cooperation framework amidst its members' divergent national priorities, uneven progress in the Sustainable Development Goals (SDGs), and different energy profiles. Achieving universal access to affordable, reliable, sustainable, and modern energy is a crucial development challenge of our time. Although all BRICS countries have committed to advancing SDG 7 ('Energy for all'), they are doing so from very different positions and conditions. Some have largely achieved universal energy access and are accelerating investments in clean energy, while others continue to prioritise expanding electricity access, meeting growing energy demand, and supporting economic development. How can BRICS evolve a common energy agenda to achieve their shared commitment to a just energy transition while responding to diverse national realities?

This article analyses the adequacy of current mechanisms for energy transition and what further steps are needed to enhance the bloc's collective advance of energy security for sustainable development. This is the basis for recommendations on practical steps and a more differentiated governance approach that BRICS countries could consider in building an innovative energy cooperation ecosystem.

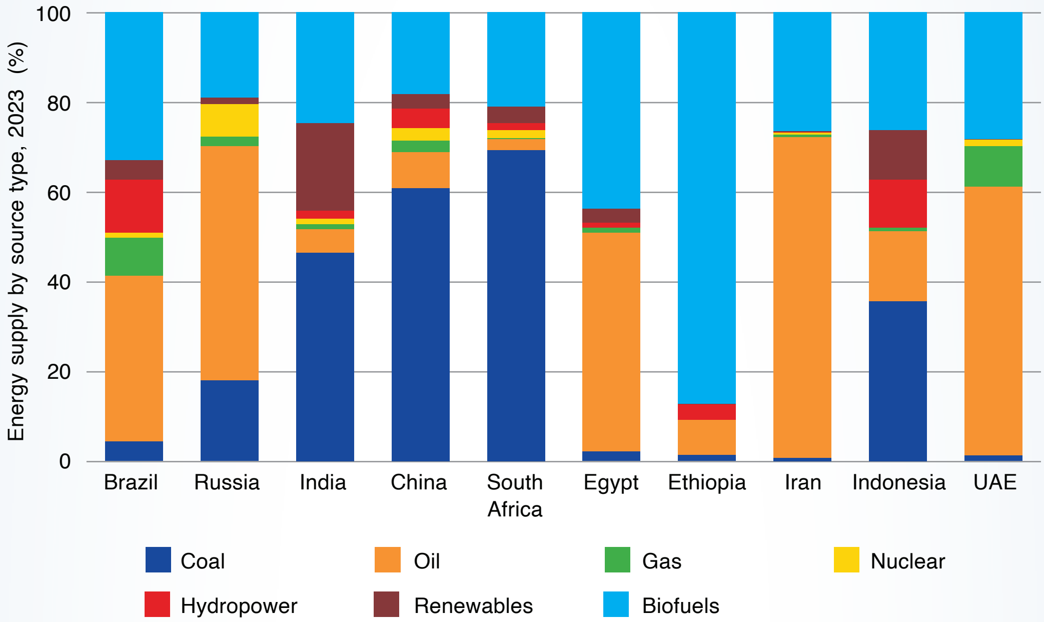
The Variable Pace of Progress in the SDGs

BRICS has long recognised that energy is at the heart of sustainable development, and that it drives economic growth, supports industrialisation, and improves living standards. Recognising that energy is essential for economic growth, poverty reduction, healthcare, education, and sustainable development, SDG 7 aims to "ensure access to affordable, reliable, sustainable and modern energy for all" by 2030. Yet the pathway towards SDG 7 looks different across BRICS countries. While some members have achieved near-universal electricity access and are investing heavily in clean energy, others are still expanding basic energy infrastructure to meet growing demand. These contrasting realities shape national priorities and the pace of energy transition. Against this backdrop, this section examines where BRICS countries stand on SDG 7 and highlights the diversity that characterises the grouping.

Although progress towards SDG 7 has improved in recent years, many of the targets are likely to be missed, especially due to structural problems slowing progress in developing countries. According to tracking by the International Energy Agency (IEA), nearly 92 percent of global population had access to electricity in 2023, while 655 million people were without electricity.[1] Progress is highly uneven, particularly in Africa, home to three BRICS countries and a continent that now accounts for over 86 percent of the global population without access to electricity.[2] Although approximately 35 million people in the region gained access to electricity by 2023, rapid population growth meant the total number of people without electricity declined by only 5 million, to about 565 million. Likewise, access to clean cooking technologies is critically slow, with 2.1 billion people still relying on polluting fuels worldwide and the access gap in Africa widening by approximately 14 million people annually due to persistent financing and investment constraints.[3]

Likewise, progress among the BRICS countries on SDG 7 has been notable but uneven across members. For example, China and India have made remarkable advances in expanding electricity access, deploying renewable energy, and investing in clean energy.[4] This has helped China to become the global leader in solar and wind energy capacity, while India has rapidly expanded rural electrification and renewable energy generation through large-scale solar initiatives. Brazil, meanwhile, continues to maintain one of the cleanest electricity mixes among the major economies due to its extensive hydropower and growing wind and bioenergy sectors.[5] South Africa has also improved electricity access since the 1990s, but still faces serious challenges in ensuring energy reliability, the adequacy of infrastructure, and transitioning out of a coal-dependent energy system. For its part, Russia has near-universal electricity access and strong energy infrastructure, though its progress towards a renewable energy transition has been slower than anticipated.[6]

Figure 1. Structure of BRICS Countries' Energy Supply (2023)



Source: IEA, Energy System[7]

The expanded BRICS further illustrates the diversity of energy transitions across emerging economies. The newer members are at very different stages of economic development, industrialisation, and energy transition, and their energy systems reflect distinct national priorities and resource endowments.[8] Egypt, Iran, and the UAE remain heavily dependent on oil and gas because of their roles as major hydrocarbon producers and exporters, while Ethiopia relies predominantly (99 percent) on renewable sources, with hydropower forming the backbone of its strategy.[9] Indonesia depends substantially on coal.

The evidence shows that BRICS countries are pursuing the same broad goal of achieving SDG 7, but from very different starting points. These differences are seen in energy access, resource endowments, development priorities, and transition strategies. Some members continue to prioritise universal energy access and infrastructure expansion, while others are increasingly focused on decarbonisation, industrial competitiveness, export revenues, and energy security. These objectives are different but not incompatible; rather, they underscore the importance of stronger intra-BRICS cooperation.

Achieving SDG 7 does not require all members to follow the same transition pathway or reach the same level of energy development. Instead, it requires a shared commitment to common goals while allowing countries the flexibility to pursue pathways that reflect their unique circumstances. This diversity also provides the backdrop against which BRICS energy governance has evolved, a subject examined in the next section.

BRICS and Energy Governance: Political Commitments Vs Action

Normative Commitments: An Evolving Energy Agenda

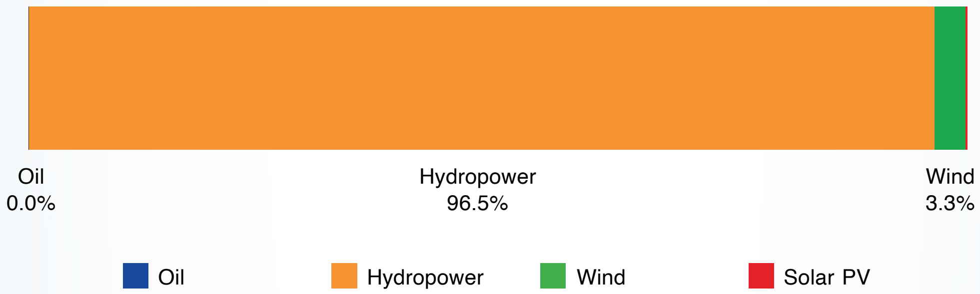
Energy has become an increasingly strong pillar of BRICS cooperation. Early summit declarations focused largely on energy security, infrastructure development, and strengthening economic cooperation through BRICS-led institutions. Over time, however, the agenda expanded. The 2016 Goa Declaration recognised "the need to scale up low carbon fuels and other clean energy solutions" and stressed that international cooperation should focus on access to "clean energy technology and finance" (para. 69),[10] while the 2017 Xiamen Declaration linked energy cooperation to green development and called for greater access to finance and technology for low-emission energy systems.[11]

A noticeable shift occurred from 2018 onwards. Successive declarations increasingly framed energy transition as part of a broader sustainable development agenda while reaffirming each country's sovereign right to determine its own transition pathway. The Johannesburg Declaration (2018) promoted "transitioning to more environmentally sustainable energy systems" and investment in renewable energy and infrastructure.[12] More recent declarations—including those adopted in Kazan (2024), Rio de Janeiro (2025), and the 2026 Foreign Ministers' Meeting—have consistently emphasised affordable and reliable energy, energy security, poverty reduction, technology cooperation, and just, inclusive energy transitions that reflect national circumstances.[13]

This evolution suggests that BRICS views energy transition not simply as a climate issue but as a broader development challenge. Energy security, industrialisation, poverty reduction, and economic resilience are treated as complementary rather than competing objectives. That perspective distinguishes the BRICS approach from policy frameworks that prioritise decarbonisation alone.

The diversity of members' net-zero targets reinforces this approach. Targets range from 2050 in Brazil, South Africa, Ethiopia, and the UAE to 2070 in India, while some members have yet to adopt formal net-zero pledges, reflecting differences in development levels, energy systems, and national priorities.[14] The recent expansion of BRICS has further widened this diversity. Ethiopia, for example, illustrates the challenge facing many low-income members: expanding energy access and infrastructure while simultaneously pursuing climate-resilient, low-carbon development under massive financial and institutional constraints.[15] Rather than seeking policy uniformity, BRICS has increasingly emphasised differentiated transition pathways that allow countries to pursue common energy goals while responding to their own national circumstances.[16]

Fig. 2. Electricity Generation in Ethiopia, by Source (2023)



Source: IEA, Ethiopian Energy Mix[17]

Institutional and Financial Cooperation

Political commitments have gradually been complemented by institutional mechanisms. Governance mechanisms have evolved through institutional mechanisms such as ministerial dialogues, research platforms, and collaborative initiatives aimed at promoting renewable energy, natural gas, and energy efficiency. The establishment of the BRICS Energy Research Cooperation Platform in 2018 represented an important step towards structured cooperation through joint research, knowledge exchange, and policy dialogue. More recently, the BRICS Energy Cooperation Roadmap

2025–2030 identified four broad priorities: policy coordination, energy security and just transition, improved governance, and expanded trade and investment. Together, these initiatives reflect an emerging model of South-South cooperation on sustainable energy. Yet progress has been uneven. Evidence suggests that bilateral cooperation among member states has often generated more concrete outcomes than cooperation undertaken collectively through BRICS institutions.[18]

The New Development Bank (NDB) represents BRICS' most tangible institutional contribution yet to energy governance by helping address the sizeable financing gap for sustainable energy in emerging and developing economies. Initially committing one-third of its portfolio to sustainable infrastructure, the Bank increased this target to 40 percent under its 2022–2026 General Strategy, with a stronger focus on renewable energy, energy efficiency, and clean energy transition.[19] Although nearly two-thirds of the Bank's early lending supported energy projects, its portfolio has since diversified. Between 2017 and 2024, clean energy projects accounted for US$23.6 billion, or approximately 13.4 percent of total approved lending, rising to about 16 percent when energy-efficiency programmes are included. While these investments have made the NDB an important source of South-South development finance, they remain modest relative to the scale of investment required to achieve universal energy access and support energy transitions. The Bank's growing emphasis on local-currency lending, together with its commitment to expand renewable energy, climate-resilient infrastructure, and low-carbon development under its 2023–2026 Strategy, provides a solid foundation for scaling up differentiated financing mechanisms across BRICS.[20]

Governance Gaps and Future Directions

These developments show that BRICS has set up a broad normative and institutional foundation for energy cooperation. However, implementation has not progressed at the same pace. While political commitments have become increasingly ambitious, cooperation continues to rely on voluntary coordination, with limited mechanisms for monitoring implementation, tracking collective progress, or supporting countries with differing transition needs.

As BRICS expands, these challenges are likely to become more pronounced. A larger and more diverse membership will require governance arrangements that are sufficiently flexible to accommodate different national circumstances while maintaining shared objectives. Moving from declarations to implementation will therefore depend not only on greater financial resources, but also on stronger institutional coordination, more structured technology partnerships, and mechanisms that translate common aspirations into country-specific action.

BRICS has undoubtedly succeeded in building a shared political vision around energy cooperation. However, its contribution to a just energy transition will be judged less by the ambition of its declarations than by its ability to deliver practical cooperation. Its comparative advantage lies in combining finance, technology, and South-South cooperation to support development-oriented energy transitions. The question is no longer whether BRICS should cooperate on energy, but how that cooperation can better respond to the diverse realities of its members. The following section addresses this question by examining why differentiated transition pathways are central to the future of BRICS energy governance.

The Need for Differentiated Policies

Existing global transition benchmarks often assume uniform decarbonisation pathways, despite major differences in historical emissions, industrial structures, infrastructure availability, financing capacity, and energy access needs. Within BRICS, these contrasts are pronounced. While all members share commitments to achieving SDG 7 and advancing low-carbon development, they face different energy realities, institutional capacities, and development priorities. Some countries continue to prioritise expanding electricity access, industrialisation, and energy infrastructure, whereas others have progressed further in renewable deployment and decarbonisation efforts. These differences arise from historical development pathways, resource endowments, economic structures, governance capacity, and access to finance. Therefore, effective energy governance within BRICS requires a balance between shared objectives and national flexibility, allowing countries to figure out how and when transition goals can be achieved according to their specific circumstances.[21] A uniform transition model is therefore neither realistic nor desirable. Instead, differentiated transition frameworks provide a more appropriate approach by recognising that energy transitions must address both climate objectives and development priorities, including energy security, industrial growth, and poverty reduction.

Yet, such diversity also represents one of BRICS' greatest strategic strengths. Member countries possess complementary capabilities across different parts of the clean energy value chain, creating opportunities for cooperation based on comparative advantage rather than dependency. China has developed global leadership in solar photovoltaic manufacturing, battery production, and wind energy technologies, providing significant industrial capacity for renewable energy expansion. India has built considerable expertise in solar deployment, renewable energy services, and emerging areas such as green hydrogen. Brazil's experience in biofuels, particularly ethanol production, alongside its hydropower capabilities, provides valuable knowledge in renewable energy integration. South Africa has developed institutional experience through renewable energy procurement mechanisms, while Russia contributes scientific and engineering capabilities relevant to advanced energy systems and energy infrastructure development.[22]

The expanded BRICS membership further broadens these complementarities by adding new sources of energy resources, industrial capacity, investment potential, and emerging clean energy opportunities. For example, Saudi Arabia and the United Arab Emirates contribute substantial energy-sector investment capacity, expertise in large-scale energy infrastructure, and growing interest in renewable energy and hydrogen development; Egypt adds solar and wind potential as well as strategic geographic advantages for regional energy connectivity; Ethiopia contributes renewable energy resources, particularly hydropower potential, alongside opportunities for expanding energy access. Despite the continued dominance of fossil fuels, BRICS countries are making progress in the energy transition through the expansion of solar and wind power, with solar accounting for most new renewable capacity additions.[23] Together, these diverse capabilities create possibilities for deeper cooperation across clean energy manufacturing, technology development, infrastructure investment, energy trade, and knowledge exchange.

These differences create opportunities for technology exchange, joint research, industrial partnerships, and investment cooperation. Rather than relying primarily on technology flows from developed economies, BRICS can strengthen South–South cooperation by combining existing capabilities and developing clean energy value chains suited to emerging economies. Beyond internal cooperation, BRICS can also contribute to a fairer global energy transition by supporting developing countries facing climate vulnerability, financing constraints, infrastructure gaps, and energy poverty. Through differentiated approaches that recognise diverse starting points and development needs, BRICS can promote a more inclusive model of energy governance in which emerging economies have greater flexibility and agency in shaping their energy futures.[24]

The key challenge is therefore not the creation of a common energy policy but the development of governance arrangements that enable countries to benefit from each other's strengths while maintaining nationally appropriate transition pathways. Current evidence suggests that bilateral partnerships between BRICS members and private-sector actors have often produced more practical outcomes than broader multilateral cooperation, highlighting the value of targeted collaboration in technology development, investment, and knowledge exchange.[25] For developing countries such as Ethiopia, where expanding energy access is a pressing priority, such a differentiated framework offers greater scope to access finance, technology, and institutional capacity without adopting transition pathways that overlook national realities. Differentiation should therefore be understood not as a limitation of BRICS cooperation, but as its organising principle, allowing the pursuit of shared sustainability aims through diverse, context-specific pathways while contributing to more inclusive global energy governance.

Recommendations

BRICS has made notable progress in developing a common vision for sustainable energy through political declarations, institutional platforms, and the NDB. The findings of this analysis, however, suggest that implementation has not kept pace with these commitments. Future cooperation should therefore focus on translating existing principles into practical mechanisms that support differentiated energy transitions while accelerating progress towards SDG 7.

a. Strengthen institutional coordination. BRICS should establish a Sustainable Energy Coordination Platform to move cooperation beyond periodic political declarations. The platform could coordinate implementation of agreed priorities, facilitate policy dialogue, monitor progress, and identify opportunities for joint projects and investment. It should also strengthen collaboration among governments, research institutions, development banks, and the private sector, ensuring that cooperation reflects members' diverse development needs and energy priorities.

b. Scale up development-oriented energy finance. NDB should play a stronger role in financing sustainable energy transitions across BRICS and the wider Global South. This includes expanding concessional and local-currency lending for renewable energy, decentralised electricity systems, climate-resilient infrastructure, and regional power interconnections. Greater use of blended finance and risk-sharing instruments would also help mobilise private investment while reducing debt and exchange-rate risks faced by developing economies.

c. Promote technology partnerships and regional value chains. Rather than limiting cooperation to technology transfer, BRICS should strengthen joint research, innovation, and industrial partnerships. Building regional clean energy value chains—from critical minerals and battery manufacturing to biofuels, solar technologies, and green hydrogen—would enable members to capitalise on their complementary strengths. Such cooperation would strengthen energy security, accelerate technology diffusion, and support sustainable industrial development across the Global South.

d. Operationalise differentiated transition pathways. BRICS should translate its commitment to nationally determined and just transitions into an operational cooperation framework. Rather than applying uniform policies, support should be tailored to countries' levels of energy access, institutional capacity, and economic development. Countries such as Ethiopia, where expanding electricity access remains an immediate priority, require greater emphasis on affordable finance, infrastructure investment, and institutional capacity alongside low-carbon development.

e. Strengthen BRICS–Africa cooperation. The expansion of BRICS creates an opportunity to deepen cooperation with African members and partner countries. Future partnerships should prioritise universal energy access, grid expansion, decentralised renewable energy, and technical capacity building while supporting climate-resilient development. Such cooperation would accelerate progress towards SDG 7 and demonstrate how differentiated transition pathways can address both development and climate objectives.

f. Promote responsible and sustainable investment. BRICS energy investments should support technology transfer, local value addition, skills development, and renewable energy development in host countries, rather than focusing solely on resource extraction.

g. Strengthen BRICS' voice in global energy governance. BRICS should continue promoting SDG 7 by positioning energy access, energy security, industrialisation, and climate action as mutually reinforcing objectives and advocating for differentiated transition pathways in global climate and energy discussions.

Ultimately, BRICS' comparative advantage lies not in offering a single model of energy transition, but in demonstrating how countries at different stages of development can cooperate to achieve common energy goals through differentiated pathways. Translating this principle into practical financing, technology partnerships, and institutional cooperation will determine whether BRICS emerges as a credible leader in development-oriented global energy governance.

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Endnotes

1 International Energy Agency, *Tracking SDG7: The Energy Progress Report*, IEA, Paris, 2025, https://www.iea.org/reports/tracking-sdg7-the-energy-progress-report-2025.

2 "Tracking SDG7: The Energy Progress Report".

3 "Tracking SDG7: The Energy Progress Report".

4 Yuling Pan and Feng Dong, "Factor Substitution and Development Path of the New Energy Market in the BRICS Countries under Carbon Neutrality: Inspirations from Developed European Countries," *Applied Energy* 331 (2023): 120442, https://doi.org/10.1016/j.apenergy.2022.120442.

5 Luciano Losekann and Amanda Tavares, *Energy Transition and Cooperation Potential in BRICS in Renewable Energy and Natural Gas*, (*Transição Energética e Potencial de Cooperação nos BRICS em Energias Renováveis e Gás Natural*), Brasília, CEPAL/IPEA, 2021, https://hdl.handle.net/11362/47261.

6 Rajesh Ramluckun, Nandi Malumbazo, and Lwazi Ngubevana, "A Review of the Energy Policies of the BRICS Countries: The Possibility of Adopting a Just Energy Transition for South Africa," *Sustainability* 16, no. 2 (2024): 703, https://doi.org/10.3390/su16020703.

7 IEA, "Energy System: Countries and Regions," https://www.iea.org/countries.

8 Igor Makarov, *Just Low-Carbon Transition: Towards Shared Vision of the BRICS Countries*, Moscow, National Research University Higher School of Economics, 2025, https://we.hse.ru/mirror/pubs/share/1110803036.pdf/.

9 Megersa Tesfaye Boke et al., "Optimizing Renewable-Based Energy Supply Options for Power Generation in Ethiopia," *PLOS ONE* 17, no. 1 (2022): e0262595, https://doi.org/10.1371/journal.pone.0262595.

10 BRICS, "Goa Declaration," Eighth BRICS Summit, October 16, 2016, https://brics2022.mfa.gov.cn/eng/gyjzgj/ljldrhwcgwj/202202/t20220222_10644347.html.

11 BRICS, "Xiamen Declaration," Ninth BRICS Summit, September 4, 2017, https://brics.br/en/documents/collection-of-previous-presidencies/leaders-declarations.

12 BRICS, "Johannesburg Declaration," Tenth BRICS Summit, July 26, 2018, https://brics.br/en/documents/collection-of-previous-presidencies/leaders-declarations.

13 BRICS, "Kazan Declaration: Strengthening Multilateralism for Just Global Development and Security," XVI BRICS Summit, Russian Federation, October 23, 2024, https://brics.br/en/documents/collection-of-previous-presidencies/leaders-declarations; BRICS, "Rio de Janeiro Declaration: Strengthening Global South Cooperation for a More Inclusive and Sustainable Governance," XVII BRICS Summit, July 6, 2025, https://brics.br/en/documents/presidency-documents; BRICS, "Chair's Statement and Outcome Document at BRICS Foreign Ministers' Meeting," New Delhi, India, May 15, 2026. https://www.mea.gov.in/advanced-search-list.htm.

14 Mannat Jaspal and Anil Kishora, *Greening Half the World: Leveraging the New Development Bank for Green Finance*, Observer Research Foundation Middle East, February 2026.

15 Ethiopia, *Ethiopia's Climate-Resilient Green Economy Strategy*, Addis Ababa, FDRE, 2011; IEA, "Ethiopia: Energy Mix," https://www.iea.org/countries/ethiopia/energy-mix; Tesfaye Boke et al., "Optimizing Renewable-Based Energy Supply Options for Power Generation in Ethiopia".

16 Gustavo de Carvalho, Jaimal Anand & Sanusha Naidu, "BRICS expansion: Adaptive Response or Proactive Restructuring of Global Governance?," *South African Journal of International Affairs* 32, no. 1-2 (2025): 9-32, DOI: 10.1080/10220461.2025.2523507.

17 IEA, "Ethiopian Energy Mix," International Energy Agency, https://www.iea.org/countries/ethiopia/energy-mix.

18 Tao Ma and Chen Xi, "BRICS Energy Cooperation and Global Energy Governance," *Contemporary China and World* (Chinese Edition), no. 1 (2022): 118–133, http://www.iwep.org.cn/xscg/xscg_lwybg/202309/W020230914486786933000.pdf; Isabella Tamine Parra Miranda et al., "A Review on Green Technology Practices at BRICS Countries: Brazil, Russia, India, China, and South Africa," *SAGE Open* 11, no. 2 (2021), https://doi.org/10.1177/21582440211013780.

19 NDB, *Agreement on the New Development Bank*, Fortaleza, New Development Bank (NDB), 2015; NDB, *Annual Report 2024*, Shanghai, New Development Bank (NDB), 2024; "Greening Half the World: Leveraging the New Development Bank for Green Finance".

20 NDB, *General Strategy: 2022–2026,* Shanghai, New Development Bank, 2023; Mannat and Kishora, *Greening Half the World.*

21 Marcelo Santana Silva, Luís Oscar Silva Martins, Fábio Matos Fernandes, Lucas da Silva Almeida, Maria Cândida Arraes de Miranda Mousinho, Rilton Gonçalo Bonfim Primo, and Ednildo Andrade Torres, "Energy Transition in the BRICS: A Comparative Assessment of the Determinants of Renewable Energy Consumption," *Energies* 19, no. 3 (2026): 811, https://doi.org/10.3390/en19030811; Yuling and Feng, "Factor Substitution and Development Path"; Luciano and Amanda, "Energy Transition and Cooperation"

22 IEA, *Advancing Clean Technology Manufacturing*, Paris, International Energy Agency (IEA), 2024, https://www.iea.org/reports/advancing-clean-technology-manufacturing; Vikas Khare et al., "Perspective of Renewable Energy in the BRICS Country," *e-Prime: Advances in Electrical Engineering, Electronics and Energy* 5: 100250, 2023, https://doi.org/10.1016/j.prime.2023.100250; Luciano, and Amanda, "Energy Transition and Cooperation"; Parra et al., "A Review on Green Technology".

23 Khare et al., "Perspective of Renewable Energy in the BRICS Country".

24 Oluwatobi Mary Owojori and Emem Anwana, "Climate Governance in the BRICS: Pathways Toward Net-Zero Emissions," *Discover Sustainability* 6 (2025): 359, https://doi.org/10.1007/s43621-025-01181-1.

25 Ma and Xi, "BRICS Energy Cooperation and Global Energy Governance".

Scaling Sustainability in BRICS: Energy, Infrastructure, and SDG Pathways through China-Egypt Cooperation

Fatma Hamdon and Ya Tan

Abstract

This article examines how BRICS can scale sustainability through the linkage of energy transition, infrastructure development, and SDG implementation, with a particular focus on China–Egypt cooperation. China's experience demonstrates the importance of long-term planning, state–market coordination, renewable energy deployment, and infrastructure integration. Egypt, meanwhile, provides a strategic platform for adapting these lessons to an emerging-economy context, given its infrastructure demand, renewable energy potential, and regional connectivity. The authors discuss how BRICS can support scalable sustainability through development finance, green infrastructure pipelines, technology cooperation, and voluntary governance mechanisms. It presents China–Egypt cooperation as a practical pilot for broader South–South sustainability cooperation within BRICS, while highlighting financing gaps, infrastructure bottlenecks, and governance limitations that constrain implementation.

1. The Challenge: Scaling Sustainability in Energy and Infrastructure

1.1. Conceptual Framing: From SDG Commitments to Scalable Systems

Sustainability is understood as a comprehensive concept that seeks to balance environmental protection, economic development, social well-being, and effective governance to meet present needs without compromising the ability of future generations to meet their own needs. In emerging economies, sustainability requires coordination across energy, infrastructure, finance, industry, and governance. A solar park, a rail line, a port, or a smart city can contribute to sustainability only when it is connected to broader systems: power grids, local industrial capacity, financing mechanisms, skills formation, digital management, and long-term maintenance.

This systems perspective is particularly important for the Sustainable Development Goals (SDGs). Energy transition directly relates to SDG 7 on affordable and clean energy, but it also affects SDG 9 on industry and infrastructure, SDG 11 on sustainable cities, SDG 13 on climate action, and SDG 17 on partnerships. Infrastructure is therefore not only a physical asset. It is also a development platform. If infrastructure lowers transaction costs, improves productivity, expands access to services, and supports green industrial upgrading, it can help transform sustainability commitments into scalable development outcomes.

For BRICS countries, the primary question is how it can be implemented at scale under real-world constraints. Many emerging economies face limited fiscal space, high financing costs, grid bottlenecks, and technology gaps. Scaling sustainability therefore requires policy coordination, predictable investment frameworks, development finance, local capacity building and South–South cooperation. China–Egypt cooperation provides a useful case in this regard. Egypt combines a strategic location linking Africa, the Middle East, and Europe with substantial infrastructure demand, abundant renewable-energy potential, and an ambitious green transition agenda. China contributes extensive experience in large-scale infrastructure delivery, renewable-energy deployment, manufacturing capacity, and development-oriented finance. Their cooperation therefore illustrates how South–South partnerships can mobilise capital, technology, and productive capacity while supporting local industrial development, skills formation, and broader regional connectivity. These issues that are highly relevant to sustainability transitions across the wider BRICS community.

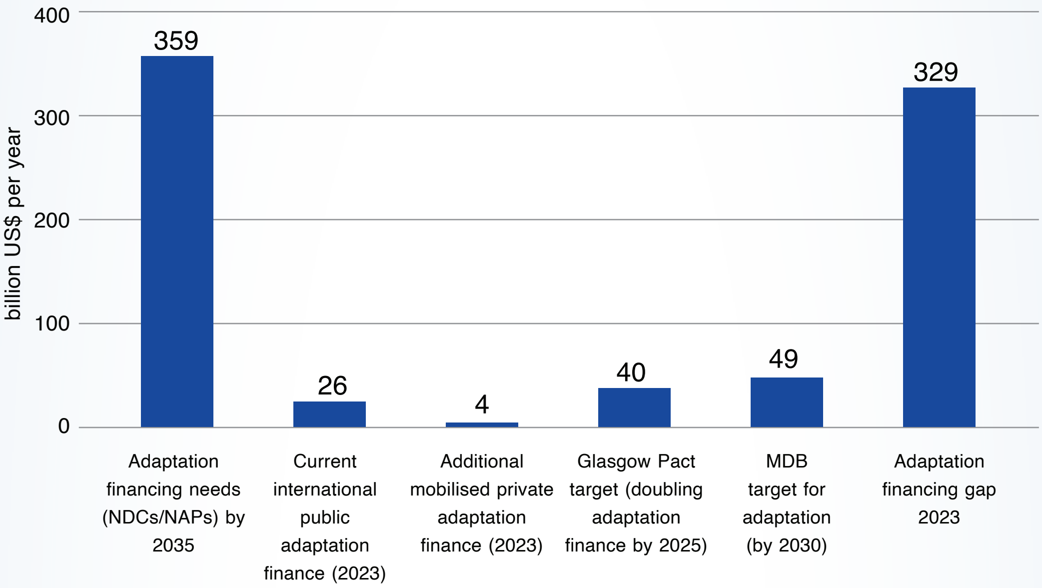
1.2. Structural Constraints in Emerging Economies

Despite growing international commitments to sustainable development and climate action, emerging and developing economies continue to face profound structural constraints that impede the scaling of sustainable energy, infrastructure systems. These constraints extend beyond simple funding shortages and encompass deep-rooted financial, institutional, governance and climate change challenges. Yet the financial and institutional architecture designed to support sustainable transitions remains insufficiently aligned with the realities of these economies.

1.2.1. Financing Gaps and Limitations of Climate and Blended Finance

One of the biggest barriers to scaling sustainability is the persistent climate finance gap. Developing countries are estimated to require approximately US$359 billion per year in adaptation finance by 2035, while current international public adaptation finance reached only US$28 billion in 2023. Private adaptation finance contributed an additional US$3 billion, leaving an adaptation financing gap of approximately US$328 billion annually. Although the Glasgow Climate Pact called for doubling adaptation finance to around US$40 billion by 2025 and Multilateral Development Banks have committed to mobilising US$50 billion annually by 2030, these efforts remain well below estimated financing needs. This highlights the limitations of current climate and blended finance mechanisms in mobilising investment at the scale required to support climate resilience and sustainable development in developing countries.[1]

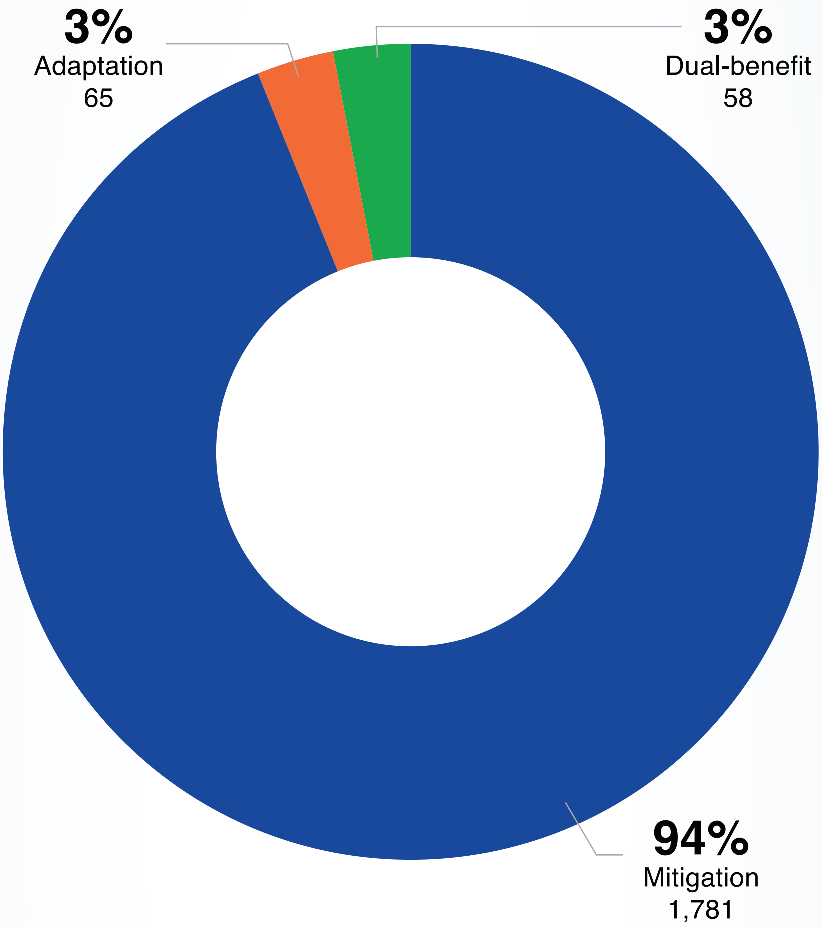
Figure 1: Adaptation Finance Needs and Current Finance Flows in Developing Countries



Source: United Nations Environment Programme (UNEP), Adaptation Gap Report 2025.[2]

Total climate finance reached US$1,904 billion in 2023. However, these flows remained overwhelmingly concentrated on mitigation activities, which accounted for US$1,781 billion (94 percent) of total climate finance. In contrast, adaptation finance received only US$65 billion (3.4 percent), while projects delivering both mitigation and adaptation benefits accounted for US$58 billion (3 percent). This distribution highlights a persistent imbalance in global climate finance, despite the growing urgency of scaling up investments in climate resilience and adaptation across developing economies.[3] Furthermore, climate finance continues to rely predominantly on debt instruments rather than grants or highly concessional financing, limiting the accessibility and sustainability of funding for many vulnerable countries.[4]

Figure 2: Landscape of Climate Finance (2023, in US$ billion and %)



Source: Climate Policy Initiative, Global Landscape of Climate Finance 2025. [5]

This challenge is particularly evident in Africa, where approximately 51 percent of climate finance in 2024 was delivered through loans, compared with 18 percent in East Asia and the Pacific and 20 percent in Latin America and the Caribbean. The dependence on debt-financed climate action has raised concerns regarding fiscal sustainability, as the number of low-income countries at high risk of debt distress more than doubled between 2013 and 2020. Borrowing costs remain high, with several African economies facing interest rates ranging from 8 percent to 20 percent, while climate vulnerability can add up to 10 percentage points to sovereign risk premiums.[6]

At the same time, blended finance mechanisms have yet to achieve the scale necessary to mobilise private investment. Although blended finance is frequently promoted as a solution for closing financing gaps, its application remains concentrated in sectors with relatively predictable commercial returns. Adaptation projects, resilient infrastructure, and social investments continue to attract limited private capital due to uncertain revenue streams and difficulties in quantifying long-term benefits. Credit enhancement instruments, guarantees, insurance mechanisms, and risk-sharing facilities remain underutilised, limiting the ability of public finance to crowd in private investment.[7]

1.2.2. Infrastructure Bottlenecks and Systemic Investment Risks

Beyond financing constraints, infrastructure bottlenecks continue to undermine sustainable development pathways. Emerging economies face deficits in energy transmission networks, urban infrastructure systems, transport logistics, water management facilities, and climate-resilient public assets. These weaknesses increase project costs, reduce productivity, and diminish the effectiveness of sustainability investments.

Foreign exchange volatility constitutes a structural obstacle. Many sustainable infrastructure projects generate revenues in local currencies while relying on financing denominated in foreign currencies such as the US dollar or euro. Currency depreciation can erode project returns and increase debt-servicing costs, discouraging international investors and raising the cost of capital. [8]

The absence of deep derivatives and hedging markets remains one of the main financial constraints facing developing economies. Without effective instruments to manage currency and interest-rate risks, infrastructure projects that are economically viable often become financially unattractive because investors cannot adequately hedge against macro-financial volatility. Well-functioning derivatives markets—including forwards, futures, swaps, and options—help address these risks by allowing governments and firms to lock in future exchange rates or borrowing costs, thereby reducing uncertainty and improving investment viability. This reduces uncertainty in trade, investment, and debt management while lowering financing costs and strengthening macroeconomic resilience.

By providing effective risk-management instruments, these markets improve access to local currency financing, enhance investor confidence, facilitate cross-border capital flows, and support long-term investment in productive sectors and sustainable infrastructure. However, many developing economies continue to lack the legal, regulatory, and institutional foundations required for efficient derivatives markets, including standardized contractual frameworks, effective insolvency and close-out netting arrangements, transparent market regulations, and sufficient financial market infrastructure. These constraints limit the use of risk-management instruments, discourage market participation, increase exposure to external financial shocks and exchange-rate volatility, and ultimately constrain sustainable economic growth and development.[9]

The effectiveness of infrastructure investment is constrained by deficiencies in climate-related data systems. Many countries lack reliable climate-risk assessments, localised vulnerability datasets, and robust Monitoring, Reporting, and Verification (MRV) frameworks. Without credible data and standardised methodologies, investors face uncertainty regarding project performance, climate risks, and expected returns, reducing the flow of public and private finance into sustainable infrastructure sectors.[10]

1.2.3. Institutional and Governance Challenges

Institutional weaknesses remain among the persistent barriers to scaling sustainability. Climate finance architecture is highly fragmented, with more than 80 international climate funds operating under diverse eligibility criteria, reporting requirements, and access procedures. This fragmentation generates transaction costs and administrative burdens that disproportionately affect countries with limited technical and institutional capacity.[11]

At the national level, governance challenges complicate implementation. Responsibilities for climate policy and sustainable infrastructure development are dispersed across multiple ministries and agencies, resulting in overlapping mandates, weak coordination mechanisms, and inconsistent policy priorities. In many developing countries, climate considerations remain insufficiently integrated into national development planning, public investment frameworks, and budgetary processes.

Capacity limitations affect project preparation and execution. Governments struggle to develop bankable projects that meet the fiduciary, environmental, and social safeguards required by major climate funds and multilateral development institutions. Limited technical expertise, weak project pipelines, and inadequate institutional coordination slow disbursement and reduce the absorption capacity of available finance. Regulatory uncertainty, governance weaknesses, and macroeconomic instability deter private-sector participation. As a result, multilateral development banks have mobilised less than US$0.30 of private investment for every public dollar committed, highlighting the difficulty of leveraging private capital at the scale required for sustainable transformation.[12]

These financing, infrastructure, and governance constraints illustrate that the challenge of scaling sustainability in emerging economies is structural rather than financial. Addressing these barriers requires coordinated reforms that strengthen institutions, improve infrastructure systems, reduce investment risks, expand concessional finance, and create effective mechanisms for mobilising domestic and international private capital. Such reforms are essential for enabling emerging economies to pursue climate-resilient growth while advancing the SDG targets.

1.3 The Case of Egypt: Transition Under Constraints

Egypt has emerged as a regional leader in integrating sustainability into national development planning through a comprehensive framework that combines green investment, climate finance, and institutional reforms. Under the Economic and Social Development Plan for FY 2025/2026, Egypt aims to allocate EGP 637 billion to green projects, representing 55 percent of total public investments, compared with only 15 percent in FY 2020/2021. Of these investments, 64 percent are directed towards climate change mitigation and 36 percent towards adaptation measures, reflecting a more balanced approach to addressing both emissions reduction and climate resilience. The government further targets increasing the share of green public investments to 60 percent by FY 2026/2027 while improving its Climate-Resilient Public Investment Assessment Index score from 1.53 in 2022/2023 to 1.8 in

2025/2026. Priority sectors include green transportation, which accounts for 64 percent of green investments, followed by the Haya Karima rural development initiative (13 percent) and sustainable urban development projects (10 percent).[13]

Egypt's sustainability agenda is supported by an expanding ecosystem of climate finance and policy instruments. The country has prioritised innovative financing mechanisms, including sovereign green bonds, green sukuk, concessional climate finance, and broader private-sector participation in sustainable investments. These efforts are guided by the National Climate Change Strategy 2050. The strategy promotes renewable energy expansion, including solar, wind, and green hydrogen projects, the localisation of environmentally friendly technologies, climate-resilient infrastructure, and enhanced adaptation measures in vulnerable sectors. It also emphasises integrating climate considerations into public policies, strengthening climate governance, mobilising financial incentives for green projects, and expanding research, innovation, and technology transfer.[14]

1.4 The Case of China: Scaling Through State–Market Coordination

China's sustainability experience is relevant to this discussion because it shows how green transition can move from project-level experimentation to system-level deployment. China's approach has relied on a combination of long-term planning, infrastructure investment, industrial policy, market competition, and technological upgrade. This does not mean that the Chinese model can be mechanically replicated elsewhere—national conditions differ. However, it does offer useful lessons on how sustainability can be scaled through coordination between the state and the market.

The first lesson is the importance of long-term policy direction. China has integrated energy transition, industrial upgrade, and infrastructure development into national development planning. Clear policy signals have helped mobilise investment in renewable energy, power grids, electric vehicles, batteries, and green manufacturing. According to China's National Energy Administration, China added 373 million kilowatts of renewable energy capacity in 2024, and renewable energy accounted for about 56 percent of the country's total installed power generation capacity. By the end of 2025, China's total installed renewable capacity had exceeded 1,800 GW, with more than 430 GW of new wind and solar capacity added in that year. These figures illustrate the scale at which renewable deployment has become part of China's broader energy system. For agriculture- and services-heavy economies, long-term policy direction can similarly coordinate investment in climate-resilient irrigation, water management, agricultural storage and cold chains, digital infrastructure, resilient transport, public health and disaster-preparedness systems. The sectors may differ, but the need for credible and consistent policy signals remains the same.

The second lesson is the role of industrial capacity. Sustainability becomes scalable when clean technologies are affordable, available, and supported by supply chains. China's large domestic market enabled firms to reduce costs, improve technology and expand production in solar photovoltaics, wind power, batteries, electric vehicles, and grid equipment. For emerging economies such as Egypt, this creates opportunities for cooperation not only in importing equipment, but also in developing local manufacturing, technical training, and maintenance capacity. However, local capacity building need not be equated with large-scale industrialisation. Countries may participate in green value chains through equipment installation and maintenance, agricultural processing, renewable-powered cold storage, climate-smart farming services, software, engineering, sustainable tourism and green finance. The broader lesson is to identify areas in which domestic firms and workers can absorb technology and capture a larger share of the value generated by green investment.

The third lesson is infrastructure integration. Renewable energy cannot be scaled without grids, storage, dispatch systems, and demand-side management. China's experience shows that renewable energy deployment must be coordinated with transmission networks, energy storage, digital power systems, and industrial demand. This lesson is highly relevant for Egypt, where renewable energy ambitions are closely linked to grid expansion, industrial zones, green hydrogen, ports, and export-oriented energy corridors. In agriculture-dependent economies, renewable power needs to be connected with irrigation, groundwater management, food processing, storage, and rural transport. In services-heavy economies, resilient electricity and digital networks are essential for tourism, finance, healthcare, education, and information services. Green infrastructure should therefore be designed around each country's productive structure rather than around a single model of industrial development.

The fourth lesson is the link between green transition and development. China's green transformation is not limited to climate policy. It is also related to industrial modernisation, employment, regional development, and technological competitiveness. This is important for BRICS cooperation. If sustainability is framed only as emissions reduction, it may appear as a burden for developing countries. If it is framed as a pathway to infrastructure upgrades, energy security, industrial capacity, and job creation, it becomes more aligned with development priorities. For countries highly dependent on agriculture or services, this developmental framing should also encompass food and water security, rural livelihoods, climate-resilient tourism, public health, and protection against disaster-related income losses. Because these economies are often directly exposed to droughts, floods, extreme heat and ecosystem degradation, adaptation and resilience may be as important as emissions mitigation.

China–Egypt cooperation already reflects some of these features. The Central Business District project in Egypt's New Administrative Capital, built by China State Construction Engineering Corporation, includes 20 towers and the 385-meter Iconic Tower. Beyond its symbolic value, the project illustrates China's role in large-scale urban infrastructure delivery and training of local engineers. The China–Egypt TEDA Suez Economic and Trade Cooperation Zone also provides a platform for industrial cooperation, linking manufacturing, logistics and access to regional markets. These cases show that sustainability cooperation should not be limited to energy projects alone. It should integrate urban infrastructure, industrial zones, logistics, energy systems and human capital.

2. Relevance for BRICS: From National Experiences to Collective Opportunity

2.1 Why BRICS Matters for Scaling Sustainability

The growing importance of BRICS in the global sustainability agenda stems from its centrality to the future of energy transition, infrastructure development, climate governance, and SDGs implementation. As the global economy undergoes a structural transformation towards low-carbon and resilient development pathways, BRICS countries increasingly occupy the core of both the sustainability challenge and its potential solutions. This is particularly evident when examining the concentration of global population, emissions, energy demand, urbanisation pressures, and infrastructure investment needs within BRICS and the broader Global South.[15]

Collectively, the expanded BRICS grouping represents nearly half of the world's population and an increasing share of global economic output. The inclusion of countries such as Egypt, the UAE, Ethiopia, and Iran has strengthened its demographic and geoeconomics significance.[16] BRICS economies also account for a substantial share of global greenhouse gas emissions (42 percent in 2016), industrial production, and energy consumption, making them key actors in global decarbonisation strategies. Recent analyses highlight BRICS' growing role in net-zero discussions as members face challenges related to industrialisation, development financing, energy security, and climate adaptation.[17]

The sustainability challenge confronting BRICS is fundamentally developmental in nature. Unlike advanced economies whose infrastructure systems have reached maturity, many BRICS and partner economies continue to experience massive deficits in transport, energy, water, sanitation, housing, and digital infrastructure. According to the World Bank, emerging markets and developing economies require approximately US$1.5 trillion annually in infrastructure investment to meet SDG and climate objectives, equivalent to roughly 4.5 percent of their combined GDP. Yet existing financing flows remain far below these requirements, leaving an estimated infrastructure financing gap of around US$700 billion annually.[18]

This infrastructure financing gap is particularly consequential because the investment decisions made during the current decade will shape development trajectories, emissions pathways, and climate resilience for decades to come. Infrastructure assets—including power systems, transport networks, industrial facilities, ports, and urban infrastructure—typically operate for 30–50 years or longer, creating persistent patterns of energy use, emissions, and resource consumption. Consequently, financing carbon-intensive infrastructure can lock countries into high-emission development pathways, increasing future mitigation costs and limiting policy flexibility. Conversely, directing financial flows toward renewable energy, energy-efficient transport, resilient water systems, climate-smart urban infrastructure, and digital connectivity enables countries to avoid carbon lock-in while advancing the Sustainable Development Goals (SDGs), strengthening climate resilience, and supporting long-term, inclusive economic growth. Given the scale of infrastructure demand and the rapid pace of infrastructure expansion across BRICS economies, the bloc represents a pivotal arena for sustainability governance. The infrastructure choices and financing decisions made today will therefore shape not only national development outcomes but also the global transition towards a low-carbon and climate-resilient economy.[19]

At the same time, BRICS countries face a structural asymmetry within existing global governance institutions. Despite their growing contribution to global GDP, trade, manufacturing, and population, developing economies continue to possess relatively limited influence within major multilateral financial institutions such as the International Monetary Fund (IMF) and the World Bank. This imbalance has become an increasingly important political driver behind BRICS cooperation. Recent BRICS ministerial statements and summit declarations have need for reforming IMF quota systems, voting rights, and leadership selection mechanisms in order to better reflect the realities of the contemporary global economy.[20]

The demand for governance reform directly affects sustainability financing and development priorities. Current global financial governance structures were largely designed in the post-Second World War era and remain insufficiently aligned with the financing needs of emerging economies facing simultaneous development and climate pressures. Many developing countries continue to encounter high borrowing costs, limited access to concessional finance, currency volatility, and restrictive investment conditions.[21] *Reuters* and World Bank reporting in 2024–2025 highlighted that foreign direct investment flows into developing economies declined to their lowest levels in nearly two decades, exacerbating financing constraints for infrastructure and climate projects. [22]

In this context, BRICS increasingly presents itself as a platform for promoting alternative development financing mechanisms and more equitable forms of multilateral cooperation. Institutions such as the New Development Bank have emerged as important instruments for mobilising infrastructure and sustainable development finance across emerging economies. Recent financing operations, including infrastructure lending in South Africa and discussions around new guarantee mechanisms for developing economies, illustrate the bloc's attempt to expand access to long-term development finance outside traditional Western-dominated financial structures. [23]

BRICS cooperation has become relevant within the broader geopolitical transition towards a multipolar global economy. The fragmentation of global trade, supply chains, and investment flows has intensified the importance of South-South cooperation frameworks capable of supporting industrial resilience, technological upgrade, and sustainable infrastructure development. The bloc's emphasis on local currency trade, development banking, technology partnerships, and infrastructure connectivity reflects an effort to reduce structural vulnerabilities associated with dependence on external financial systems and volatile global capital markets. [24]

Importantly, BRICS reframes sustainability as a developmental opportunity rather than solely an environmental obligation. For developing economies, the energy transition cannot be separated from industrialisation, employment creation, infrastructure modernisation, and poverty reduction. This perspective is significant for African and Middle Eastern members such as Egypt, which seek to expand energy access, attract green investment, strengthen logistics connectivity, and develop sustainable industrial ecosystems. BRICS provides a framework for emerging economies to pursue development pathways aligned with their structural realities and national priorities. Ultimately, its importance lies in its economic scale, future infrastructure demand, and role in global governance reform, making it a key factor in shaping sustainable development governance.

2.2. Complementarities within BRICS

Egypt and Similar Economies as Implementation Platforms

A defining characteristic of the expanded BRICS is the diversity and complementarity of its member economies. BRICS derives much of its strategic relevance from the differentiated capabilities, resource endowments, market structures, and development trajectories of its members. This diversity creates opportunities for mutually reinforcing cooperation in infrastructure development, industrial transformation, energy transition, logistics integration, and sustainable finance. Within this broader architecture, countries such as Egypt have a key role as implementation platforms capable of translating large-scale investment flows and strategic partnerships into operational sustainability outcomes across Africa, the Middle East, and the Mediterranean region.

Implementation platforms are increasingly significant because the sustainability challenge is no longer confined to financing alone. Many emerging economies possess access to investment pledges, climate commitments, and development partnerships, yet continue to face constraints related to institutional coordination, project preparation, logistics integration, and execution capacity. Strategically positioned middle economies such as Egypt bridge capital-exporting economies, regional markets, and infrastructure demand centres. Their value lies not only in market size, but also in their ability to operationalise regional connectivity and accelerate implementation at scale.

Egypt's strategic importance within BRICS stems first from its geographic positioning at the intersection of Africa, the Middle East, Europe, and Asia. The country hosts one of the world's most important maritime trade corridors through the Suez Canal, which facilitates approximately 12-15 percent of global trade flows and up to 30 percent of container traffic.[25] Egypt plays a key role in international supply chains and sustainable logistics. Its location also strengthens its potential as a manufacturing, logistics, and energy hub linking BRICS production networks with African and European markets.

Egypt has notably expanded green public investment between FY 2020/2021 and FY 2025/2026, with a growing focus on climate-related projects, including renewable energy, green hydrogen, and sustainable transport. [26] The country's renewable energy strategy aims to substantially increase the share of renewables within the national energy mix while simultaneously positioning Egypt as a future exporter of clean energy and green fuels. These initiatives align closely with broader BRICS priorities related to energy security, industrial decarbonisation, and resilient infrastructure systems.

Egypt is an increasingly attractive platform for infrastructure deployment because of its large domestic market, ongoing mega-projects, and developed institutional coordination mechanisms. The country has invested in ports, industrial zones, transport corridors, electricity networks, and digital infrastructure during the past decade. Such investments create ecosystems and support regional manufacturing partnerships and facilitating technology transfer. In sustainability terms, this transforms Egypt into a practical implementation environment where climate finance, industrial policy, and infrastructure modernisation can converge within operational projects rather than remaining confined to policy commitments Its renewable energy strategy aims to raise renewables to 42 percent of electricity generation by 2030, compared with around 12 percent currently.[27]

The complementarity between Egypt and larger BRICS economies, particularly China, creates opportunities for renewable energy manufacturing, infrastructure engineering, industrial financing, electric mobility, and large-scale project execution. Egypt, meanwhile, offers strategic location advantages, market accessibility, preferential trade agreements with African and Arab economies, and growing infrastructure readiness. Together, these factors create conditions for mutually beneficial cooperation centered on industrial localisation, green infrastructure deployment, and regional value chain integration.

China–Egypt cooperation has increasingly shifted towards large-scale sustainable infrastructure and clean energy projects that align with Egypt's Vision 2030 and the Belt and Road Initiative (BRI). One of the most useful examples is the 1.1 GW Suez Wind Energy Project, where Power Construction Corporation of China (PowerChina) serves as the Engineering, Procurement and Construction (EPC) contractor.[28] The project, located in the Gulf of Suez, represents Egypt's largest onshore wind farm, with an expected annual electricity generation of approximately 4.3 TWh, sufficient to supply more than one million households while avoiding nearly 2.4 million tons of CO_2 emissions annually. Construction accelerated following the EPC contract awarded to PowerChina in late 2024, reinforcing China's growing role in Egypt's renewable energy transition and supporting the country's target of expanding renewable electricity generation.[29]

Beyond renewable power generation, bilateral cooperation has expanded through the China–Egypt TEDA Suez Economic and Trade Cooperation Zone in the Suez Canal Economic Zone (SCZone), which has become one of the flagship sustainable industrial platforms under the Belt and Road Initiative. In 2025, both countries agreed on a US$100-million infrastructure expansion covering approximately 2.86 km², aiming to attract advanced manufacturing, renewable energy industries, electric vehicle supply chains, and green technology investments.[30] The zone has emerged as a strategic hub for sustainable industrialisation by integrating modern infrastructure, low-carbon manufacturing, and logistics connectivity, thereby strengthening Egypt's role as a regional production and export gateway linking Africa, Europe, and Asia.

Such complementarities reflect global economy shifts. Rising geopolitical tensions, trade fragmentation, and tighter financing conditions drive the diversification of manufacturing and logistics networks. *Reuters* and World Bank reporting between 2024 and 2025 emphasised that developing economies face increasing financing pressures alongside declining foreign direct investment flows, making regional cooperation and blended finance mechanisms increasingly important. Within this environment, implementation platforms such as Egypt become critical because they reduce transaction costs, improve regional connectivity, and enhance the bankability of infrastructure and industrial projects.

South-South cooperation within BRICS supports technology diffusion and institutional learning in areas such as renewable energy deployment, digital infrastructure, industrial policy design, smart logistics, and climate adaptation technologies. This is particularly relevant for countries seeking to industrialise while avoiding carbon-intensive development pathways. Emerging evidence on BRICS climate governance suggests that cooperation among developing economies is becoming an increasingly important channel for scaling renewable energy systems and sustainable infrastructure investment.

For Egypt and comparable economies, BRICS participation goes beyond diplomatic alignment; it provides access to development finance, infrastructure partnerships, technology ecosystems, and alternative governance platforms capable of supporting long-term structural transformation. Its focus on local-currency financing, infrastructure guarantees, and multilateral development banking can also reduce exposure to financial volatility and foreign-exchange pressures, facilitating infrastructure investment and sustainable development.

Other BRICS members

Other BRICS members can add complementary strengths. Brazil offers experience in bioenergy, hydropower, agriculture and climate-related land-use governance. India brings experience in digital public infrastructure, solar deployment and large-scale development programs. South Africa provides regional experience in African energy transition and mineral value chains. The UAE has strengths in logistics, finance, renewable investment and green hydrogen. The New Development Bank can provide project finance for infrastructure and sustainable development, while newer BRICS members can bring additional regional perspectives and project pipelines.

2.3 Strategic Opportunities

The existing complementarities within BRICS create opportunities that extend beyond individual infrastructure projects. First, cooperation could support the development of integrated green industrial value chains through common standards, joint research, and the localisation of clean technologies across member economies, allowing countries such as Egypt to move from project implementation toward higher-value manufacturing and technology development. Second, existing connectivity between BRICS economies could evolve into cross-border infrastructure corridors based on interoperable electricity, transport, logistics, and digital systems, creating more integrated regional markets rather than isolated national projects. Third, the growing infrastructure and climate-financing gap creates an opportunity to develop a more structured South–South climate-finance architecture, combining BRICS development banks, local-currency instruments, guarantees, and project-preparation facilities to make complex regional projects more bankable. These opportunities would allow BRICS to move from cooperation based primarily on individual investments toward deeper integration of industrial, infrastructure, and financial systems.

2.4 Risks and Trade-offs

Scaling sustainability through BRICS cooperation also involves risks that should be addressed carefully.

The first is debt sustainability. Large infrastructure and energy projects require long-term finance, but many emerging economies face fiscal pressure and high borrowing costs. Sustainability projects should therefore be assessed not only by climate benefits, but also by revenue generation, repayment capacity, social impact and long-term maintenance costs. Development finance should avoid adding unsustainable debt burdens.

The second risk is technology dependency. Cooperation should not be limited to equipment supply. If emerging economies only import technologies without building local capabilities, green transition may create new forms of dependency. China–Egypt cooperation should therefore emphasise co-development, local training, joint research, industrial localisation and maintenance capacity.

The third risk is governance asymmetry. Large projects often involve multiple actors, including governments, state-owned enterprises, private investors, development banks and local communities. Without transparent rules and effective coordination, project implementation may face delays, cost overruns or social concerns. Sustainability cooperation should therefore include clear standards for feasibility studies, environmental and social assessment, procurement, monitoring and local participation.

The fourth risk is fragmented standards. BRICS countries may use different green taxonomies, ESG metrics, project evaluation methods and data systems. This can make it difficult to compare projects or mobilise finance. However, standardisation should be gradual and voluntary. BRICS should not create rigid rules that ignore national circumstances. Instead, it can develop reference frameworks, share methodologies and encourage mutual learning.

3. Recommendations for BRICS

3.1 Enhancing Financial Integration and Development Financing

BRICS can strengthen development finance for sustainable infrastructure within existing institutional frameworks. The New Development Bank can continue to support infrastructure and sustainable development projects in a prudent and balanced manner. Priority can be given to projects that combine climate benefits with development impact, such as renewable energy, grid modernisation, water systems, public transport, logistics corridors and resilient urban infrastructure. For countries such as Egypt, project preparation support is especially important. Many sustainable infrastructure projects fail not because they lack strategic value, but because they are not sufficiently bankable. BRICS can therefore support feasibility studies, environmental assessment, financial structuring and risk mitigation.

BRICS can promote blended and local-currency financing where conditions are mature. Sustainability projects often require long payback periods. Blended finance can help mobilize public, private and development finance, but it should be used carefully to avoid transferring excessive risks to public balance sheets. Local-currency financing can reduce currency mismatch, especially when project revenues are generated domestically. Such cooperation should remain voluntary, market-oriented and consistent with national financial regulations.

3.2 Advancing Joint Infrastructure and Energy Cooperation

BRICS can develop a voluntary pipeline of bankable green infrastructure projects by using the New Development Bank and national development banks to support feasibility studies, risk assessment, and financial structuring. Blended finance tools, including guarantees and co-financing, can help attract private investment and address Egypt's estimated climate-finance gaps of US$153.5 billion for mitigation and US$94.7 billion for adaptation.[31]

China–Egypt cooperation provides a practical model, with US$15.6 billion in agreements in the Suez Canal Economic Zone and framework agreements of up to US$64 billion for green hydrogen projects.[32] These partnerships can support renewable-energy manufacturing, grid modernisation, and green industrial zones, while successful pilot projects can be adapted across BRICS economies through shared standards and knowledge exchange.

3.3 Promoting Technology Transfer and Industrial Partnerships

BRICS can establish a voluntary platform for renewable-energy cooperation by creating mechanisms for technology exchange, joint research programmes, and industrial partnerships among member countries. The platform could support knowledge sharing, capacity building, and collaboration between public institutions and private companies in areas such as renewable energy technologies, energy storage, smart grids, green hydrogen, and industrial efficiency. China–Egypt cooperation provides a practical example of how such collaboration can move from individual projects toward technology localisation and the development of regional green value chains serving African, Arab, and BRICS markets.

3.4 Strengthening Institutional Coordination and Governance Mechanisms

BRICS cooperation on green taxonomies, ESG indicators, environmental safeguards, and project monitoring can be strengthened through voluntary alignment mechanisms that allow countries to share standards and improve transparency without imposing a single regulatory model. Egypt's existing frameworks, including the NCCS 2050, the National Water Resources Plan 2050, NWFE, and NISGP, which maps green projects across all 27 governorates, provide a practical basis for applying these mechanisms. Such coordination would improve project comparability, facilitate access to climate finance, and maintain national policy flexibility.

3.5 Establishing China–Egypt Cooperation as a Pilot Model for BRICS Engagement

China–Egypt cooperation provides a practical pilot model for BRICS climate and infrastructure partnerships by combining renewable-energy technology, infrastructure expertise, and blended finance with Egypt's existing climate priorities under the NWFE program. This cooperation can be operationalised through project-based partnerships that mobilise concessional finance, equity participation, guarantees, and private investment to reduce risks and improve project bankability. The experience gained from China–Egypt projects could then be adapted across BRICS economies in areas such as renewable energy, water management, sustainable transport, industrial efficiency, and climate-resilient infrastructure.

Conclusion

China–Egypt cooperation demonstrates that South–South partnerships can extend beyond traditional infrastructure financing to support integrated pathways for sustainable development. By combining China's technological capabilities, industrial expertise, and infrastructure investment with Egypt's strategic geographic location and national sustainability agenda, the partnership provides a practical model for advancing renewable energy, green industrialisation, and resilient infrastructure within the broader BRICS framework.

As BRICS continues to strengthen its role in global sustainable development governance, scaling such collaborative initiatives can enhance climate resilience, accelerate low-carbon economic transformation, and contribute to achieving the Sustainable Development Goals while fostering more inclusive and balanced development across emerging economies.

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Endnotes

1 United Nations Environment Programme (UNEP), *Adaptation Gap Report 2025: Running on Empty—The World Is Gearing Up for Climate Resilience without the Money to Get There*. Nairobi: United Nations Environment Programme 2025, https://doi.org/10.59117/20.500.11822/48798

2 *Adaptation Gap Report 2025: Running on Empty—The World Is Gearing Up for Climate Resilience without the Money to Get There*.

3 Climate Policy Initiative, *Global Landscape of Climate Finance 2025*, San Francisco: Climate Policy Initiative, 2026, https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2025/.

4 Information and Decision Support Center (IDSC), *Advancing Climate Finance in Egypt*, *The BRICS and the Global South: Policy Perspectives Series*, 1st ed. (Cairo: Egyptian Cabinet, 2025), https://idsc.gov.eg/upload/DocumentLibrary/AttachmentA/11130/Advancing%20Climate%20Finance%20in%20Egypt-%20s.pdf.

5 *Global Landscape of Climate Finance 2025*.

6 Beata Cichocka and Ian Mitchell, "Climate Finance Effectiveness: Six Challenging Trends," *CGD Policy Paper* 281 (Washington, DC: Center for Global Development, 2022), https://www.cgdev.org/sites/default/files/climate-finance-effectiveness-six-challenging-trends.pdf.

7 IDSC, *Advancing Climate Finance in Egypt*, 37.

8 OECD, *OECD DAC Blended Finance Guidance 2025: Supporting Sustainable Development and Climate Action* (Paris: OECD Publishing, September 22, 2025), https://doi.org/10.1787/e4a13d2c-en.

9 World Bank Group, "World Bank Group and ISDA Join Forces to Strengthen Derivatives Markets in Developing Economies," *World Bank*, July 15, 2026, https://www.worldbank.org/en/news/press-release/2026/07/15/world-bank-group-and-isda-join-forces-to-strengthen-derivatives-markets-in-developing-economies

10 IDSC, *Advancing Climate Finance in Egypt*, 38.

11 Organisation for Economic Co-operation and Development (OECD), *Scaling Up Adaptation Finance in Developing Countries: Challenges and Opportunities for International Providers*, Green Finance and Investment (Paris: OECD Publishing, 2023), https://doi.org/10.1787/b0878862-en.

12 Mahmoud Mohieldin, Bogolo Kenewendo, and Reuben Wambui, "Breaking Financing Barriers for Just Climate Transition in Africa," *CGD Note* 351 (Washington, DC: Center for Global Development, 2023), https://www.cgdev.org/sites/default/files/breaking-financing-barriers-just-climate-transition-africa.pdf

13 Ministry of Planning, Economic Development and International Cooperation, "Ministry of Planning, Economic Development and International Cooperation Reviews National Priorities and Egypt's Strategy for Addressing Climate Change and Transitioning to a Green Economy within the 2025/2026 Plan," September 17, 2025, https://www.mped.gov.eg/singlenews?id=6553&lang=en

14 “Ministry of Planning, Economic Development and International Cooperation Reviews National Priorities and Egypt›s Strategy for Addressing Climate Change and Transitioning to a Green Economy within the 2025/2026 Plan.”

15 Oluwatobi Mary Owojori and Emem Anwana, “Climate Governance in the BRICS: Pathways toward Net-Zero Emissions,” *Discover Sustainability* 6, no. 1 (2025): 359, May 2, 2025, https://doi.org/10.1007/s43621-025-01181-1

16 Owojori and Anwana, “Climate Governance in the BRICS: Pathways toward Net-Zero Emissions.”

17 Owojori and Anwana, “Climate Governance in the BRICS: Pathways toward Net-Zero Emissions.”

18 World Bank, “Scaling Sustainable Infrastructure: Harnessing Private Capital through Pooled Investment Vehicles,” October 16, 2024, https://www.worldbank.org/en/events/2024/10/16/high--level-panel-on-pooled-investment-vehicles

19 OECD, The World Bank, and United Nations Environment Programme. *Financing Climate Futures: Rethinking Infrastructure*. Paris: OECD Publishing, 2018, https://doi.org/10.1787/9789264308114-en.

20 ORF, NIIA, ORF, and SAIIA, “The BRICS Summit 2025: The Challenge to Find Common Ground.” Council on Foreign Relations, July 23, 2025, https://www.cfr.org/councilofcouncils/global-memo/the-brics-summit-2025-the-challenge-to-find-common-ground/

21 Karin Strohecker, Jorgelina Do Rosario, and Libby George, “World Bank: Emerging Economies Must Grow ‘Much Faster’ to Repay Debt,” *Reuters*, February 21, 2024, https://www.reuters.com/markets/emerging/world-bank-warns-emerging-economies-need-grow-much-faster-repay-debt-2024-02-21/.

22 Strohecker, Do Rosario, and George, “World Bank: Emerging Economies Must Grow ‘Much Faster’ to Repay Debt;” Andrea Shalal, “Investment Flows in 2023 into Developing Countries at Lowest Since 2005, World Bank Says,” *Reuters*, June 16, 2025, https://www.reuters.com/world/china/investment-flows-2023-into-developing-countries-lowest-since-2005-world-bank-2025-06-16/

23 South Africa’s Transnet Gets 5 bln Rand Loan from BRICS Bank,” *Reuters*, August 30, 2024, https://www.reuters.com/world/africa/south-africas-transnet-gets-5-bln-rand-loan-brics-bank-2024-08-30/

24 “The BRICS Summit 2025: The Challenge to Find Common Ground.”

25 Cubic, “Suez Canal Reopening: What It Means for Freight Rates in 2026,” *Cubic*, January 6, 2026, https://www.gocubic.io/blog/suez-canal-reopening-2026-freight-rates

26 “Ministry of Planning, Economic Development and International Cooperation Reviews National Priorities and Egypt›s Strategy for Addressing Climate Change and Transitioning to a Green Economy within the 2025/2026 Plan.”

27 OECD, *Efficient and Sustainable Infrastructure in Egypt: Advancing Service Delivery, Green Transition and Private Investment* (Paris: OECD Publishing, May 4, 2026), https://doi.org/10.1787/d6e57f17-en.

28 Power Construction Corporation of China (PowerChina). (2025). PowerChina to build Egypt's largest onshore wind power project. https://epaper.chinadaily.com.cn/a/202501/07/WS677c6d8aa3105c25b38f16ca.html.

29 T El Kady, *Powering the Green Transition: China's Growing Role in Egypt's Renewable Energy Sector*, https://www.e3g.org/wp-content/uploads/Chinas-Growing-Role-in-Egypts-Renewable-Energy-Sector.pdf.

30 *Powering the Green Transition: China's Growing Role in Egypt's Renewable Energy Sector*, 18.

31 Egypt's National Climate Change Strategy (NCCS) 2050, https://www.eeaa.gov.eg/Uploads/Topics/Files/20221206130720583.pdf

32 Michèle Labrut, "Suez Canal Signs $15.6 Billion Deal to Produce Green Hydrogen," Seatrade Maritime, November 8, 2023, https://www.seatrade-maritime.com/green-shipping/suez-canal-signs-15-6-billion-deal-to-produce-green-hydrogen; Waleid Gamal El-Din, "Suez Canal Economic Zone Secures $64 bn in Green Hydrogen Investments," *Daily News Egypt*, December 23, 2024, https://www.dailynewsegypt.com/2024/12/23/suez-canal-economic-zone-secures-64bn-in-green-hydrogen-investments/

The India-UAE Energy Synergy: Templates of Cooperation for BRICS and the Global South

Cauvery Ganapathy and Mohamed AlZarouni

Abstract

THE INDIA-UNITED ARAB EMIRATES (UAE) energy partnership is moored in an energy pragmatism that pursues decarbonisation while recognising that the imperatives of energy security also argue for legacy oil and gas ecosystems. This mutually beneficial bilateral energy partnership recognises the need for new energy systems to be strengthened before dismantling old hydrocarbon pathways. Within the Global South ecosystem, nations often have to balance their growth targets with the pressures of energy access, energy security, industrial development, and climate change considerations. The expanding India-UAE energy partnership offers a template for energy cooperation in these geographies, particularly among BRICS+ member states, many of which are among the world's fastest-growing economies and have increasing energy needs. It serves as a model case study for the adoption of energy cooperation by demonstrating that energy security, energy resilience, and the energy transition can be better achieved through parallel rather than sequential pathways.

Introduction

India and the UAE recognise that resilient hydrocarbon ecosystems remain central to the pursuit of industrial development, reliable and affordable energy provision, and systems dependability. In a policy firmament of stark choices and prescriptions, this measured nuance anchors the unique and comprehensive energy partnership between the two countries. The distinct national and economic circumstances of both countries have shaped energy policies that emphasise security, resilience, diversification, and decarbonisation.[1] The two countries share a pragmatic view regarding the timelines and objectives of their energy strategies, coupled with strategic alignment in their structured approaches to managing a gradual transition from hydrocarbons while ensuring socially inclusive growth and long-term development investment.[a] This convergence lays the foundations for a bilateral partnership underpinned by energy pathways that balance legacy hydrocarbon systems and the rapidly emerging renewable energy ecosystems.

This convergence does not imply identical energy profiles. The UAE has traditionally positioned itself as a major hydrocarbon producer and exporter, while recently emerging as an active clean-energy player. India, in contrast, is a rapidly growing energy consumer whose remarkable development trajectory continues to generate increasing demand for energy imports, supplemented by domestic deployment of alternative energy sources. Therefore, both states approach the same transition from different starting points. At the same time, differences in resource availability, infrastructure, production, and consumption will see both states pursue distinct strategies in achieving their transition commitments.

The multifaceted nature of this energy partnership is increasingly relevant for BRICS and BRICS partners, as the India-UAE dynamic demonstrates how states with distinct energy profiles and national priorities can collaborate effectively. Despite their differences, the two states have coordinated their

a The official Net Zero commitments of both states (India's Net Zero 2070 and UAE's Net Zero 2050 announcements) take due cognisance of the need for the energy transition while simultaneously utilising hydrocarbon pathways where applicable, to meet their energy security and developmental needs.

actions to address the challenges of maintaining economic continuity through hydrocarbons while pursuing strategies for energy diversification, resilience, and security based on cleaner alternative sources. Furthermore, their shared vision for a low-carbon future, while based on principles of sustainability, rejects disruptive processes involving abrupt energy source substitutions that can adversely impact human and economic security. This balanced approach underwrites the partnership's fundamental value proposition in the pursuit of the Sustainable Development Goals (SDGs). It offers a useful template that resonates across the diverse contexts of the Global South, in general, and the BRICS+ grouping in particular.

The increasing energy demand among BRICS+ member states, many of which are among the world's fastest-growing economies, will greatly affect efforts to triple global renewable energy capacity by the 2030s.[2] The UAE's active role as an energy and infrastructure investor, combined with India's status as one of the world's fastest-growing economies with a burgeoning energy demand, places this partnership at the forefront of a transition agenda that balances ambition with realism.

Driven by India's near-universal electrification of its large population and the UAE's planned data-centre-focused Fourth Industrial Revolution, the two nations are poised to adopt pathways that can substantially impact the trajectory of the global energy transition. By demonstrating how energy security mechanisms can be integrated into emerging clean energy value chains and industrial strategies to support a more durable transition pathway, the India-UAE partnership provides a model for energy security that aligns with three specific SDGs: clean water and sanitation (SDG 6), affordable and clean energy (SDG 7), and climate action (SDG 13).

By harnessing their respective strengths, India and the UAE can leverage their collective influence to advance a broader and more equitable global climate and energy consensus grounded in the principles of energy pragmatism. This article explores whether this bilateral relationship can leverage mutually reinforcing strengths in innovation and technology deployment to scale a framework for energy cooperation focused on security and sustainability across Global South states.

The Enduring India-UAE Energy Partnership

The bilateral energy partnership between India and the UAE has emerged from a broader, multidimensional relationship increasingly defined by mutual interdependence. This is particularly evident in their shared economic expansion and collaboration on joint low-carbon development initiatives.[3]

The Comprehensive Economic Partnership Agreement (CEPA), ratified in 2022,[4] has further embedded bilateral energy cooperation within bidirectional flows of investment, trade, technology, and knowledge exchange, as well as wider geopolitical alignment.[5] This integration is important for alternative energies, supporting a wider strategy to expand non-oil trade to US$100 billion. Article 14.2 specifically notes "energy" as one of the key areas of economic cooperation, while Annexes 2A and 2B outline various cost-reduction mechanisms that can benefit energy-related machinery and equipment.

For India's energy security model, secure access to affordable and reliable energy is key.[6] Rapid economic growth has both catalysed and challenged diversification efforts and the pace of energy infrastructure development. Consequently, despite the pursuit of alternative pathways, hydrocarbons remain indispensable—a balancing act that serves as the keystone of the India-UAE energy partnership.[7] The UAE perceives India's rapid economic growth as conducive to a stable partnership within an increasingly volatile energy market.[8] To India, meanwhile, the UAE is a reliable partner facilitating New Delhi's strategic objective of diversifying its hydrocarbon sources as well as an enduring collaborator that is equally invested across the value-chain of the country's energy ecosystem, whether by way of contributing to India's Strategic Petroleum Reserves or by offering exploration rights to Indian oil companies in the UAE. Thus, cooperation and coordination across hydrocarbon sectors, including long-term LNG contracts and strategic petroleum reserves,[9,10] underscore the joint approach of the two states towards energy security, longevity, and reliability.

Recent agreements between the Abu Dhabi National Oil Company (ADNOC) and Indian partners signal a transition from transactional commodity trade to a more institutionalised framework focused on system resilience, supply reliability, and supply chain optimisation.[11] ADNOC's long-term LNG commitments with IndianOil—in addition to their collaboration on crude, LNG, and LPG storage capacity[12]—illustrate how the partnership increasingly integrates supply security objectives with infrastructure growth and risk management. LNG continues to play a key role in India's transition strategy, serving as a critical bridge fuel that can support both transport and household energy needs. These developments reflect a broader shift in how producer–consumer relationships are evolving—driven by geopolitical uncertainties, a tighter global LNG market, and shifting hydrocarbon demand patterns as both states move towards decarbonisation.

Complementing this enduring partnership between the two countries in the hydrocarbon sector are synergies in the fields of solar energy, nuclear energy, and green hydrogen.

Solar Energy

Renewable energy, particularly solar, represents a vital pathway for the India-UAE energy partnership to extend beyond hydrocarbons into low-carbon investment, infrastructure development, and technological cooperation. While distinct national priorities drive investment in each state, both have structural incentives to accelerate the deployment of utility-scale solar capacity. For India, scaling renewable energy is essential to meeting rapidly increasing electricity demand, supporting large-scale electrification, and advancing towards its 2070 Net Zero target.[13,14] For the UAE, solar development contributes to economic diversification, reinforces the credibility of its climate policies, and aligns with its 2050 Net Zero goal.[15]

The proposed India-UAE subsea grid connection, under feasibility assessment at the time of writing,[16] demonstrates how solar cooperation may evolve beyond individual projects into integrated cross-border energy infrastructure. The proposed grid aims to transmit up to 2GW of electricity across an estimated 1,600 km maritime corridor. In addition to its bilateral benefits, this project can serve as an entry point for India to tap into the wider Gulf Cooperation Council (GCC) grid interconnections to create a potential regional "super grid" extending from India to Egypt, as part of an India-Middle East-Europe Economic Corridor (IMEC) electricity network.

Nuclear Power

Increased nuclear cooperation between India and the UAE adds a layer of strategic complexity and system diversification to their energy cooperation architecture. Given the economic and strategic significance of nuclear energy, cooperation in this sector can further bilateral interdependence and enhance bidirectional capabilities, system reliability, and knowledge-sharing between the two countries. Since nuclear projects have longer construction timelines and require stable, long-term commitments between partners, such a partnership can help forge enduring strategic cooperation between the two states over a multi-decadal timeline.

A coordinated approach to the sourcing of uranium through joint international exploration and offtake agreements could, for instance, serve as a pillar of Indo-Emirati cooperation in the nuclear sector. Such an approach would be particularly relevant to the economic diversification pathways based on the development of energy-intensive data centres that both states are pursuing. Data centres need significant amounts of reliable energy. Nuclear energy can provide the requisite baseload power with relatively low emissions, making it a decisive pillar for future industrial strategies and economic competitiveness considerations of countries such as India and the UAE.

For India, nuclear energy provides firm, low-carbon generation that may further support grid stability as renewable deployment accelerates and electrification deepens, ultimately reducing long-term exposure to imported hydrocarbons.[17] At the same time, the Barakah Nuclear Energy Plant has enabled the UAE to rapidly build national expertise in financing, regulating, constructing, and operating commercial-scale reactors, a capability still uncommon among newer nuclear states.[18] Nuclear power now supplies nearly a quarter of the UAE's electricity,[19] and its strategic importance will likely increase as clean baseload generation becomes vital for energy-intensive sectors such as data centres and advanced industry. In this context, UAE-India nuclear cooperation strategically prioritises knowledge transfer, supply-chain participation, and specialised workforce development rather than direct energy exchange.[20]

In a show of faith in the strength of their strategic alignment as well as India's expertise in the field, the Nuclear Power Corporation of India Limited (NPCIL) has become a key partner for the Emirates Nuclear Energy Corporation

(ENEC). Through a landmark Memorandum of Understanding (MoU), NPCIL has been entrusted with the operations and management[21] of the Barakah nuclear power plant.[22] The two sides have also expressed mutual interest in harnessing the potential of the Sustainable Harnessing and Advancement of Nuclear Energy for Transforming India (SHANTI) Act to explore cooperation in advanced nuclear technologies, including the development and deployment of Small Modular Reactors (SMRs).[23] Leveraging their respective partnerships with industry leaders in the US and France, the UAE and India could extend this cooperation into nuclear commerce with states seeking to deploy safe SMRs.

Recent developments in India point to nuclear power's potential for global expansion. India's three-stage nuclear programme has entered the second stage, with the indigenously developed fast breeder reactors (FBRs) achieving first criticality.[24] These FBRs are expected to breed uranium using domestically available thorium reserves. Since India holds limited uranium reserves but one of the largest thorium reserves in the world, this breakthrough could in the future reduce India's dependence on competitive global uranium markets. While the technology is not yet mature enough to scale, this development has the potential to further strengthen India-UAE cooperation in the sector over the long-term, with India becoming a reliable source of fuel to power potential FBR reactors that the UAE could consider including in its own civilian nuclear energy portfolio.

Green Hydrogen

Green hydrogen development is closely integrated with the energy diversification and decarbonisation strategies of both India and the UAE. There is demonstrable policy alignment between India's National Green Hydrogen Mission[25] and the UAE's National Hydrogen Strategy.[26]

India seeks to reduce fossil fuel imports and achieve an annual production of approximately 10 million metric tons (MMT) of green hydrogen and ammonia. The UAE has simultaneously set a target of 1.3 MMT of low-carbon hydrogen by 2031. Both states benefit from globally competitive levelised production costs: India contributes renewable energy scale for low-cost electrolysis, while the UAE provides advanced infrastructure and export capacity. The UAE–India Hydrogen Task Force serves as the primary institutional platform for scaling technology and strengthening bilateral cooperation.[27]

Actualising the BRICS and BRICS Partners' Value Proposition

Within the expanded BRICS framework, India-UAE energy cooperation illustrates how structurally diverse economies can collaboratively maintain energy system resilience while advancing diversification and decarbonisation. This model is particularly relevant given the grouping's heterogeneity in resource endowments, development trajectories, and energy access levels. The model's broader value lies in extending the benefits of the energy transition to the wider Global South.

This alignment enables cooperation across key areas, including renewable deployment, grid integration, storage, and cross-border clean-energy investments.[28] However, financing remains the focus, with UAE sovereign funds well-positioned to catalyse capital-intensive projects. At the same time, Indian institutions contribute scalable implementation models that link electrification to broader development outcomes. This is achievable through mechanisms such as below-market finance through the IRENA Energy Transition Accelerator Financing Platform.[29] Thus, UAE capital may provide a limited anchor for early-stage finance and attract additional private capital. At the same time, Indian institutions contribute longer-term credit options by leveraging affordable technologies and scalable capabilities.

Globally, approximately 730 million people lack access to electricity.[30] India and the UAE's complementary capabilities can together address this persistent energy poverty by combining cost-efficient innovation and large-scale deployment experience with capital investment, infrastructure development, global financing platforms, and digitisation models that commend themselves to scaling. For instance, this combined approach can enhance energy access in sub-Saharan Africa, which currently accounts for nearly eight out of every 10 people without access to electricity.[31]

Table 1: India's Participation in Initiatives to Improve Energy Access and Climate Resilience in the Global South

Initiative/ Programme	Description	Key Outcomes/Deliverables
International Solar Alliance	Coalition of 120 countries to facilitate the adoption of solar energy by leveraging India's expertise in the sector	Supporting solar energy projects in Africa, Latin America and Asia; Targeting investments of US$1 tn in solar energy by 2030
International Solar Technology Hub	Collaborative platform for R&D focused on advancing solar technology in developing nations.	Indian investment of US$100 mn in research centres working to integrate efficiencies and cost improvements in solar deployment
South-South Cooperation (SSC)	Collaborative partnership with other developing countries on energy efficiency, sustainable development, and climate change	Investment close to US$500 mn through technical assistance in solar energy, energy efficiency, waste management, capacity building
	Tripartite partnership focused on sustainable development through promotion of knowledge exchange and joint initiatives in renewable energy.	US$50 mn for joint project developments in solar and wind energy
Asia-Pacific Renewable Energy Technology Cooperation (APRETEC)	Regional initiative to foster joint project development in clean and renewable energy	US$400 mn for technology transfers and R&D, particularly in the solar and wind energy sector in Sri Lanka, Bangladesh, and Vietnam

Source: Authors' own, based on "Empowering the Global South: India's Leadership in Energy Conservation and Sustainable Development"[32] and MEA official portal[33]

Table 2: UAE's Participation in Initiatives to Improve Energy Access and Climate Resilience in the Global South

Initiative/ Programme	Description	Key Outcomes/Deliverables
Etihad 7 (MASDAR)	Facilitating access to reliable and clean energy to countries in Africa through the raising of public and private sector funds	Provision of clean electricity to 100 mn people in the region by 2035; meeting the UAE's commitment to the UN SDGs; development of renewable energy projects in Angola, Zambia, Uganda, and Tanzania
Development and deployment of Solar Energy in Africa	Solar photovoltaic project to power homes and generate jobs	150MW Quipungo Solar Photovoltaic project in Angola
Deployment of solar energy and storage facilities by MASDAR in Central Asia	Development of solar photovoltaic power plant and battery energy storage	300MW solar photovoltaic plant and 75MWh capacity battery energy storage system in Uzbekistan; US$2 bn investment in Central Asia for clean and renewable energy deployment options
MASDAR, Infinity Power & Hassan Allam Utilities	Development of wind energy to improve energy access and clean energy deployment through green hydrogen	10GW onshore wind project in Egypt; development of 4GW electrolyser capacity by 2030 in Egypt with an output of 480,000 tonnes of green hydrogen annually; MASDAR developing similar projects in Morocco, Mauritania, and Seychelles
Global South Utilities	Improving energy security and reducing reliance on diesel-powered generation	Grid-connected solar photovoltaic power plant in Berbera in the Horn of Africa
Dubai Electricity and Water Authority (DEWA) launching international operations	Sharing the UAE's expertise to meet the US$20 tn energy and water infrastructure demands globally through conventional and renewable energy pathways	Creation of an institutional mechanism to share best practises and technical knowledge to improve energy access globally.
Abu Dhabi Future Energy Company (MASDAR) and Elite Agro	Scalable model for integrating renewable energy into sustainable agriculture	First agricultural photovoltaic (AgriPV) in the MENA region

Source: Authors' own, based on inputs from MASDAR and MOFA portals, Zawya and Utilities Middle East[94]

The pragmatism underpinning the India-UAE partnership in the sector is built on the pillars of energy access, affordability, and efficiency. This value proposition can be further harnessed through targeted investments and the sharing of best practises on issues such as grid modernisation and grid extensions to address outages, technical losses, and access challenges that the Global South commonly contends with. The anticipated risks of such investments could be mitigated by blended finance instruments underwritten by government guarantees, which lowers the cost of capital and makes them more attractive to institutional investors.

In addition to addressing issues of energy access, the partnership is also relevant to energy resilience, particularly in addressing risks related to geopolitical and supply chain disruptions and climate impacts. Cooperation in digital systems, storage, and diversified supply networks can strengthen both hydrocarbon and renewable infrastructure. Longer-term collaboration may extend to nuclear energy, focusing on regulatory development, safety standards, and emerging technologies such as SMRs, leveraging India's technical expertise and the UAE's institutional and financial capacity.

Finally, where the India-UAE energy partnership intersects with the critical minerals sector, investment in energy infrastructure within resource-rich economies can support both supply-chain security and domestic value addition, linking energy cooperation to broader South–South development objectives.

Challenges and Constraints

Despite the distinct merits of the proposed approaches and initiatives that the India-UAE partnership can contribute to, both bilaterally and through multilateral platforms, various constraints warrant further consideration.

First, in addition to their strong bilateral relationship, both India and the UAE maintain an expansive matrix of other bilateral and multilateral alliances. Since nation-states naturally prioritise their own sovereign interests, alignments inevitably shift in response to market conditions, technological disruptions, and evolving geopolitical scenarios. It augurs well, therefore, for the abiding bilateral consensus to recognise that the value of the partnership lies not in an expectation of exclusivity but in deliberate strategic coordination. The diversity of partnerships provides both states with greater strategic flexibility by reducing the risk of excessive interdependence.

Second, while this article has highlighted four specific vectors of coordination in the energy sector, further exploration, such as the infrastructure underpinning the operationalisation of these concepts, can reveal practical constraints. For instance, it is unrealistic to assume that both states will approach all elements with the same degree of enthusiasm and readiness for joint initiatives. A more realistic assumption for a unified energy strategy, therefore, is selective alignment across multiple fronts, with varying degrees of depth across pathways.

Third, adding a BRICS+ dimension to the bilateral relationship, however strong, can introduce complex geopolitical friction. For instance, other BRICS and BRICS partner states may wish to cultivate their own relationships with each of these states or non-BRICS entities. Additionally, the G7 may view the growing partnership as aggressive or competitive and attempt to push back, reminiscent of the counterapproach the group mounted in the critical-minerals space.

Finally, the frameworks between India and the UAE are unique outcomes of a relationship built upon centuries of cooperation. As such, many of these initiatives cannot be directly applied to other contexts. Divergent economic, demographic, and geographical differences between the UAE and other nations can, for instance, pose transferability challenges. The analytical value of this partnership lies not in mechanically replicating its workings but in understanding the underlying dynamics that can be extracted, tailored, and applied across diverse contexts—while the core principles of enablement between states remain the same.

Conclusion

The India-UAE energy partnership demonstrates how two states with distinct energy systems, economic structures, and development priorities can nevertheless build a practical framework for cooperation. Its significance lies not in the absence of differences, but in the ability of both partners to navigate them using their complementary strengths: India's scale, technical capacity, and development experience, and the UAE's role as an energy producer, investor, and infrastructure partner.

This article argues that the partnership offers a credible model of energy cooperation across several fronts, including energy security, low-carbon transition, knowledge exchange, investment, infrastructure resilience, and policy coordination. Rather than treating hydrocarbons, renewables, nuclear energy, hydrogen, and critical minerals as separate agendas, the UAE-India experience shows how diversified energy systems can be built through long-term supply arrangements, clean-energy investment, technical collaboration, and institutional learning. Its broader relevance to BRICS+ and the Global South lies in its operational character.

The partnership does not offer a universal template, nor can it be extrapolated mechanically to states with different financial capacities or energy needs. However, it does demonstrate a set of instructive principles such as matching capital with scale, linking energy access to development, strengthening system resilience, and pursuing decarbonisation without disregarding economic security. In so doing, the India-UAE partnership provides a pragmatic model for managing energy transitions that are economically resilient, technologically diverse, and more responsive to the developmental constraints and priorities of the Global South.

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Endnotes

1 The United Arab Emirates, “The UAE’s Net Zero 2050 Strategy,” The United Arab Emirates’ Government Platform, https://u.ae/en/about-the-uae/strategies-initiatives-and-awards/strategies-plans-and-visions/environment-and-energy/the-uae-net-zero-2050-strategy.

2 UAE Consensus, “Global Renewables and Energy Efficiency Pledge,” COP28 UAE, https://www.cop28.com/en/global-renewables-and-energy-efficiency-pledge.

3 S. Ismail and S. Ahmed, “Economy-wide Impacts of India–UAE CEPA: A CGE Analysis,” *The Indian Economic Journal* 73 (no. 4), May 13, 2024, https://journals.sagepub.com/doi/10.1177/00194662241251511.

4 Ministry of Economy & Tourism UAE, “UAE-India Comprehensive Economic Partnership Agreement,” May 20, 2026, https://www.moet.gov.ae/en/cepa_india.

5 India Brand Equity Foundation, “India UAE Trade,” January 4, 2026, https://www.ibef.org/indian-exports/india-uae-trade.

6 A. Chakrabarti and R.K. Arora, “India’s Energy Security: Critical Considerations,” *Global Business Review* 17 (no. 6), September 28, 2016, https://journals.sagepub.com/doi/10.1177/0972150916660443.

7 R. Agarwal, “India’s Strategic Partnership with the UAE,” *Indian Foreign Affairs Journal* 17 (no. 1/2): 15-28, June 2022, https://www.jstor.org/stable/48745122.

8 L.C. Sim, “The Arab Gulf States in the Asian Energy Market: is the Russia-Ukraine War a Game Changer?,” *Policy Studies* 45 (no. 3-4), November 20, 2023, https://doi.org/10.1080/01442872.2023.2279986.

9 ADNOC Gas, “ADNOC Gas Signs 14-Year LNG Supply Agreement with Indian Oil Corporation,” February 12, 2025, https://adnocgas.ae/en/news-and-media/press-releases/2025/adnoc-gas-signs-14-year-lng-supply-agreement-with-indian-oil-corporation.

10 S&P Global, “UAE Looks to Expand Crude Storage at Indian Strategic Petroleum Reserves,” September 10, 2024, https://www.spglobal.com/energy/en/news-research/latest-news/crude-oil/091024-uae-looks-to-expand-crude-storage-at-indian-strategic-petroleum-reserves.

11 ADNOC, “UAE President and India Prime Minister Witness Exchange of Strategic Agreements between ADNOC and Indian Energy Partners,” May 15, 2026, https://www.adnoc.ae/en/news-and-media/press-releases/2026/uae-president-and-india-prime-minister-witness-exchange-of-strategic-agreements.

12 ADNOC, “ADNOC Signs 15-Year LNG Sales and Purchase Agreement with IndianOil for Ruwais LNG Project,” August 27, 2025, https://www.adnoc.ae/en/news-and-media/press-releases/2025/adnoc-signs-15-year-lng-sales-and-purchase-agreement-with-indianoil-for-ruwais-lng-project.

13 V. Chaturvedi et al., “India’s Pathway to Net Zero by 2070: Status, Challenges, and Way,” *Environ. Res. Lett.* 19, October 22, 2024, https://cstep.in/wp-content/uploads/2025/06/Indias-pathway-to-net-zero-by-2070_status-challenges-and-way-forward.pdf.

14 K. Yenneti, “The Grid-Connected Solar Energy in India: Structures and Challenges,” *Energy Strategy Reviews* 11-12, June 2016, https://www.sciencedirect.com/science/article/abs/pii/S2211467X16300219.

15 Ministry of Energy & Infrastructure UAE, "UAE Energy Strategy 2050," July 2023, https://assets.u.ae/api/public/content/19315ce46f104e2e9fd57f30d6007055?v=e25be1d1.

16 Pramod Kumar, "UAE Entity to Test Feasibility of Power Link with India," *Arabian Gulf Business Insight*, January 19, 2026, https://www.agbi.com/energy/2026/01/uae-entity-to-test-feasibility-of-power-connectivity-with-india/.

17 R. Grovner and S. Chandra, "Scenario for Growth of Electricity in India," *Energy Policy* 34 (no. 17): 2834-2847, November 2006, https://www.sciencedirect.com/science/article/abs/pii/S030142150500131X.

18 Abdullah Rashid, "How Barakah Nuclear Power Plant Made the UAE a Global Clean Energy Leader," *Gulf News*, May 18, 2026, https://gulfnews.com/business/energy/how-barakah-nuclear-power-plant-made-the-uae-a-global-clean-energy-leader-1.500544253.

19 World Nuclear Association, "Nuclear Power in the United Arab Emirates," March 23, 2026, https://world-nuclear.org/infuntry-profiles/countries-t-z/united-arab-emirates.

20 "India And UAE Sign Civil Nuclear Cooperation Agreement," *Knowledge & News Network*, September 10, 2024, https://knnindia.co.in/news/newsdetails/global/india-and-uae-sign-civil-nuclear-cooperation-agreement#google_vignette.

21 Energy Connects, "ENEC and NPCIL to Explore Future Cooperation in the Development and Operation of Civil Nuclear Energy Plants," September 11, 2024, https://www.energyconnects.com/news/utilities/2024/september/enec-and-npcil-to-explore-future-cooperation-in-the-development-and-operation-of-civil-nuclear-energy-plants/.

22 Kallol Bhattacherjee, "India, UAE Sign Civil Nuclear Energy Agreement," *The Hindu,* September 9, 2024, India, UAE sign civil nuclear energy agreement - The Hindu.

23 Ministry of External Affairs, Government of India, "Joint Statement: Visit of President of the UAE, His Highness Sheikh Mohamed bin Zayed Al Nahyan to India," January 19, 2026, https://www.mea.gov.in/bilateral-documents.htm?dtl/40601/Joint_Statement_Visit_of_President_of_the_UAE_His_Highness_Sheikh_Mohamed_bin_Zayed_Al_Nahyan_to_India_January_19_2026.

24 Government of India, Technology,
https://www.pib.gov.in/FactsheetDetails.aspx?Id=150617&lang=1&reg=3.

25 Ministry of New and Renewable Energy, Government of India, "National Green Hydrogen Mission," https://mnre.gov.in/en/national-green-hydrogen-mission/.

26 Ministry of Energy and Infrastructure (MoEI), The United Arab Emirates, "National Hydrogen Strategy 2050," July 2023,
https://assets.u.ae/api/public/content/d663ba3cc96841f6bc0bb71b2b6d49f6?v=9031b617.

27 Ministry of External Affairs, Government of India, "Joint India-UAE Vision Statement - Advancing the India-UAE Comprehensive Strategic Partnership: New Frontiers, New milestones," February 18, 2022, https://www.mea.gov.in/bilateral-documents?dtl/34877/Joint_IndiaUAE_Vision_Statement__Advancing_the_IndiaUAE_Comprehensive_Strategic_Partnership_New_Frontiers_New_milestones.

28 A. Tandon, "Strategies for Solar PV Manufacturing in India: Harnessing Stakeholder Inputs," *Sustainable Futures* 10, December 2025, https://www.sciencedirect.com/science/article/pii/S2666188825008767.

29 International Renewable Energy Agency, "Report of the Thirteenth Session of the Assembly of the International Renewable Energy Agency," August 3, 2023, https://www.irena.org/-/media/Files/IRENA/Remember/Assembly/Thirteenth-session-of-the-Assembly/A_13_SR_1_Report_Final.pdf.

30 Laura Cozzi et al., "Access to Electricity Stagnates, Leaving Globally 730 Million in the Dark," International Energy Agency, October 9, 2025, https://www.iea.org/commentaries/access-to-electricity-stagnates-leaving-globally-730-million-in-the-dark.

31 Cozzi et al., "Access to Electricity Stagnates, Leaving Globally 730 Million in the Dark".

32 R.K. Saran and Ashwani Kumar, "Empowering the Global South: India's Leadership in Energy Conservation and Sustainable Development," *International Educational Scientific Research Journal* 10 (no. 12), December 2024, https://www.researchgate.net/publication/388027229_EMPOWERING_THE_GLOBAL_SOUTH_INDIA'S_LEADERSHIP_IN_ENERGY_CONSERVATION_AND_SUSTAINABLE_DEVELOPMENT.

33 Ministry of External Affairs, Government of India, "Remarks by MoS Shri Kirti Vardhan Singh at the 10th Raisina Dialogue 2025 on 'Towards a 'Green Future' for Sustainable Development: India's Climate Initiatives for Environmental Cooperation'," March 18, 2025, https://www.mea.gov.in/speeches-statements?dtl/39201/Remarks_by_MoS_Shri_Kirti_Vardhan_Singh_at_the_10th_Raisina_Dialogue_2025_on_Towards_a_Green_Future_for_Sustainable_Development_Indias_Climate_Initiat.

34 Emirates News Agency, "UAE Global Projects, Investments Pave Way for Clean Energy Future," *Zawya*, April 6, 2026, https://www.zawya.com/en/business/energy/uae-global-projects-investments-pave-way-for-clean-energy-future-m3oowa5o; Ministry of Foreign Affairs, The United Arab Emirates, "UAE launches Etihad 7 Program to Fund Renewable Energy Projects in Africa at Abu Dhabi Sustainability Week 2022," January 17, 2026, https://www.mofa.gov.ae/en/mediahub/news/2022/1/17/17-01-2022-uae-projects; "Masdar to Develop 5 GW of Renewable Energy Projects to Advance Africa's Clean Energy Objectives," *Masdar*, January 20, 2023, https://masdar.ae/en/news/newsroom/masdar-to-develop-5-gw-of-renewable-energy-projects; Nora Watts, "DEWA Launches International Arm to Pursue Global Energy and Water Projects," *Utilities Middle East*, June 22, 2026, https://www.utilities-me.com/news/dewa-launches-international-arm-to-pursue-global-energy-and-water-projects.

IV.

Emerging Technologies: Cooperation and Opportunity

Emerging Technologies: An Avenue for BRICS Cooperation

Mahmoud Khalifa Gouda and Rebeca Rabêlo

Abstract

EMERGING TECHNOLOGIES, SUCH AS artificial intelligence (AI), digital infrastructure, and fintech, are reshaping global economic structures and value chains. This article assesses BRICS' structural challenges and opportunities for cooperation in emerging technologies. To strengthen their position on this front, the BRICS countries will need to develop common institutional frameworks, strengthen financing through the New Development Bank, support open innovation, and coordinate data and cybersecurity policies. The experiences of Egypt and Brazil in AI, digital infrastructure, and fintech can serve as models for promoting deeper technological integration within the BRICS grouping.

Introduction

Emerging technological and digital developments provide an analytical framework for understanding the structural transformations taking place in contemporary economies; technology is now an essential component in shaping economic value and measuring the progress of nations.

Emerging technologies encompass an interconnected set of innovations that work in an integrated manner, not in isolation from one another. Artificial Intelligence (AI) provides analytical and predictive capabilities, while blockchain technology supports digital trust through decentralisation and cryptography. Meanwhile, the Internet of Things (IoT) connects physical devices and digital data, creating intelligent environments capable of interacting in real time. Quantum computing represents a paradigm shift in computing power, enabling it to address complex problems beyond the capabilities of traditional computing. Biotechnology complements this landscape through its applications in healthcare, agriculture, and environmental conservation, fostering innovation in vital domains. Together, these technologies constitute a new wave of technological transformations that are redefining the boundaries of industrial innovation.[1]

The significance of these technologies extends beyond their individual capabilities. Their convergence is fundamentally reshaping production systems, business models, and the broader digital economy, making them key drivers of economic transformation.

Emerging technologies such as AI, cloud computing, and IoT help reshape production structures and value chains. Consequently, productivity could be enhanced and new data-driven business models developed. Economies will be able to transition from traditional models to a knowledge-based digital economy shaped by three main axes: smart sustainable ecosystems, enabling communities, and trust and security.

Notably, emerging technologies are also increasingly acquiring strategic significance in the geopolitical and security domains. Emerging technologies have become an essential element of national power, with technological power linked to economic sovereignty and national security. Semiconductor supply chains, advanced computing, and digital infrastructure are now strategic elements in the geopolitical competition between global powers.[2] Simultaneously, discussions on ‘digital sovereignty’ have intensified as the powers seek to control data, algorithms, and digital infrastructure, potentially leading to competing technology conglomerates. Thus, emerging technologies are no longer mere tools for growth but for reshaping the global balance of power.[3]

BRICS' High Technological Potential

BRICS has increasingly consolidated itself as a strategic platform for cooperation among emerging economies seeking greater influence within global governance structures. Originally centred on economic coordination and financial reform, the bloc has progressively expanded its agenda to include digital infrastructure, technological innovation, AI, and technological sovereignty. This evolution is increasingly reflected in concrete institutional initiatives. In 2025, BRICS leaders adopted the 'Leaders' Statement on the Global Governance of Artificial Intelligence', articulating shared principles for AI governance and emphasising equitable access, capacity building, and inclusive global rulemaking.[4] The same year also saw the launch of the 'BRICS Study Groups on Future Networks and Digital Public Infrastructure (DPI)', aimed at fostering technical cooperation and knowledge exchange on next-generation digital ecosystems.[5] More recently, in June 2026, the bloc established the 'BRICS Digital Centre of Excellence for Smart Grids and Energy Storage', underscoring its growing focus on leveraging digital technologies to accelerate the energy transition and strengthen the resilience of critical infrastructure. Together, these initiatives demonstrate that BRICS is moving beyond political declarations towards institutionalised technological cooperation.[6]

This shift reflects the growing recognition that emerging technologies are becoming central to economic competitiveness, geopolitical influence, and strategic autonomy. As global technological competition intensifies, BRICS countries increasingly view technological cooperation as essential for reducing external dependence, strengthening domestic innovation capacities, and promoting a more multipolar and inclusive digital order.

The global market for 17 frontier and advanced technologies is estimated to grow from US$2.5 trillion in 2023 to US$16.4 trillion by 2033. AI is the dominant driver of this growth and is projected to surge to US$4.8 trillion by 2033.[7] These estimates reveal the extent of the opportunity available for the BRICS bloc to benefit from these technologies as it seeks to strengthen its position in the global digital economy.

However, the BRICS countries—and the wider Global South—face various structural challenges in the field of emerging technologies:

- **Digital divide and the asymmetry of technological capabilities within:** BRICS has expanded from a five-nation grouping (of Brazil, Russia, India, China, and South Africa) to include Egypt, Ethiopia, Iran, the United Arab Emirates (UAE), Saudi Arabia, and Indonesia, making it more representative of the Global South, but also simultaneously highlighting internal gaps.[8]
- **Funding and infrastructure constraints:** Emerging technologies require huge investments in digital infrastructure, data centres, and cybersecurity systems.[9]
- **BRICS countries still operate in a digital ecosystem dominated by major companies in cloud computing, semiconductors, and intelligence models:** Data suggests that only 100 companies accounted for over 40 percent of investments in global research and development (R&D) activities in 2022.[10]
- **Gaps in governance and regulatory frameworks:** Emerging technologies present complex issues related to data protection, algorithm regulation, intellectual property, cybersecurity, accountability, anti-monopoly, and the protection of digital rights. These gaps appear to be more pronounced within BRICS due to differences in political and economic systems and in legislative and regulatory capacities among its members.[11]
- **Geopolitical tensions and divergent strategic interests:** These constitute one of the biggest impediments to deeper cooperation among the BRICS countries in the field of emerging technologies. Although the member states share a broad commitment to strengthening economic and technological cooperation, differences in national priorities, varying levels of technological development, and divergent foreign policy orientations complicate collective action. In addition, bilateral disputes among certain members—such as those between India and China, and between the UAE and Iran—further hinder consensus on joint initiatives, technology transfer, and the coordination of digital policies.[12]

This article assesses the experiences of Egypt and Brazil, both emerging economies seeking to leverage emerging technologies to advance digital transformation, foster innovation, and achieve sustainable development. Despite differences in their institutional and economic contexts and their levels of technological readiness, the two countries face similar opportunities and challenges in adopting emerging technologies, developing digital infrastructure, strengthening human capacities, and establishing regulatory frameworks that support innovation. Their experiences also serve to present avenues to strengthen cooperation among BRICS countries in emerging technologies, thereby enhancing the bloc's competitiveness in the global digital economy.

Emerging Technologies in Egypt and Brazil: Case Studies

Egypt

Egypt has experienced a strong digital transformation in recent years, driven by the government's vision to build a digital economy that is better able to attract investment and enhance institutional efficiency and public services. The 'Digital Egypt' initiative[13] is the main framework for developing digital infrastructure, expanding e-government services, and supporting innovation and digital entrepreneurship, in line with 'Egypt Vision 2030'.[14]

In April 2025, the government announced an investment of about US$256 million to develop critical digital infrastructure, including secure government networks and the comprehensive digitisation of public services.[15] In June 2025, Egypt officially launched 5G services nationwide, marking a milestone in its digital transformation.[16]

Overall, Egypt's ICT sector is experiencing high growth, reaching 15.2 percent in FY 2022/2023, exceeding the GDP growth rate. The sector's contribution to GDP increased to 5.1 percent in FY 2022/2023, compared to 4.4 percent in FY 2019/2020. Total investments in the ICT sector increased to US$4.2 billion in FY 2022/2023, up by 20 percent from the previous fiscal year.[17] Egypt's IT market is expected to nearly triple in value between 2025 and 2031, from US$3.5 billion to US$9.2 billion.[18]

Furthermore, Egypt is working to integrate AI into its economic and social development plans. The country launched the second edition of the 'National Artificial Intelligence Strategy 2025–2030,'[19] which aims to transform Egypt into a regional hub for AI. The strategy is based on six pillars: governance, infrastructure, data, skills development, innovation support, and establishing an integrated technology ecosystem. It also aims to raise the telecommunications sector's GDP contribution to 7.7 percent by 2030 and support more than 250 startups specialising in modern technologies.[20] A

US$300-million semiconductor and AI fund, established in partnership with China's Tsinghua Unigroup in 2024, supports Egypt's ambition to become a regional leader in semiconductor production and AI technology under the 'Egypt Makes Electronics' initiative.[21]

Egypt has also expanded its focus to other emerging technologies. In 2026, the mandate of the National Council for Artificial Intelligence was extended to include quantum computing, biotechnology, and other frontier technologies, reflecting a shift from a standalone AI strategy towards a comprehensive governance framework for advanced technologies. This policy direction has been reinforced through capacity-building initiatives, such as workshops organised by the communications and IT ministry in collaboration with the Egypt University of Informatics on the opportunities and challenges of quantum technologies. These initiatives indicate that Egypt is currently investing in knowledge development and institutional preparedness before moving towards large-scale industrial adoption.[22]

A key institutional mechanism supporting this transformation is the Applied Innovation Center, established by the communications and IT ministry to convert emerging technologies into practical solutions for national challenges. The centre adopts a project-based innovation model, developing applications in healthcare, justice, education, and cultural preservation while leveraging AI and high-performance computing technologies. This approach demonstrates that Egypt's strategy extends beyond importing advanced technologies to fostering indigenous innovation capabilities that are tailored to national priorities and supported by locally generated data and institutional expertise.[23]

The adoption of IoT, robotics, and intelligent systems is primarily being driven through universities and technology startups under programmes supported by the Information Technology Industry Development Agency, particularly the Information Technology Academia Collaboration initiative. Accepted graduation projects for 2025–2026 include smart neonatal incubators equipped with IoT capabilities, smart community infrastructure, warehouse and assistive robots, AI- and IoT-enabled agricultural robots, and intelligent healthcare systems. These initiatives illustrate that Egypt is building an innovation pipeline by nurturing technical talent and early-stage prototypes, although wider commercialisation will depend on stronger industrial partnerships, government procurement, and technology transfer mechanisms.[24]

In the area of blockchain and financial technologies, Egypt has adopted a cautious regulatory approach. The Central Bank of Egypt has issued warnings against dealing in cryptocurrencies, indicating that digital assets are not recognised as an open financial instrument within the Egyptian financial system.[25] At the same time, the country's Financial Regulatory Authority provides a controlled environment for testing innovative financial solutions, such as digital identity management, regulatory compliance, and financial infrastructure. This balanced approach reflects Egypt's objective of encouraging financial innovation while maintaining regulatory oversight and financial stability.[26]

Brazil

Brazil occupies a unique position among the BRICS members in its approach to digital transformation. With a GDP of US$2.174 trillion and a population of 211 million (as of 2023), Brazil is the largest economy in Latin America and one of the most significant emerging markets within the BRICS bloc. Despite an R&D investment of 1.15 percent of GDP (in 2020), the country has demonstrated a consistent capacity to develop and deploy large-scale digital public infrastructure. Its instant payment system, PIX, and ongoing digital identity initiatives exemplify Brazil's proven ability to design, govern, and scale interoperable public platforms at scale.[27]

Beyond digital public infrastructure, Brazil has increasingly applied emerging technologies to strategic sectors, particularly agriculture, where AI, IoT devices, remote sensing, satellite imagery, drones, and precision agriculture technologies are improving productivity, climate resilience, and environmental sustainability. Public research institutions, especially the Brazilian Agricultural Research Corporation (Embrapa), have played a central role in adapting digital technologies to tropical agriculture, positioning Brazil as an international reference in agricultural innovation and sustainable food systems.[28] More broadly, Brazil possesses one of the largest digital economies in Latin America, supported by expanding broadband connectivity, digital public services, and a dynamic technology ecosystem that continues to attract domestic and foreign investment.[29] Brazil is pursuing a sovereignty-of-interdependence model: regulatory assertiveness and public infrastructure development pursued within global digital integration.[30] The Brazilian Artificial Intelligence Strategy (EBIA) determines national AI priorities upon legal frameworks, governance, qualified personnel, and international engagement.[31] This strategy frames AI primarily as a tool for scientific advancement, productivity gains, improved public services, and reduced social inequality, rather than as a vehicle for technological leadership or autonomous innovation. This orientation is reflected in the country's AI startup ecosystem: while Brazil counted some 12,000 active startups in 2020, only 26 were identified as AI-focused as recently as in 2018[32]—a figure that illustrates the gap between the country's broader technology sector and its capacity for specialised AI development. This distinguishes Brazil from peers such as China and Russia that pursue comprehensive technological sovereignty, and aligns it more closely with a developmental deployment model, adopting and governing AI solutions to address national challenges rather than producing frontier technologies.

On data governance, Brazil's approach is notably ethics-centred, anchored in the 'Lei Geral de Proteção de Dados Pessoais' (LGPD, or the General Data Protection Law). Enacted in 2020, the LGPD established a comprehensive framework for the collection, processing, and storage of personal data, bringing Brazil's regulatory landscape closer to international standards, such as the European Union's General Data Protection Regulation. Building on this foundation, the EBIA promotes open government data, interoperability standards, and the adoption of open-source code to mitigate algorithmic bias, reflecting a commitment to responsible and transparent AI development. Brazil's data governance strategy thus prioritises the protection of individual rights and ethical use of data as preconditions for sustainable AI innovation. At the same time, the country has strengthened cybersecurity policies and digital resilience as essential components of its digital transformation strategy, recognising secure digital infrastructure as a prerequisite for economic competitiveness and the broader adoption of emerging technologies.[33]

Brazil's AI research and development ecosystem remains modest in scale. The EBIA references the IA²MCTI programme, which supports projects with caps of approximately US$85,000 each, a figure that contrasts sharply with the multi-billion-dollar investments that characterise leading AI economies. Brazil has relevant computational assets, operating nine high-performance computing centres and participating in regional networks such as RedCLARA[a,34] and Scalac,[b,35] foundations that position the country as a potential node in emerging South-South AI infrastructure cooperation. Beyond AI, these facilities provide computational capacity for climate modelling, biotechnology, agricultural research, and advanced industrial applications, reinforcing Brazil's scientific and technological capabilities.[36]

Recent policy developments indicate that Brazil is complementing its regulatory and governance strengths with a more ambitious industrial and innovation agenda. Under the 'Nova Indústria Brasil' (New Industry) strategy, the Ministry of Science, Technology and Innovation announced investments of US$7.7 billion through 2026 as part of a broader US$28-billion financing package coordinated by the Brazilian Development Bank, Funding Authority for Studies and Projects, Brazilian Company for Industrial Research and Innovation, and Brazilian Agency for Industrial Development.[37] The initiative prioritises digital transformation, advanced manufacturing, the bioeconomy, the energy transition, sustainable agribusiness, the healthcare industry, and critical technologies for national sovereignty. It also supports collaborative innovation in strategic areas such as AI for industrial productivity, low-carbon hydrogen, critical minerals, and semiconductor technologies, while strengthening cooperation between universities, research institutes, and the productive sector. Although Brazil continues to depend on imported semiconductors and remains behind the world's leading AI powers in frontier technological capabilities, these investments demonstrate a growing commitment to expanding domestic technological capacity, increasing industrial competitiveness, and fostering innovation-driven development.

Brazil's status in global AI governance is characterised by constructive multilateralism rather than leadership ambition. The EBIA calls for a proactive stance in international forums. Brazil was among the five BRICS members to sign the 2025 Paris Declaration on Inclusive and Sustainable AI, alongside

a RedCLARA (Latin American Cooperation of Advanced Networks) is a regional academic network that connects research and education institutions across Latin America and links them to global scientific networks.

b SCALAC (Advanced Computing System for Latin America and the Caribbean) is a regional initiative that promotes cooperation and shared access to high-performance computing resources across Latin America and the Caribbean.

China, Egypt, India, and Indonesia.[38] Brazil's comparative advantage lies not in autonomous technological development but in its capacity to deploy AI for public services, social equity, and democratic governance, positioning it as a norm-shaping actor within emerging South-South AI cooperation frameworks.

Areas of Cooperation

Egypt and Brazil share a developmental orientation, albeit from different starting points. Brazil brings more consolidated regulatory frameworks, proven digital public infrastructure, expanding capabilities in agricultural innovation, and an increasingly integrated industrial and technological policy. Egypt contributes infrastructure assets and regional connectivity. Within the BRICS cooperation agenda, these profiles are complementary and create opportunities for collaboration in AI, digital governance, sustainable agriculture, advanced manufacturing, critical minerals, clean energy technologies, and digital public infrastructure.

Egypt is aiming to strengthen the country's position as a regional hub for cross-border technology services while promoting digital sovereignty and localising advanced technologies. Egypt no longer positions itself as a recipient of imported technology but rather as a partner that negotiates the transfer of capabilities alongside investment in digital infrastructure,[39] while Brazil is working through its digital transformation strategy to integrate government policies into a single framework for digital transformation and economic and social development.[40] Consequently, bilateral cooperation can help Egypt draw on the Brazilian experience to expand the scope of financial inclusion.[41]

Egypt boasts an important geographical advantage as a transit point between the Red Sea and the Mediterranean, making it a potential regional hub for data traffic between Asia, Africa, and Europe.[42] Meanwhile, Brazil is establishing itself as the most important data centre in the southern hemisphere and one of the most dynamic digital services markets in Latin America, with digital infrastructure and communications rapidly expanding. The two countries can forge partnerships to expand the establishment of data centres, host cloud services, share experiences in critical infrastructure governance, and connect digital markets between Africa and Latin America.[43]

Brazil needs to strengthen government coordination in digital transformation and improve access to digital infrastructure,[44] while Egypt should expand access to digital services and build a more inclusive digital society.[45] The two sides can collaborate on low-cost solutions to expand connectivity in peripheral areas, support local internet service providers, exchange public-private financing models in fibre and 5G networks, and develop common measurement tools for connectivity quality, accessibility, and service prices.

The two countries already cooperate in projects that encourage academic mobility and human capital development. For example, Egyptian students pursue undergraduate and graduate studies at Brazilian universities through programmes supported by the Brazilian government, contributing to long-term scientific exchange and capacity building. These initiatives constitute an important dimension of Brazil's international development cooperation, fostering knowledge transfer, research collaboration, and the formation of professional networks that can support future bilateral initiatives in emerging technologies. Such academic exchanges can also create opportunities for collaborative research in AI, digital agriculture, biotechnology, environmental sustainability, and engineering.[46]

Strengthening BRICS-Based Multilateral Collaboration in Emerging Technologies

The BRICS countries possess complementary technological capabilities that can be leveraged through coordinated innovation policies. Rather than pursuing isolated national strategies, member states should strengthen collaborative mechanisms to accelerate technological development and address shared development challenges. Building on the experiences of Brazil and Egypt, the following recommendations can help advance a more integrated BRICS innovation agenda.

Policy and Institutional Coordination

Harmonising policies: The member countries operate under markedly different regulatory frameworks, which complicates joint initiatives and limits coordinated engagement in international standard-setting processes. They should promote greater convergence in digital governance by developing common principles for AI, cybersecurity, digital identity, and cross-border data governance. Although national regulatory approaches will continue to differ, greater interoperability and shared ethical standards will facilitate digital trade, scientific collaboration, and technological cooperation while strengthening the group's collective influence in global digital governance.

Shared regulatory frameworks: A BRICS Digital Regulatory Forum, bringing together technology regulators and data protection authorities from member states, could support coordinated positions in bodies such as the International Telecommunication Union and the International Organization for Standardization, where technical standards for AI and cybersecurity are currently being negotiated.

Data governance and digital sovereignty: A BRICS data governance dialogue focused initially on mapping areas of regulatory compatibility, rather than pursuing full harmonisation, could serve as a practical step towards coordinated positions at forums such as the World Trade Organization's (WTO) negotiations on electronic commerce and the United Nations' (UN) processes on digital economy governance.

Investment and Financing

Role of the New Development Bank (NDB): The NDB's architecture of equal voting rights among its five founding members and excluding veto mechanisms positions it as a relevant financing instrument for technology cooperation within the bloc.[47] Indeed, digital infrastructure is one of the priority areas of the NDB's 129 registered projects (as of 2025).[48] The NDB has also increased the use of national currencies in its operations, reducing member states' exposure to dollar-denominated financing constraints. The NDB should also expand its support for innovation-driven development by financing projects related to digital infrastructure, high-performance computing facilities, data centres, smart manufacturing, and sustainable digital technologies.

Digital infrastructure financing: The NDB has a project completion rate of about 11 percent, indicating that implementation capacity needs as much attention as financing volume.[49] Bridging the digital infrastructure gap across the bloc requires concessional loans, blended finance mechanisms, and coordinated public investment. Dedicated funding mechanisms for startups and small and medium-sized enterprises will further stimulate innovation ecosystems across BRICS countries while reducing technological asymmetries among members.

Innovation and public-private partnerships support: A dedicated BRICS Innovation Fund, with transparent governance criteria, will support early-stage ventures and deep-tech research outside standard lending parameters. The NDB's non-sovereign lending window, which finances private and subnational actors subject to formal government authorisation and mandatory compliance with environmental and social standards, offers a relevant institutional model for structured public-private engagement.[50]

Innovation and R&D Collaboration

Joint research centres: Joint research centres, whether co-located or organised as distributed networks, offer a practical instrument for institutionalising scientific collaboration among member states. Priority areas could include AI applications, sustainable energy, and agricultural biotechnology.

Knowledge exchange: Academic exchange programmes, collaborative research initiatives, and shared scientific databases will contribute to a broader knowledge-sharing infrastructure across the bloc. Coordinated BRICS positions at the WTO and the World Intellectual Property Organization will further expand researchers' access to scientific findings across member states.

Startup ecosystem support: A structured startup corridor, providing pathways for cross-border investment and market-entry support for startups in partner countries, could pave the way for integrating member states' innovation ecosystems without requiring deeper political harmonisation.

Joint demonstration projects: BRICS should prioritise such projects in sectors where member countries possess complementary comparative advantages. Digital agriculture, climate-smart technologies, bioeconomy, renewable energy, low-carbon hydrogen, critical minerals, and digital public infrastructure represent promising areas for collaborative pilot projects.

Technological Sovereignty

Reducing external dependence: Technological sovereignty refers to a state's capacity to make meaningful choices about the infrastructure and platforms on which its economy depends. A coordinated assessment of shared dependencies in semiconductors, foundational AI models, and core internet infrastructure will be a practical first step towards a common BRICS approach.

Building independent platforms: India's Unified Payments Interface and Aadhaar digital identity system, and Brazil's PIX illustrate that interoperable, publicly governed digital platforms can be developed at scale within the bloc. Extending this model to cloud services and data exchange protocols will reduce reliance on foreign commercial infrastructure.

Strengthening cybersecurity: A cooperative cybersecurity framework, including shared threat intelligence mechanisms and harmonised national standards, will address growing exposure as digital infrastructure expands across member states. A coordinated BRICS position grounded in the UN Charter and international law will serve the long-term interests of member states in ongoing international norm-setting processes.[51]

By combining technological capabilities, financial resources, and scientific expertise, BRICS can strengthen its role as a driver of innovation within the Global South. A cooperation agenda centred on emerging technologies will not only enhance technological sovereignty and industrial competitiveness but also contribute to more inclusive, resilient, and sustainable development across member countries.

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Endnotes

1 McKinsey & Company, *The Top Trends in Tech 2025*, New York, McKinsey Global Institute, July 22, 2025, https://www.mckinsey.com/capabilities/tech-and-ai/our-insights/the-top-trends-in-tech.

2 European Parliament, *Chips Act and the Geopolitics of Semiconductors*, Brussels, European Union, 2024, p. 1, https://www.europarl.europa.eu/RegData/etudes/BRIE/2024/762384/EPRS_BRI%282024%29762384_EN.pdf.

3 "The Geopolitics of AI and the Rise of Digital Sovereignty," Brookings, December 22, 2023, https://www.brookings.edu/articles/the-geopolitics-of-ai-and-the-rise-of-digital-sovereignty.

4 BRICS, *BRICS Leaders' Statement on the Global Governance of Artificial Intelligence*, July 6, 2025, https://brics.br/en/documents/presidency-documents/250706_brics_ggai_declarationfinal.pdf.

5 BRICS Brasil, "Artificial Intelligence Governance in BRICS: Cooperation and Development for Social Inclusion," April 11, 2025, https://brics.br/en/news/articles/artificial-intelligence-governance-in-brics-cooperation-and-development-for-social-inclusion.

6 BRICS Digital Centre of Excellence, "BRICS Digital Centre of Excellence for Smart Grids and Energy Storage," https://brics-dcoe.global/.

7 United Nations Conference on Trade and Development (UNCTAD), *Technology and Innovation Report 2025: Inclusive Artificial Intelligence for Development*, Geneva, United Nations, 2025, p. 15, https://unctad.org/system/files/official-document/tir2025_en.pdf.

8 BRICS India 2026, "About BRICS," https://www.brics2026.gov.in/about-us.

9 "BRICS Leaders' Statement on the Global Governance of Artificial Intelligence".

10 United Nations Conference on Trade and Development (UNCTAD), *Technology and Innovation Report 2025: Inclusive Artificial Intelligence for Development,* Geneva, United Nations, 2025, https://unctad.org/publication/technology-and-innovation-report-2025.

11 Sergio Queiroz and Denise Direito, *Inteligência Artificial nos Países do BRICS: Soberania, Estágios de Desenvolvimento e Diferentes Perspectivas*, Texto para Discussão no. 3132, Rio de Janeiro, Instituto de Pesquisa Econômica Aplicada, 2025, https://doi.org/10.38116/td3132-port.

12 H. Haryono, "BRICS in the Digital Age: Investigating Technological Innovation and Knowledge Sharing for Economic Transformation," *Eastasouth Journal of Information System and Computer Science* 2, no. 2 (2024): 89–91.

13 Ministry of Communications and Information Technology, "Digital Egypt Platform," https://digital.gov.eg/.

14 Ministry of Planning, Economic Development and International Cooperation, *Egypt Vision 2030: Updated Sustainable Development Strategy* (Cairo: Ministry of Planning, Economic Development and International Cooperation, 2023), https://mped.gov.eg/DynamicPage?id=115&lang=en.

15 Fitch Solutions, *Digital Transformation in Egypt Gains Momentum with Government Investment and Mega Projects*, Cairo, Fitch Solutions, 2025, 1–3.

16 International Trade Administration, "Information and Communications Technology; and Digital Economy Egypt," November 21, 2025, https://www.trade.gov/country-commercial-guides/egypt-information-and-communications-technology-and-digital-economy.

17 International Trade Administration, "Information and Communications Technology; and Digital Economy Egypt."

18 "Digital Transformation in Egypt Gains Momentum".

19 Ministry of Communications and Information Technology, *Egypt National Artificial Intelligence Strategy: Second Edition (2025–2030)* (Cairo: Ministry of Communications and Information Technology, 2025), https://ai.gov.eg/SynchedFiles/en/Resources/AIstrategy%20English%2016-1-2025-1.pdf

20 OECD, "Egypt National Artificial Intelligence Strategy," OECD.AI, February 10, 2026, https://oecd.ai/en/dashboards/policy-initiatives/egypt-national-artificial-intelligence-strategy.

21 "Digital Transformation in Egypt Gains Momentum".

22 Ministry of Communications and Information Technology, "National Council for Artificial Intelligence and Emerging Technologies," https://mcit.gov.eg.

23 Ministry of Communications and Information Technology, "Applied Innovation Center," https://mcit.gov.eg.

24 Information Technology Industry Development Agency (ITIDA), *List of Technically Accepted Graduation Projects – Round 21* (Cairo: Information Technology Industry Development Agency, 2025), https://itida.gov.eg.

25 Central Bank of Egypt, *Warning Statement on Dealing in Virtual Cryptocurrencies* (Cairo: Central Bank of Egypt, September 12, 2022), https://www.cbe.org.eg.

26 Financial Regulatory Authority (FRA), "FRA Sandbox Holds First Advisory Committee Meeting," June 15, 2026, https://fra.gov.eg/en/fra_news.

27 Sergio Queiroz and Denise Direito, "Inteligência artificial nos países do BRICS: Soberania, estágios de desenvolvimento e diferentes perspectivas," Texto para Discussão No. 3132, Rio de Janeiro, Instituto de Pesquisa Econômica Aplicada (Ipea), 2025, https://doi.org/10.38116/td3132-port.

28 International Trade Administration, *Brazil – Digital Economy*, Country Commercial Guide. U.S. Department of Commerce, 2024, https://www.trade.gov/country-commercial-guides/brazil-digital-economy.

29 Ministério da Ciência, Tecnologia e Inovação (MCTI), *Estratégia Brasileira de Inteligência Artificial (EBIA)*, Brasília, MCTI, 2021, https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/transformacaodigital/estrategia-brasileira-de-inteligencia-artificial.

30 Queiroz and Direito, "Inteligência Artificial nos Países do BRICS: Soberania, Estágios de Desenvolvimento e Diferentes Perspectivas".

31 Brazil, *Brazilian Artificial Intelligence Strategy (Estratégia Brasileira de Inteligência Artificial – EBIA)* (Brasília: Ministry of Science, Technology and Innovation, 2021), https://www.gov.br/mcti.

32 Brazil, *Brazilian Artificial Intelligence Strategy*, p. 8.

33 International Trade Administration, *Brazil – Digital Economy*, Country Commercial Guide. U.S. Department of Commerce, 2024, https://www.trade.gov/country-commercial-guides/brazil-digital-economy.

34 RedCLARA, *The Digital Open Science Ecosystem in Latin America and the Caribbean*, https://www.redclara.net.

35 SCALAC, *Advanced Computing System for Latin America and the Caribbean*, https://scalac.redclara.net.

36 aboratório Nacional de Computação Científica (LNCC), *Sistema Nacional de Processamento de Alto Desempenho (SINAPAD)*, https://www.lncc.br/sinapad/sinapad.php; Laboratório Nacional de Computação Científica (LNCC), *SINAPAD*, Governo Federal, https://www.gov.br/lncc/pt-br/acesso-a-informacao/acoes-e-programas/programas-nacionais/sinapad.

37 Ministério da Ciência, Tecnologia e Inovação (MCTI), "MCTI mobiliza quase R$ 39 bilhões em novo pacote de R$ 140 bilhões para a indústria brasileira," June 2026, https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/noticias/2026/06/mcti-mobiliza-quase-r-39-bilhoes-em-novo-pacote-de-r-140-bilhoes-para-a-industria-brasileira.

38 Élysée, "Statement on Inclusive and Sustainable Artificial Intelligence for People and the Planet," February 11, 2025, https://www.elysee.fr/en/emmanuel-macron/2025/02/11/statement-on-inclusive-and-sustainable-artificial-intelligence-for-people-and-the-planet.

39 Cairo ICT, "Egypt Aligns Three Ministries to Prepare a New Wave of Big Tech Partnerships in Data Centers and AI," May 3, 2026, https://cairoict.com/egypt-aligns-three-ministries-to-prepare-a-new-wave-of-big-tech-partnerships-in-data-centers-and-ai/.

40 CGEE, *Brazilian digital transformation strategy: E-Digital 2022–2026 cycle*, 2022, 9, https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/transformacaodigital/arquivosestrategiadigital/digitalstrategy_2022-2026.pdf.

41 Ministry of Finance, Arab Republic of Egypt, "Minister of Finance in a Meeting with his Brazilian Counterpart on the Sidelines of BRICS Meetings: Enhancing Economic and Investment Bilateral Cooperation with Brazil, and with BRICS Countries in Productive and Ecofriendly Projects, and Facilitating Trade," July 5, 2025, https://mof.gov.eg/en/posts/media/6869377ea3f93e0007bd9c2b/Minister%20of%20Finance%20in%20a%20meeting%20with%20his%20Brazilian%20counterpart%20on%20the%20sidelines%20of%20BRICS%20meetings%3A%20Enhancing%20economic%20and%20investment%20bilateral%20cooperation%20with%20Brazil%2C%20and%20with%20%22BRICS%22%20countries%20in%20productive%20and%20ecofriendly%20projects%2C%20and%20facilitating%20trade.

42 Telecom Egypt, "Telecom Egypt Announces Africa-1 Subsea Cable System Landing in Egypt," November 6, 2024, https://ir.te.eg/en/CorporateNews/PressRelease/208/Telecom-Egypt-Announces-Africa-1-Subsea-Cable-System-Landing-in-Egypt.

43 Tomás Paiva, et al., "Brazil's Digital Future: Key Trends, Regulatory Shifts, and Investment Opportunities in Technology, Media and Telecommunications," *Chambers and Partners,* February 19, 2026, https://practiceguides.chambers.com/practice-guides/tmt-2026/brazil/trends-and-developments.

44 OECD, *Digital Government Review of Brazil*, 2018, 11, https://www.oecd.org/content/dam/oecd/en/publications/reports/2018/11/digital-government-review-of-brazil_g1g98df2/9789264307636-en.pdf.

45 OECD, "Egypt National Artificial Intelligence Strategy".

46 Instituto de Pesquisa Econômica Aplicada (IPEA), *COBRADI – Cooperação Brasileira para o*

Desenvolvimento Internacional: Base de Dados, COBRADI Data Portal.

47 Bas Hooijmaaijers, “The Internal and External Institutionalization of the BRICS Countries: The Case of the New Development Bank,” *International Political Science Review* 43, no. 4 (2022): 481–494.

48 NDB, “Focus Areas,” New Development Bank, 2025, https://www.ndb.int/about-ndb/focus-areas/.

49 Oliveira et al., “O Novo Banco de Desenvolvimento (NBD) e a Expansão do BRICS,” Unpublished manuscript, 2025.

50 NDB, Policy on Transactions without Sovereign Guarantee,” NDB, 2016, https://www.ndb.int/wp-content/uploads/2017/08/Policy-on-Transaction-without-Sovereign-Guarantee-201612201.pdf.

51 Amitav Acharya, “Global Governance in a Multiplex World,” Robert Schuman Centre for Advanced Studies Research Paper No. RSCAS 29 (2017).

From Space Data to Seed Systems: A BRICS Agenda for Agricultural Resilience and Technological Sovereignty

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Abstract

BILATERAL PROGRAMMES ON AGRICULTURE, such as those on agricultural data exchange and remote sensing capacity, have already shown practical value at a time when food security is increasingly being shaped by access to data, seed systems, climate monitoring, biotechnology, and technological capacity. For BRICS and BRICS partner countries, this creates a practical agenda at the intersection of emerging technologies and development. This article argues that BRICS should connect satellite data, agricultural analytics, plant biotechnology, and capacity-building into a common framework for agricultural resilience. It recommends that BRICS establish a mechanism on space-enabled agricultural resilience, launch projects in drought-prone regions, connect Earth observation with plant-breeding programmes, and create joint training tracks for specialists working across geospatial data, biotechnology, and agricultural policy.

Food Security as a Question of Technology

Food security is no longer only an agricultural question. Beyond hunger, it encompasses raising agricultural productivity, adapting to climate variability, and reducing supply chain fragility—areas where data, biotechnology, and monitoring technologies can make a difference. Likewise, building climate resilience and securing the flow of inputs and outputs across borders require integrated technological solutions that go far beyond traditional farming practices. It increasingly depends on access to data, resilient supply chains, seed systems, climate monitoring, soil and water information, and the capacity to translate scientific knowledge into practical decisions for farmers. The 2025 edition of *The State of Food Security and Nutrition in the World* estimates that between 638 million and 720 million people faced hunger in 2024, while 512 million people will likely continue to experience hunger by 2030. The same report stresses that elevated food price inflation has weakened purchasing power and made healthy diets less affordable, especially for low-income populations.[1]

For BRICS[a] and BRICS partner countries, this issue has direct strategic importance. Many of them are confronting challenges of climate stress, demographic growth, rising food demand, uneven access to advanced technologies, and dependence on external digital platforms. In this context, the BRICS agenda on emerging technologies should not be treated as an abstract innovation agenda. Instead, it should be understood as a practical instrument for food security, technological resilience, and long-term development. Recurrent climate-driven droughts across Africa, particularly in Ethiopia, severely threaten crop resilience and agricultural productivity, underscoring the urgent need for climate-resilient, localised seed systems and strengthened BRICS collaboration in biotechnology, crop improvement, and sustainable agricultural innovation to enhance regional food security.[2]

The strength of BRICS lies in the fact that different elements of this technological chain already exist within the grouping. Some members possess advanced space infrastructure, satellite systems, and Earth observation

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a BRICS is a grouping of 11 countries comprising Brazil, China, Egypt, Ethiopia, India, Indonesia, Iran, the Russian Federation, Saudi Arabia, South Africa, and the United Arab Emirates.

capabilities. Others have large agricultural markets, massive biodiversity, experience in managing droughts, land degradation, and food insecurity, and a growing demand for applied technological solutions. China, for instance, operates one of the world's most extensive Earth observation satellite constellations and has integrated big-data platforms for crop monitoring nationwide.

India, for its part, has rolled out digital public infrastructure (DPI) for agriculture that connects millions of farmers with real-time advisories and market intelligence. Brazil combines large-scale agronomic research with sophisticated climate forecasting tools for its export-oriented grain belts, and South Africa has developed regional drought early-warning systems that draw on satellite data and ground-based hydro-meteorological networks. The 2025 BRICS Agriculture Working Group declaration already emphasised cooperation in climate-resilient production systems, agricultural information exchange, sustainable agriculture, innovation, digital technologies, and the training of highly qualified personnel. This creates an institutional basis for a more ambitious agenda.[3]

However, BRICS capabilities still often develop in parallel rather than as part of an integrated framework for cooperation. The next stage of cooperation should therefore move from general declarations about technology to applied mechanisms that connect satellite data, agricultural analytics, biotechnology, seed systems, and capacity-building.

Space technologies should be viewed not as a symbol of national prestige, but as development infrastructure. Satellite observation can help assess crop conditions, forecast droughts, monitor water resources, detect land degradation, evaluate floods and other natural disasters, and improve agricultural planning. GEOGLAM, the Group on Earth Observations Global Agricultural Monitoring initiative, provides monthly crop-condition information for more than 97 percent of global agriculture and works with more than 70 partners from monitoring systems, governments, space agencies, agricultural organisations, and universities.[4] The technological model already exists; the political question for BRICS is whether the grouping can adapt this logic to its own development priorities.

Linking Space Data, Biotechnology, and Agricultural Resilience within BRICS

The case for such cooperation is particularly strong in Africa, and Ethiopia illustrates the scale of the challenge. According to African Development Bank (ADB) data, agriculture still employs around 65 percent of Ethiopia's labour force.[5] The World Bank also notes that agriculture, forestry, and fishing accounted for around 34.9 percent of Ethiopia's Gross Domestic Product (GDP) in 2024.[6] Climate shocks in agriculture are therefore not sectoral events but affect employment, inflation, social stability, and national development.

The World Bank's climate risk profile for Ethiopia identifies drought as the country's most destructive climate-related natural hazard. It estimates that climate change may reduce Ethiopia's GDP by up to 10 percent by 2045, largely through drought-induced impacts on agricultural productivity. Recent massive drought episodes have reduced GDP by 1 percent to 4 percent, while rain-induced soil erosion has been estimated to reduce GDP by approximately an additional 1 percent.[7] These figures show why early warning, crop monitoring, and resilient seed systems should be treated as part of the same policy agenda.

Data alone, however, cannot produce resilience. Its value appears only when monitoring results are translated into agricultural decisions: crop choice, variety adaptation, seed-system development, water management, early warning, and responses to threats to harvests. This is where the space and digital agenda should be connected with biotechnology and plant breeding. If satellite monitoring shows where environmental conditions are changing, biotechnology and plant breeding can help produce the response through more resilient varieties, locally adapted crops, and modernised agricultural practices.

For example, satellite-derived soil moisture and vegetation health indices can trigger drought alerts, guide irrigation scheduling, support index-based crop insurance payouts, and feed into farmer advisory services via mobile platforms, enabling timely and sitespecific management decisions. Ethiopia's own seedsystem strategy recognised that plantbreeding research should be supported by technical advances, including biotechnology, to raise agricultural productivity.[8]

Plant biotechnology and modern plant breeding provide important opportunities for strengthening agricultural cooperation among BRICS countries and partner nations such as Ethiopia. Collaborative research in areas such as drought tolerance, disease resistance, climate-smart agriculture, genome editing, and improved seed systems can help accelerate the development of resilient crop varieties adapted to changing environmental conditions.

Through knowledge exchange, technology transfer, joint research programmes, and capacity building, BRICS collaboration can support the development and dissemination of improved seeds that enhance productivity, food security, and farmer resilience. Effective seed systems are equally important in translating biotechnology research into farmer-level impact by ensuring that improved crop varieties are multiplied, certified, and distributed efficiently across farming communities. Strengthening cooperation among research institutions, seed enterprises, regulatory agencies, and extension services within the BRICS framework can therefore contribute massively to sustainable agricultural transformation and climate resilience.[9]

For Russia, this agenda is connected to the practical use of space infrastructure for development tasks. The country should not be presented only as a traditional space power with a strong historical legacy. Its relevant contribution to the BRICS food-security agenda lies in Earth observation, meteorological and radar satellites, navigation, communications, data processing, fertiliser expertise, and engineering education.

The Russian Earth remote sensing constellation includes satellites such as Resurs-P, Canopus-V, Kondor-FKA, Meteor-M, Elektro-L, and Arktika-M, whose data can be used for environmental monitoring, emergency response, disaster management, and other public-interest applications.[10] CEOS lists operational Russian missions across several relevant series, including Arktika-M, Elektro-L, Kanopus-V, Meteor-M, Kondor-FKA, and Resurs-P.[11] This gives Russia a diversified space database: optical imagery for land and crop assessment, meteorological satellites for weather and climate monitoring, radar observation for all-weather applications, and navigation services through the Global Navigation Satellite System (GLONASS).

GLONASS is important for transport, logistics, mapping, land management, precision agriculture, emergency response, and rural digitalisation. According to the official GLONASS Information and Analysis Centre, the constellation currently includes 28 satellites, of which 23 are operational.[12] For BRICS partners seeking to reduce dependence on a single provider, access to multiple navigation systems can strengthen resilience and interoperability.

Russia's emerging low Earth orbit communications projects also merit attention. Aerospace entity Bureau 1440 states that its low Earth orbit broadband system is designed to provide connectivity with data rates of up to 1 Gbps and latency under 70 m from an orbital altitude of about 800 km.[13] Recent reporting indicates that the first 16 satellites of the Rassvet constellation were launched on 23 March 2026.[14] For this article, the importance of such projects is not only restricted to commercial broadband. Low Earth orbit connectivity can support remote data transmission, tele-education, telemedicine, emergency services, rural connectivity, logistics, and real-time monitoring in regions where terrestrial infrastructure is weak.

The country's possible contribution to a BRICS agricultural resilience mechanism is therefore not a single technology export but an integrated package. Earth observation data for regions vulnerable to drought, floods, and soil degradation; navigation and geospatial expertise for precision agriculture and logistics; satellite communications for remote areas; and training capacity for specialists working across data, agriculture, biotechnology, and policy design are part of this integrated package.

The Russia–Ethiopia perspective is relevant because the two sides represent different parts of the same technological chain. Russia brings space infrastructure, industrial capabilities, data-processing potential, fertiliser expertise, and engineering education. Ethiopia brings the practical development problem: a large agricultural workforce, vulnerability to drought, biodiversity, seed-system challenges, and a growing biotechnology base. The Bio and Emerging Technology Institute of Ethiopia states that it has two specialised centres and 10 core directorates, including a Biotechnology Centre with Plant Biotechnology as one of its directorates.[15]

This combination makes it possible to examine BRICS technological cooperation not as a one-way transfer of technology, but as complementarity. One side brings infrastructure, platforms, and technical systems; the other brings field relevance, genetic resources, agricultural challenges, and applied development needs. At the same time, data sovereignty concerns inevitably shape how such cooperation unfolds: partner countries are cautious about storing and processing agricultural and geospatial data outside national jurisdictions, which complicates crossborder data sharing and requires mutually agreed frameworks for access, ownership, and usage rights. Balancing open collaboration with national security and commercial interests thus becomes a central governance challenge, demanding clear data localisation protocols, metadata exchange, and the joint stewardship of shared platforms.

This approach also helps avoid a narrow understanding of technological sovereignty. For developing countries, sovereignty does not mean isolation—it means the ability to access, adapt, govern, and develop critical technologies according to national priorities, from satellite data and seed technologies to digital tools and biosafety expertise. Ethiopia exemplifies this as its biosafety regulations (Proclamation No. 655/2009, amended in 2015) govern the research, testing, and commercialisation of genetically modified organisms, with a focus on risk assessment and biodiversity protection, while also safeguarding indigenous genetic resources in line with the Nagoya Protocol. In December 2024, Ethiopia further updated its rules to cover genomeedited crops and stackedgene plants, showing how regulatory frameworks can evolve to keep pace with biotech innovations.[16,17,18]

Recommendations for BRICS

BRICS should establish a dedicated mechanism on emerging technologies for food and agricultural resilience. Its purpose should not be another general expert dialogue, but applied projects at the intersection of satellite monitoring, biotechnology, agricultural analytics, and human capital development. Such a mechanism could include a working group on space-enabled agricultural resilience, a data-sharing platform for pilot regions, joint research on resilient crops, training programmes in geospatial and biotechnological applications, and demonstration projects in BRICS and partner countries.

The pilot could focus on drought-prone agricultural regions. Satellite data could monitor vegetation stress, soil moisture, and water availability, while biotechnology and plant-breeding expertise could support the selection or development of more resilient crop varieties. Ethiopia is a relevant case because its development risks are closely linked to drought, land degradation, and agricultural productivity. In 2024, the Climate Investment Funds approved a US$500-million plan to help drought-prone Ethiopia restore degraded land, protect forests, and strengthen food security. The programme is expected to support the restoration of more than 320,000 hectares of wild Arabica coffee forests, farmlands, and rangelands in Amhara, Oromia, South Ethiopia, and Somali regions.[19] A BRICS pilot could add a technological layer: satellite monitoring, crop-risk analytics, plant biotechnology, and local capacity-building.

A second pilot could focus on fertiliser efficiency and soil-health monitoring. Ethiopia's agricultural productivity is constrained not only by climate stress but also by input access. Recent reporting on a planned US$2.5-billion nitrogen fertiliser plant in Gode noted that Ethiopian farmers struggle with limited access to affordable fertilisers, and that fertiliser use is about 38 kg per hectare, compared to 119 kg per hectare in France.[20] Data-driven agriculture can help optimise input use, identify degraded soils, and connect fertiliser policy with crop resilience, water management, and seed-system development. For BRICS, this is an opportunity to link Russian fertiliser and agricultural expertise with satellite monitoring and African agricultural priorities.

A Russia–Ethiopia demonstration project on space-enabled and biotechnology-supported agricultural resilience could be a third pilot. Russian satellite data and geospatial expertise could help identify drought-prone areas, monitor vegetation stress, assess water availability, and map soil degradation. Ethiopian biotechnology and plant-breeding expertise could then help translate these signals into crop adaptation strategies, seed-system priorities, and field-level interventions. This would turn BRICS cooperation from a general statement about emerging technologies into a reproducible policy model: monitor risk from space, analyse it through national institutions, respond through biotechnology and agronomy, and strengthen local capacity. Capacity-building should be central to this agenda. One obstacle to effective cooperation is the shortage of specialists across space data, agricultural science, biotechnology, and policy. BRICS universities, research institutes, and specialised agencies could develop joint training programmes for officials, researchers, and practitioners. These programmes should include practical work with satellite data, agricultural modelling, laboratory methods, seed systems, data governance, biosafety, and policy design. The 2025 BRICS Agriculture Working Group declaration already supported the training of highly qualified personnel in sustainable agriculture. This could be expanded into a specialised track on space-enabled and biotechnology-supported agricultural resilience.[21]

The policy value of this agenda is that it gives BRICS a concrete development-oriented technological project. Instead of presenting the idea of 'technological sovereignty' as a slogan, BRICS can define it through practical cooperation in food, water, climate adaptation, and rural development. The connection between space data, biotechnology, and agricultural policy can help BRICS offer the Global South a set of practical instruments for resilience, and not an abstract alternative to existing institutions.

For this reason, the emerging technologies agenda in BRICS should be built around integration. Space systems, biotechnology, artificial intelligence (AI), agricultural science, fertiliser policy, and education should not be treated as separate tracks. Their real value appears when they are connected to a common development objective. Food security is one of the areas where this connection is most visible. It is also an area where the Russia–Ethiopia perspective can provide a balanced contribution: one side brings technological and space infrastructure, and the other brings agricultural biotechnology, biodiversity, and practical development needs.

Policy Recommendations

To harness the full potential of emerging technologies for food security and climate adaptation, BRICS members must move beyond isolated initiatives and build a coordinated, cross-sectoral framework that links space-based assets with agricultural innovation. Such a framework should be grounded in shared ownership, mutual learning, and the specific ecological and socio-economic realities of each member state and partner country.

This article outlines the following recommendations for BRICS:

- Establish a working mechanism on space-enabled agricultural resilience, bringing together space agencies, agricultural ministries, biotechnology institutes, universities, seed-system authorities, and development institutions.
- Avoid a model of one-way technology transfer and instead prioritise capacity-building, local adaptation, data governance, and the strengthening of national technological capabilities.
- Create joint training programmes on geospatial data, agricultural biotechnology, digital agriculture, biosafety, data governance, and technology regulation for researchers, officials, and practitioners.
- Develop a pilot platform for the exchange of applied satellite data related to agriculture, drought monitoring, water resources, land degradation, vegetation stress, and climate adaptation.
- Connect satellite monitoring with biotechnology and plant-breeding programmes, so that data on environmental stress can be translated into crop adaptation strategies and seed-system development.
- Launch demonstration projects in selected regions of BRICS and BRICS partner countries, with special attention to African agricultural systems vulnerable to drought, food insecurity, and climate shocks.
- Include fertiliser efficiency, soil-health monitoring, and input optimisation in the space-enabled agricultural resilience agenda.
- Include food security, space data, and biotechnology as a practical track within the broader agenda of emerging technologies.

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Endnotes

1 Food and Agriculture Organization of United Nations, , "The State of Food Security and Nutrition in the World 2025," https://openknowledge.fao.org/items/4b1f7d26-267d-4a81-aed4-4f9de4d93f85.

2 IPCC, *Climate Change 2022: Impacts, Adaptation and Vulnerability*, Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, 2022.

3 BRICS Agriculture Working Group, "Joint Declaration of the 15th Meeting of BRICS Ministers of Agriculture," *Brasília,* April 17, 2025.

4 GEOGLAM, "Global Agriculture Monitoring," https://geoglam.org/ag-monitoring/.

5 ADB, *Country Focus Report 2024: Ethiopia*, Abidjan, African Development Bank, 2024.

6 World Bank, "Agriculture, Forestry, and Fishing, Value Added (% of GDP): Ethiopia," World Development Indicators.

7 World Bank Group, *Climate Risk Country Profile: Ethiopia*, Washington DC, World Bank Group, 2021.

8 Federal Democratic Republic of Ethiopia, Ministry of Agriculture, *Seed System Development Strategy* (Addis Ababa: Ministry of Agriculture, 2013).

9 African Development Bank, "Technologies for African Agricultural Transformation (TAAT)," https://www.afdb.org/en/topics-and-sectors/initiatives-partnerships/technologies-african-agricultural-transformation-taat.

10 Russian Federation, "Space2030 Agenda Midterm Review: Submission by the Russian Federation," United Nations Office for Outer Space Affairs, 2025.

11 Committee on Earth Observation Satellites, "Earth Observation Satellites from Roscosmos," in *CEOS Earth Observation Handbook.*

12 GLONASS Information and Analysis Centre, "GLONASS Constellation Status," https://glonass-iac.ru/en/sostavOG/.

13 Bureau 1440, "Tech Capacity," https://1440.space/en/.

14 Will Knight, "Meet Rassvet, Russia's Answer to Starlink," *Wired*, May 8, 2026, https://www.wired.com/story/meet-rassvet-russias-answer-to-starlink/.

15 Bio and Emerging Technology Institute, "Research Centers," BETin.

16 Federal Democratic Republic of Ethiopia, "Biosafety Proclamation No. 655/2009," Federal Negarit Gazeta, 2009.

17 Federal Democratic Republic of Ethiopia, *Biosafety (Amendment) Proclamation No. 896/2015," Federal Negarit Gazeta, 2015.

18 Convention on Biological Diversity, *Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity*, Montreal, Secretariat of the Convention on Biological Diversity, 2011.

19 USDA FAS, *Biotechnology and Other New Production Technologies Annual: Ethiopia*, Addis Ababa, US Department of Agriculture Foreign Agricultural Service, 2025.

20 "Climate Investment Funds Board Backs $500 mln Ethiopia Nature Plan," *Reuters*, December 4, 2024.

21 "Africa's Wealthiest Man to Build One of the Continent's Largest Fertilizer Plants in Ethiopia," *Le Monde*, September 12, 2025.

The Global South Labour That Runs the Modern AI Economy: A Case for BRICS Stewardship

Shashank Mohan, Seerat Jabeen, and Nirmala Gopal

Abstract

COUNTRIES OF THE GLOBAL SOUTH bear a disproportionate share of the development costs of artificial intelligence (AI), both as suppliers of data labour and as the primary sites where emerging systems are deployed, tested, and iterated upon. This asymmetry between the Global North and Global South reflects patterns of technological extraction where the South absorbs risk while value accrues elsewhere. Can BRICS operate as a forum to help close this AI development gap? This article explores the common frameworks that could enable BRICS member states to leverage their structural position as primary suppliers of data labour in the global AI supply chain. It examines the mechanisms that could translate these frameworks into model standards that advance the protection and well-being of this data labour, recognise it as a critical component of the global AI stack, and enable responsible AI development.

Introduction: What Is Data Labour?

A news story in late May 2026 illuminated a disturbing reality for the future of Indian labour.[1] Workers in a textile factory in Western India were made to strap cameras to their foreheads as they worked. The cameras were meant to capture their every move, and the workers could only take them off during toilet and lunch breaks. This data extraction was intended to train future robots that could soon replace these very workers.[2] Such invisible data labour[a] is critical to the artificial intelligence (AI) global supply chain,[3] and is disproportionately sourced from the Global South,[4] contributing to what scholars have called "data colonialism".[5] In their book *Data Grab: The New Colonialism of Big Tech and How to Fight Back* (2024), Ulises Mejias and Nick Couldry argue that the labour that goes into training AI systems is frequently performed by people in need in the Global South.[6] This unequal relationship between the people who perform this labour and the ones who benefit from it replays the global division of labour that is a long-term colonial legacy.

Machine learning systems such as large language models (LLMs) process high volumes of human-generated data to train their algorithms to mimic human language, tone, and behaviour.[7,8] Data labellers teach them to distinguish between text and images, and understand the human physical and linguistic world.[9] For instance, cameras on driverless cars can recognise a pedestrian crossing because humans have helped these systems learn to do so. An explanation for this is data annotators sort large quantities of captured video from streets around the world into categories such as pedestrian crossing, lamppost, and traffic lights. This labelling helps AI algorithms learn about the physical world.

a Data labour' is a concept that entails the generation, labelling, management, and moderation of data for various digital services. This labour includes the work that users put in to train algorithms on social media feeds; the labour of labelling data to train modern-day AI models; it can be the ego-centric data that is generated by people who record themselves performing everyday chores to train AI robots; and it includes the labour of human content moderation that keeps online feeds clean and safe. As the AI economy evolves, there may be more functions feeding into the digital services and AI stack that relies on human labour for creating and maintaining digital services. This labour is informal and highly precarious. This article uses 'data labour' or 'data work' to denote work that directly feeds into the development of the AI stack: data labelling and ego-centric data collection for robot training. But since data workers might perform many jobs in a day and their relationship with providers does not change based on the type of work, readers must keep the broader data labour ecosystem framing while assessing challenges and policy solutions.

This training, known as 'ghost work', often exploits economic and social conditions in less-developed countries such as India and South Africa, using labour and regulatory arbitrage to access on-demand labour.[10,11] While this labour is globally distributed, it is disproportionately concentrated in the Global South. BRICS members can make this data labour visible to highlight the critical role their populations play in developing the global AI stack.

How Data Labourers Are Exploited

The market for exploitative data labour in the form of gig work is not new, especially for dominant technology firms like Meta.[12] To keep their social media platforms such as Facebook and Instagram free from violent and hateful content, they subject human content moderators sitting in countries like Kenya or Colombia to unreasonable working hours and harsh working conditions.[13] This exploitative archetype is now being used to train AI models and future robots. The management of these gig workers, whether for food delivery or data annotation, is often delegated to opaque algorithms, which can cut pay, suspend contracts, and penalise them for low performance.[14] This type of management often results in physical, psychological, and sexual harm.[15]

In Kenya, for instance, data workers have initiated a class action lawsuit against Meta and Sama (a sub-contractor) for workplace abuse.[16] In India, where labour regulation and welfare laws are weak, wages are abysmally low, and workers often migrate to urban spaces for jobs, data work is promoted with a promise of dignity and safety, but ends up serving commercial goals rather than offering meaningful dignity to the labourers.[17] A 2021 report by the National Association of Software and Service Companies (NASSCOM) predicts that by 2030, around one million workers could be engaged in data work in India.[18] Analysts have pointed out that in countries like India, which is home to the world's largest share of online gig workers,[19,20] highly precarious data work is largely carried out by women, who have little bargaining power, if at all, and are exposed to physical and mental abuse.[21,22]

Similarly, while the rise of platform work in, say, South Africa, could provide economic opportunities, it also leads to certain challenges for workers. A comparative study of food courier motorbike riders in Accra (Ghana), Johannesburg (South Africa), and Nairobi (Kenya),[23] highlighted a new form of precarious work undertaken predominantly by men working long hours with no paid leave or social security benefits. The study found that these riders faced constant risks of accidents and harassment, while the hiring companies do not provide even basic occupational health and safety protection. While these harms are evident in the case of platform labour, data work is an extension of the same economy and is bound to follow a similar trajectory, unless safety is woven into the architecture right from the inception stage.

Workers who sustain AI systems are not peripheral actors; they form the foundation of the entire AI supply ecosystem. The data labour problem primarily concerns labour governance issues, with millions of workers facing poor conditions such as low wages and weak protections.[24] Technology firms exploit platform-based labour by outsourcing tasks globally, often classifying workers as independent contractors, thus limiting their access to essential rights and protections.[25] Algorithmic administration exacerbates these vulnerabilities, utilising rating systems and automated decisions to control workers without traditional employer obligations.[26] This leads to the "invisibilisation of labour", where substantial economic contributions remain undercompensated and anonymous.[27] Although the International Labour Organization (ILO) promotes initiatives to protect worker rights, there is currently no comprehensive international legal framework for data labour.[28] As a result, regulatory inconsistencies leave many workers exposed to exploitation.

Regulatory and Policy Gaps: India and South Africa

Exploitative acts towards data labour do not emerge in a vacuum. Rather, they are enabled, and often intensified, by gaps in existing labour and regulatory frameworks. Although platform behaviour plays an important role, labour exploitative harms cannot be solely attributed to that; regulatory lacunae also contributes.

India and South Africa illustrate this issue.[29,30] While the two have different labour histories, their existing labour law frameworks were largely designed around a conception of employment that largely presupposes an identifiable employer–employee relationship.[31] Data labourers often do not fit this mould as they work through intermediary platforms and are often classified as independent contractors, thereby getting excluded from the protections that formal employment status would confer. [32,33,34]

India

In India, the Code on Social Security (CSS) represents a meaningful first step to extend certain protections to the unorganised labour force, including gig and platform workers.[35] The CSS formally acknowledges, for the first time, that these categories of labour exist and warrant recognition. It defines gig workers as those who perform work outside the traditional employer–employee relationship, and platform work to mean a work relationship negotiated via an online platform.[36] It allows the Government of India to frame welfare schemes for gig and platform workers covering health benefits, old-age protection, education, and life cover (including other benefits decided by the central government), and envisions the creation of a social security fund partially contributed to by aggregators.[37]

While it is proceeding in the right direction, in practice, the CSS remains inoperative in India at the time of writing, with welfare schemes for gig and platform workers awaited. Its coverage also remains uncertain. The schedule lists categories of work eligible for social security contribution by aggregators but does not account for newer forms of work such as data annotation or training AI models, including robots. Commentators have also pointed out obstacles even for traditional gig workers regarding implementation, disregard of disguised employment,[b,38] the optional nature of social security,[39] mandatory registration for all gig and platform workers,[40] and non-recognition of multi-platform work.[41]

Data labourers comprise a particularly vulnerable subset of this workforce, yet they remain effectively invisible both within these projections and the policy architecture that surrounds them. This is a structural omission that has governance consequences, given that workers who remain statistically uncounted will, in practice, remain unrepresented in policymaking.

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b Disguised employment': the disguising of the employment relationship between online platforms and workers. Although often of contractual nature, often online platforms singlehandedly determine the terms and conditions of the contract between them and the workers.

As a social security code, CSS's scope is confined to welfare protection and does not address working conditions. Challenges such as opacity of algorithmic task allocation, mandatory non-disclosure agreements,[42] unilateral changes to pay structures, or the psychological toll of moderation work are outside its ambit by design. Addressing these may require a separate, specialised instrument, or making changes to other labour laws. None of the codes and regulations operational in India currently were designed with the specificity of data labour.

South Africa

In South Africa, platform- or gig-based work provide 'self-employment' opportunities for many young people desperate for an income. Drawing on the traditional gig economy, with promises of 'flexibility' and 'freedom', the platform companies lead workers to believe they are in a 'partnership', as opposed to simply being employed. This platform business model has transformed the employer–employee relationship and undermined worker rights.[43] It is also probable that high unemployment levels in South Africa influenced these companies to avoid South African national labour regulations by presenting themselves as technology intermediaries rather than geographically tethered service providers.[44]

A proposed amendment 50A to the Basic Conditions of Employment Act of South Africa,[45] introduced in 2025, represents a potentially significant step. It incorporates expanded definitions of 'employer' and 'employee' that could extend labour protections to platform workers. However, the discussion around the platform economy is still "like a battlefield,"[46] and the amendment itself is pending.

Like the CSS in India, the amendment 50A does not establish a framework to address platform or gig sector-specific working conditions. While classifying data labourers as 'employees' would extend them basic social security, the specific harms around data work will remain unaddressed, as they require dedicated regulatory interventions.

The Fairwork project's evaluation of digital labour platforms across both India and South Africa confirms the scale of the regulatory gap.[47] Only 25 percent of evaluated digital labour platforms ensured payments to their workers that were at least equivalent to the minimum wage, and offered health and safety protections or transparent appeal processes, with fewer than 10 percent recognising freedom of association. Data labourers are bound to be subjected to the same platform logic, which remains informal, unbundled, jurisdictionally ambiguous, but with even less visibility and without any monitoring or regulatory attention similar to the Fairwork project.

Why Data Labour Protection Is Important for BRICS

The implications of the data labour model extend beyond worker welfare and are directly relevant to the strategic interests of BRICS countries. Muldoon et al. (2024) highlight "AI data work" as essential for AI development, raising important concerns for labour rights.[48] This issue affects data sovereignty, technological growth, governance, and geopolitical relations as well. Heylyung Yun (2024) emphasises the need for a nuanced digital governance approach that transcends the simplistic competition-versus-cooperation paradigm, illustrating how geographical boundaries are mirrored in cyberspace through diverse data practices.[49]

The BRICS nations, as some of the key global emerging economies, play a critical role in the global AI landscape. They serve as leading suppliers of AI labour, and are major emerging consumer markets and innovation hubs.[50] Their growing influence in global governance underscores the need to incorporate their perspectives into frameworks to protect citizens and manage data responsibly. Recent BRICS declarations, especially the 2025 Rio Leaders' Statement on the Global Governance of AI (BRICS AI Statement 2025),[51] emphasise AI governance and digital sovereignty, aiming for inclusive digital development and equitable technology transfer.

However, Couldry and Mejias (2024), and Kate Crawford (2021) warn that if the global digital and AI economy concentrates power in a few countries and corporations while positioning much of the Global South as resources, labour, and data suppliers rather than decision-makers, the South may remain merely a supply source, with limited say in governance, thus perpetuating existing inequalities.[52,53] This article argues that BRICS members should proactively engage in drafting key protocols that protect their economic and regional priorities regarding AI development.

The Current Gap in BRICS

Regulatory shortcomings at the national level are mirrored by similar limitations at the multilateral level. BRICS declarations have progressively engaged with AI governance, including, most notably and recently, the BRICS AI Statement 2025,[54] which represented a meaningful advance. Among other commitments, the declaration affirmed that AI poses risks to working conditions, work intensity, job displacement, and threats to employment and workers' dignity. It stresses the importance of safeguarding the rights and well-being of all workers, particularly those directly affected by digital transformation. While largely framed from the perspective of future readiness, it signals a welcome shift from labour being positioned as an afterthought to having an acknowledged stake in global governance discourse.

However, the 2025 Statement stops short of specifically naming data labour or proposing concrete, implementable mechanisms to operationalise its commitments towards workers in the global AI supply chain, such as model protocols, common principles for compensation, or occupational standards. In this context, the upcoming India BRICS summit in September 2026 is an opportunity to frame data labour as a matter of digital sovereignty and an important contributor to the global AI supply chain. This invisible labour force is critical to the development and maintenance of AI systems and helps counter dominant nations' claim of being the deserving creators, managers, and beneficiaries of technological development. This recognition of data labour will also help the supplying countries negotiate an equal seat at the table in the development, governance, and deployment of emerging technologies.

Globally, the International Labour Organization (ILO) is the primary institution with the mandate, expertise, and universal reach to set global labour standards, which become binding on member states upon ratification. The ILO Convention No. 193 on Decent Work in the Platform Economy,[55] adopted in June 2026, sets the first international labour standard for platform work.[56]

The definitions in it are broad enough to cover platform work, “regardless of whether that work is performed online or in a specific geography.”[57] If ratified under state jurisdictions, this could act as a pushback towards the ‘digital platforms as technological intermediary’ defence that have been used in the past and would bring data annotation and other AI supply chain work within its ambit.[58]

In-principle formal coverage, however, often does not turn into enforceable protection. This is where BRICS holds a comparative structural advantage over ILO, especially for the Global South. Currently, the success of the ILO Convention No. 193 stands contested in the Global South, with the Indian government notably abstaining from voting on it and South Africa voting in its favour.[59,60] A platform like BRICS, centred on negotiating economic and political interests among its members, becomes a more effective platform to build consensus among countries on the direction of data labour. BRICS can directly negotiate a political buy-in on Global South data-labour-supplying states. A labour protocol negotiated among the supplying members themselves would not just be more representative of their interests and participatory in nature but would be practically enforceable. This kind of protocol should therefore be charted out in tandem with the evolving ILO considerations on data work to supplement structural thinking with practical enforceability.

Recommendations

While this article has highlighted the precarity of data work within the global AI supply chain, it does not argue that such work should be ceased. Rather, it suggests that working conditions should be regulated in the interests of worker dignity and well-being, as recognised by the BRICS AI Statement 2025.

BRICS should move beyond declarations towards tangible commitments by putting in place structures like a Digital Labour Protocol, a model instrument developed by and for Global South countries. This could become a tangible instrument to advance data labour protection standards as well as a strong positioning mechanism for Global South actors to proactively set their own priorities rather than adopt them from the Global North.

Strategic Policy Recommendations

A more concrete set of policy interventions is required to translate these principles into action. BRICS nations should pursue five strategic priorities to embrace their agency and transform their position from AI input providers to governance partners:

Create a BRICS Data Labour Protocol

BRICS should develop a dedicated Data Labour Protocol to address the gaps in the ILO Convention 193. While some data labourers may fall within the Convention's protection if their work coincides with platform work, in its current form it does not directly address issues around data labour. More importantly, the convention itself only becomes effective if ratified by countries. The convention also does not recognise AI data labourers, including data annotators, content moderators, model evaluators, and supply-chain workers as a distinct category, leaving them vulnerable to AI-supply-chain-specific risks like psychological harm from repeated exposure to distressing content, opacity in algorithmic task allocation,[61] and non-disclosure agreements restricting worker concerns.

BRICS should introduce a model Data Labour Protocol drawn up collaboratively by member states that is representative of member interests and practically implementable. The adoption could be voluntary to start with and eventually be phased into a more solid, region-specific set of data labour protocols across member nations.

The protocol should include explicit recognition of AI data workers, as a distinct category that requires targeted protection against occupational hazards. It should also establish standards for occupational health, grievance redressal, fair wages, right to form associations, and other labour rights, such as severance packages and mental health support.

This protocol fits within BRICS' existing economic and industrial policy priorities. BRICS has historically convened around trade, investment, and value-chain positioning for its member economies; data labour represents the digital economy manifestation of the same asymmetry BRICS has long sought to correct in commodities and manufacturing, where Global South states supply low-paying inputs while value concentrates elsewhere. In this context, the envisioned protocol is not an expansion of BRICS' scope but an application of it to a new and rapidly growing sector.

Reform Labour Laws

The BRICS Data Labour Protocol or any intervention made will only have an impact if it is adopted into the national legislation, particularly by India and South Africa. This would ensure that both the Indian CSS and the South African Basic Conditions of Employment Act evolve keeping data labour as a recognised category. These social security reforms should be developed in tandem with the labour protocol to establish a clear and enforceable set of guidelines for this new emerging employer-employee relationship. Governments, particularly in these two countries, should reform labour laws to support better data collection for platform-based workers, recognising their status as distinct from traditional employment models. This involves extending rights and benefits to independent contractors and implementing mandatory registration for all gig workers to aid in tracking and representation

Strengthen Digital Sovereignty

Digital sovereignty is a top priority for the Global South, including the BRICS countries.[62] As the United States (US) exerts its technological dominance through export control and supply-chain sanctions, [63,64] other nations are keen to enhance their self-sufficiency.[65] Investing in domestic AI capacity is sound public policy, but countries need to rationalise the extent of self-reliance when it comes to a truly global AI supply chain. For instance, India joining the US-led Pax Silica initiative to consolidate the supply chain for critical AI resources might be strategic, but does not bolster its digital sovereignty claims.[66]

The AI supply chain is globally distributed by design.[67] NVIDIA and Apple have built trillion-dollar businesses because they outsourced manufacturing capacity to manufacturers like TSMC in Taiwan.[68] The most advanced lithographic machine needed to make cutting-edge semiconductors only comes from one factory in the Netherlands,[69] and data-centre capacity is still concentrated within Big Tech firms.[70] For building modern AI models, NVIDIA not only controls the physical supply of advanced chips but runs its chips exclusively on proprietary software.[71] In this scenario, BRICS nations must be creative about supply chain diversification and closely coordinate to protect against risks of concentration. Instead of traditional notions of state sovereignty, they could explore "commons digital sovereignty,"[72] which advances the concept of collective production of digital public goods.

They must build on their existing strengths, for instance, China's semiconductor production or India's software expertise and distribute critical components of the AI stack in public interest across the Global South.[73] A Digital Labour Protocol could operate in a similar manner by establishing ethical and labour protective tools and agreements to enhance resilience and diffuse concentration. Building on innovative proposals such as the BRICS Platform on Digital Public Goods,[74] a repository for all open-source technology applications created by BRICS members, AI sovereignty must be a shared goal met by collaboration and coordination, and in the interests of the people of the Global South.

Harmonise BRICS Positions in AI Governance

BRICS members should coordinate their positioning across global and multilateral processes and forums to create a united position on data labour and their participation in it. Currently, engagements by member states remain scattered and uncoordinated. A unified front could strengthen their supply-side position as a whole. Countries that provide substantial AI labour should have a proportionate voice in establishing the rules governing the global AI economy.[75] While harmonising may not, and should not, mean identical domestic policies, given the diversity of experiences and contexts among nations, a shared understanding on fundamental priorities could be a solid structure.

Taken together, these recommendations point towards a broader vision of equitable participation in the AI economy. Through coordinated action on labour standards, digital sovereignty, AI governance, infrastructure development, and multilateral reform, BRICS can transform the Global South from a site of digital extraction into a co-author of the future digital order.

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Endnotes

1 Soumyarendra Barik, "'I'm Working in My Own Grave': Workers in India Are Training Robots That May Replace Them," *The Indian Express*, May 20, 2026, https://indianexpress.com/article/business/workers-india-training-robots-replace-factory-10698712/.

2 Billy Perrigo, "Inside Facebook's African Sweatshop," Business, *TIME*, February 14, 2022, https://time.com/6147458/facebook-africa-content-moderation-employee-treatment/; Shivani Kava, "Bengaluru Market Vendors Hired to Train AI Robots That Could Replace Them," *Newslaundry*, June 16, 2026, https://www.newslaundry.com/2026/06/16/bengaluru-market-vendors-hired-to-train-ai-robots-that-could-replace-them.

3 Andrew Deck, "The Workers at the Frontlines of the AI Revolution," *Rest of World*, July 11, 2023, https://restofworld.org/2023/ai-revolution-outsourced-workers/.

4 Sreya Nair, *Invisible Workers, Visible Harm: Perils and Precarities of AI Labour*, Aapti Institute, 2026, https://aapti.in/blog/invisible-workers-visible-harm-perils-and-precarities-of-ai-labour/.

5 Nick Couldry and Ulises A. Mejias, "Data Colonialism: Rethinking Big Data's Relation to the Contemporary Subject," *Television & New Media* 20, no. 4 (2019): 336–49, https://doi.org/10.1177/1527476418796632.

6 Ulises A. Mejias and Nick Couldry, *Data Grab: The New Colonialism of Big Tech and How to Fight Back* (University of Chicago Press, 2024).

7 Cole Stryker, "What Are Large Language Models (LLMs)? | IBM," *Think*, October 6, 2021, https://www.ibm.com/think/topics/large-language-models.

8 Asmita Bhutani Vij, "Women Workers Behind the AI Revolution: The Production and Reproduction of Data Annotation Platforms," *TSpace*, November 2023, https://utoronto.scholaris.ca/items/42b5a919-a98d-44ac-a257-8f81a41aa47b.

9 Nair, *Invisible Workers, Visible Harm*.

10 Siddharth Suri and Mary L. Gray, *Ghost Work: How to Stop Silicon Valley from Building a New Global Underclass - International Labour Organization,* https://labordoc.ilo.org/discovery/fulldisplay/alma995064693102676/41ILO_INST:41ILO_V1.

11 Disha Verma, *Labor in the Shadows: Rights and Risks for Asia's Data Workers*, Tech Global Institute, 2025, https://techglobalinstitute.com/research/labor-in-the-shadows-rights-and-risks-for-asias-data-workers/.

12 Vittoria Elliott, "Meta's Gruesome Content Broke Him. Now He Wants It to Pay," Tags, *Wired*, February 6, 2023, https://www.wired.com/story/meta-kenya-lawsuit-outsourcing-content-moderation/.

13 Equidem, *Scroll. Click. Suffer: The Hidden Human Cost of Content Moderation and Data Labelling—Equidem*, 2025, https://equidem.org/reports/scroll-click-suffer-the-hidden-human-cost-of-content-moderation-and-data-labelling/.

14 "Scroll. Click. Suffer: The Hidden Human Cost of Content Moderation and Data Labelling—Equidem".

15 "Scroll. Click. Suffer: The Hidden Human Cost of Content Moderation and Data Labelling—Equidem".

16 Sonia Kgomo, "I Was a Content Moderator for Facebook. I Saw the Real Cost of Outsourcing Digital Labour," *The Guardian*, February 12, 2025, https://www.theguardian.com/commentisfree/2025/feb/12/moderator-facebook-real-cost-outsourcing-digital-labour.

17 Anuj Behal, "'In the End, You Feel Blank': India's Female Workers Watching Hours of Abusive Content to Train AI," *The Guardian*, February 5, 2026, https://www.theguardian.com/global-development/2026/feb/05/in-the-end-you-feel-blank-indias-female-workers-watching-hours-of-abusive-content-to-train-ai; Shivam Rastogi Khan Samiya, "A Data Labeller Spots AI Bias against Their Community," *The Third Eye*, July 28, 2025, https://thethirdeyeportal.in/praxis/a-data-labeller-spots-ais-biases-against-their-community-what-do-they-do/.

18 NASSCOM, *Data Annotation—Billion Dollar Potential Driving the AI Revolution*, 2020, https://community.nasscom.in/communities/ai/data-annotation-billion-dollar-potential-driving-ai-revolution.

19 Sumit Khanna and Rina Chandran, "Unable to Find Good Jobs, Youth in India Are Turning to Scam Call Centres and Online Microwork," *Scroll*, March 26, 2023, https://scroll.in/article/1046158/unable-to-find-good-jobs-youth-in-india-are-turning-to-scam-call-centres-and-online-microwork.

20 NITI Aayog, *India's Booming Gig and Platform Economy*, 2022, https://www.niti.gov.in/sites/default/files/2022-06/25th_June_Final_Report_27062022.pdf.

21 "Labor in the Shadows: Rights and Risks for Asia's Data Workers".

22 Bhutani Vij, "Women Workers Behind the AI Revolution."

23 Edward Webster and Fikile Masikane, "I Just Want to Survive." A Comparative Study of Food Courier Riders in Three African Cities (2021)," https://southafrica.fes.de/fileadmin/user_upload/I_just_want_to_Survive.pdf.

24 Antonio A. Casilli, *Waiting for Robots: The Hired Hands of Automation* (Chicago: University of Chicago Press, 2025).

25 Lorenzo Cini, "How Algorithms Are Reshaping the Exploitation of Labour-Power: Insights into the Process of Labour Invisibilization in the Platform Economy," *Theory and Society* 52, no. 5 (2023): 885–911, https://doi.org/10.1007/s11186-023-09520-9; Alex J. Wood et al., "Good Gig, Bad Gig: Autonomy and Algorithmic Control in the Global Gig Economy," *Work, Employment and Society* 33, no. 1 (2019): 56–75, https://doi.org/10.1177/0950017018785616.

26 Cini, "How Algorithms Are Reshaping the Exploitation of Labour-Power."

27 Niels van Doorn, "Platform Labor: On the Gendered and Racialized Exploitation of Low-Income Service Work in the 'on-Demand' Economy," *Information, Communication & Society* 20, no. 6 (2017): 898–914, https://doi.org/10.1080/1369118X.2017.1294194; Wood et al., "Good Gig, Bad Gig."

28 Odilile Ayodele and Vhonani Petla, "Leveraging the BRICS Digital Partnership for Collaborative Digital Governance," *Journal of BRICS Studies* 3, no. 1 (2024): 1–7, https://doi.org/10.36615/feg0h138.

29 Anuj Kumar and Shivam Shani, "Gig Workers in India: Bridging Legal Gaps and Ensuring Sustainability," *NLIU Law Review* 14, no. 2 (2024), https://nliulawreview.nliu.ac.in/journal_articles/gig-workers-in-india-bridging-legal-gaps-and-ensuring-sustainability/.

30 Labour Relations Act, 1995, 1877 (1995), https://faolex.fao.org/docs/pdf/saf213396.pdf.

31 Sangam Tripathy, "The ILO Convention on Platform Labour: A Verdict," Features, *Asian Labour Review*, July 3, 2026, https://labourreview.org/verdict-ilo-convention-platform/.

32 Michelle Du and Chinasa T. Okolo, “Reimagining the Future of Data and AI Labor in the Global South,” *Brookings*, October 7, 2025, https://www.brookings.edu/articles/reimagining-the-future-of-data-and-ai-labor-in-the-global-south/.

33 Equidem, *Realising Decent Work in the Platform Economy: Addressing Intermediated Platform Employment in Food Delivery and Data Work—Equidem*, 2025, https://equidem.org/reports/realising-decent-work-in-the-platform-economy-addressing-intermediated-platform-employment-in-food-delivery-and-data-work/.

34 Valerio De Stefano et al., “Platform Work and the Employment Relationship,” *preprint,* February 25, 2021, https://webapps.ilo.org/static/english/intserv/working-papers/wp027/index.html.

35 The Code on Social Security, 2020, Act No. 36 of 2020 (2025), https://www.indiacode.nic.in/bitstream/123456789/16823/1/aA2020-36.pdf.

36 The Code on Social Security, 2020, Act No. 36 of 2020.

37 The Code on Social Security, 2020, Act No. 36 of 2020.

38 Gayatri Singh and Akhil Surya, “Trapped in a Disguised Employment Relationship, India’s Platform Workers Deserve a New Lease on Social Security,” *The Leaflet*, June 13, 2025, https://theleaflet.in/labour-law/trapped-in-a-disguised-employment-relationship-indias-platform-workers-deserve-a-new-lease-on-social-security.

39 Singh and Surya, “Trapped in a Disguised Employment Relationship, India’s Platform Workers Deserve a New Lease on Social Security.”

40 Suresh Nadagoudar and Rajashree Patil, “Social Security Code 2020: An Analysis,” *Christ University Law Journal* 10, no. 2 (2021): 19–42, https://doi.org/10.12728/culj.19.2.

41 Tanmay Satvik, *Logged In, Left Out: How Code On Social Security, 2020 Only Mentions About India’s Gig Workers*, LiveLaw, March 26, 2026, https://www.livelaw.in/articles/code-on-social-security2020-india-gig-workers-527945.

42 Margarida Silva, *Big Tech Sets Unfair Terms and Conditions for AI Data Workers Globally*, 2026, https://www.somo.nl/big-tech-sets-unfair-terms-and-conditions-for-ai-data-workers-globally/.

43 Edward Webster et al., “Beyond Traditional Trade Unionism: Innovative Worker Responses in Three African Cities,” in *Labour Conflicts in the Global South,* ed. Andreas Bieler and Jörg Nowak (London: Routledge, 2022).

44 Brenda Mwale and Ruth Castel-Branco, “South Africa’s Gig Economy Workers Set to Get More Protection under Planned Labour Law Reforms,” *The Conversation*, March 22, 2026, https://doi.org/10.64628/AAJ.vmsp7qee5.

45 Mwale and Castel-Branco, “South Africa’s Gig Economy Workers Set to Get More Protection under Planned Labour Law Reforms.”

46 Mwale and Castel-Branco, “South Africa’s Gig Economy Workers Set to Get More Protection under Planned Labour Law Reforms.”

47 Mark Graham et al., *Fair Work in the Platform Economy and AI Supply Chain | Policy Brief G20 South Africa 2025*, Policy Brief (G20 South Africa 2025, n.d.), https://www.global-solutions-initiative.org/wp-content/uploads/2026/02/T20_TF2_SB3_PB5_PlatformEconomy.pdf.

48 Eric W. Liguori et al., “Charting the Future of Entrepreneurship: A Roadmap for Interdisciplinary Research and Societal Impact,” *Cogent Business & Management* 11, no. 1 (2024): 2314218, https://doi.org/10.1080/23311975.2024.2314218.

49 Heylyung Yun, "China's Data Sovereignty and Security: Implications for Global Digital Borders and Governance," *Chinese Political Science Review* 10 (2025):178-203, https://doi.org/10.1007/s41111-024-00269-9.

50 Kenny Shui et al., *Technology and Innovation Report 2025: Inclusive Artificial Intelligence for Development*, United Nations, 2025, https://unctad.org/system/files/official-document/tir2025_en.pdf.

51 "BRICS Leaders' Statement on the Global Governance of Artificial Intelligence," BRICS Brasil, 2025, http://www.brics.utoronto.ca/docs/250706-ai.html.

52 Couldry and Mejias, "Data Colonialism: Rethinking Big Data's Relation to the Contemporary Subject".

53 Kate Crawford, *Atlas of AI* (Yale Books, 2021), https://yalebooks.yale.edu/book/9780300264630/atlas-of-ai/.

54 "BRICS Leaders' Statement on the Global Governance of Artificial Intelligence".

55 ILO, *Convention 193: Decent Work in the Platform Economy Convention, 2026*, Labour standards C193, International Labour Organization, Geneva, June 12, 2026, https://wwwex.ilo.org/dyn/r/normlex/files/static/v126Y/authentic/C193-authentic.pdf.

56 ILO, *International Labour Conference Ends with Adoption of the First Convention on Decent Work in the Platform Economy,* International Labour Organization, https://www.ilo.org/resource/news/ilc/ilc114/international-labour-conference-ends-adoption-first-convention-decent-work.

57 International Labour Organization, *Convention 193: Decent Work in the Platform Economy Convention, 2026*, https://normlex.ilo.org/dyn/nrmlx_en/f?p=NORMLEXPUB:12100:0::NO::P12100_INSTRUMENT_ID:4496059.

58 Tripathy, "The ILO Convention on Platform Labour: A Verdict".

59 Shivendu Jaiman and Archit Garg, *ILO'S Convention for Platform Workers: Analysing India's Abstention and Its Implications*, Articles, July 15, 2026, https://www.livelaw.in/articles/ilo-convention-platform-workers-analysing-india-abstention-implications-541178.

60 "Results of the Vote on the Adoption of the Decent Work in the Platform Economy Convention, 2026," International Labour Organization, June 12, 2026, https://www.ilo.org/resource/conference-paper/ilc/ilc114/results-vote-adoption-decent-work-platform-economy-convention-2026.

61 Chunhong Guo et al., "The Double-Edged Sword Effects of Algorithmic Opacity: The Self-Determination Theory Perspective," *Acta Psychologica* 260 (October 2025): 105600, https://doi.org/10.1016/j.actpsy.2025.105600.

62 Min Jiang and Luca Belli, eds., *Digital Sovereignty in the BRICS Countries: How the Global South and Emerging Power Alliances Are Reshaping Digital Governance*, Communication, Society and Politics (2024; Cambridge University Press, 2025), https://doi.org/10.1017/9781009531085.

63 Nisha Talagala, "The AI Blackout: What the Anthropic Fable Ban Means for Business," *Forbes*, July 9, 2026, https://www.forbes.com/sites/nishatalagala/2026/07/09/the-ai-blackout-what-the-anthropic-fable-ban-means-for-business/.

64 "Beijing Denounces US Chip Curbs as Threat to Global Supply Chains," *South China Morning Post*, July 17, 2026, https://www.scmp.com/news/us/article/3360846/beijing-denounces-us-chip-curbs-threat-global-supply-chains.

65 Cabinet, Government of India, https://www.pib.gov.in/Pressreleaseshare.aspx?PRID=2284784.

66 Konark Bhandari, "India Signs the Pax Silica—A Counter to Pax Sinica?," Carnegie Endowment for International Peace, March 3, 2026, https://carnegieendowment.org/russia-eurasia/posts/2026/03/india-signs-the-pax-silicaa-counter-to-pax-sinica.

67 Chris Miller, *Chip War—The Fight for the World's Most Critical Technology* (Simon and Schuster UK, 2023).

68 "Chip War—The Fight for the World's Most Critical Technology"; Helen Davidson and Chi-hui Lin, "How Taiwan Secured Semiconductor Supremacy – and Why It Won't Give It up," *The Guardian*, July 19, 2024, https://www.theguardian.com/world/article/2024/jul/19/taiwan-semiconductor-industry-booming.

69 Kai Nicol-Schwarz, "Why Nvidia's AI Boom Couldn't Happen without Dutch Chip Equipment Maker ASML," *CNBC*, January 29, 2026, https://www.cnbc.com/2026/01/29/-ai-boom-nvidia-asml-dutch-chip-equipment-maker-lithography-.html.

70 Alicia Park, "Big Tech's AI Spending Spree Could Reach $750 Billion This Year," *Forbes*, April 30, 2026, https://www.forbes.com/sites/aliciapark/2026/04/30/big-tech-is-on-track-to-spend-750-billion-on-ai-this-year/.

71 Indranil Ghosh, "The Gulf Has Billions to Spend on AI. It Still Needs Nvidia," *Rest of World*, July 14, 2026, https://restofworld.org/2026/gulf-ai-investment-nvidia-monopoly-blackwell/.

72 Jiang and Belli, *Digital Sovereignty in the BRICS Countries*.

73 Jiang and Belli, *Digital Sovereignty in the BRICS Countries*; Sergio Queiroz and Denise Direito, *Artificial Intelligence in Brics Countries: Sovereignty, Development Stages, and Different Perspectives*, Ipea, 2025, https://repositorio.ipea.gov.br/handle/11058/17535.

74 Ministry of External Affairs, Government of India, "XIII BRICS Summit- New Delhi Declaration," https://www.mea.gov.in/bilateral-documents?dtl/34236/XIII_BRICS_Summit_New_Delhi_Declaration.

75 Ayodele and Petla, "Leveraging the BRICS Digital Partnership for Collaborative Digital Governance."

Emerging Technologies, Shared Resilience, and Opportunities for BRICS Collaboration

Lirong Ren and Mohammad Javad Shariati

Abstract

In today's world, acquiring emerging technologies is not merely a matter of advancement in a specialised field. Nations regard competition in the realm of new knowledge as a key factor for power and global preeminence. Within the expanding BRICS bloc, emerging technologies are no longer viewed merely as commercial tools, but as the foundation for collective resilience and sustainability. For the BRICS nations, emerging technology serves both as the engines of economic growth and the primary bulwark against external geopolitical shocks.

Digital Standards, Data Mutual Trust, and Cross-Border Settlement Under the BRICS Mechanism

As the global economy realigns, emerging technologies such as blockchain and central bank digital currencies (CBDCs) are presenting historic windows of opportunity for the Global South, including the BRICS nations. These emerging technologies have enhanced the commercial efficiency. Building on this foundation, by establishing parallel digital and financial infrastructures through multilateral cooperation, the BRICS nations have further reduced their over-reliance on single, centralised architectures, thereby fostering economic autonomy and collective resilience. Evolving from participants to pioneers, the BRICS nations are now providing technological public goods and co-designing global digital governance rules. This article explores how emerging technologies are reshaping the paradigm of South-South cooperation in the areas of joint standard-setting, digital mutual trust, and payment infrastructure innovation.

In this technological process, the NDB (New Development Bank) acts as a driving force for local currency financing within the BRICS financial ecosystem, serving as the foundational infrastructure for trade digitisation. Beyond reducing exchange rate risks, this mechanism reinforces monetary sovereignty, shields members from unilateral sanctions, and reduces reliance on external currencies. Since its inception, the NDB has been committed to mobilising resources for emerging economies, establishing local currency financing as a core strategy that distinguishes it from traditional multilateral development banks. By the end of 2025, the NDB had approved over 130 projects totalling US$42 billion, with local currency denominated loans accounting for 25 percent of the total.[1] As NDB Vice-President and Chief Operating Officer Roman Serov emphasised, this is "demonstrating our commitment to supporting local currency financing and promoting a more balanced and resilient monetary system."[2]

The NDB's contribution to the BRICS financial ecosystem extends beyond mere financial support and is deeply embedded in digital infrastructure projects. From the upgrade of critical digital infrastructure in India, co-financed with the Asian Infrastructure Investment Bank (AIIB), to projects within China such as Yinchuan's intelligent transportation system, Qingdao's smart metro, and Taiyuan's zero-carbon airport management platform, the NDB has funded projects spanning digital backbone networks, data transmission, and smart energy systems.[3] This hardware forms the physical foundation of the digital trade ecosystem. Without such high-speed, stable infrastructure, concepts like blockchain and CBDC payments would not be feasible.

If digital infrastructure is likened to 'building roads', then the mutual recognition and interoperability of standards are the key mechanisms for harmonising different national systems to follow common 'traffic rules'. This is important for the development of cross-border digital identity verification and payment systems.

The launch of 'BRICS Action Plan on Trade Development and Standards Cooperation (2025–2026)' is aimed at this, seeking to establish information-sharing mechanisms and facilitate digital trade through the alignment of standards[4] Within this framework, China is actively transforming its own technological practices into public goods for South-South cooperation. For instance, the international standardisation project for data infrastructure based on the 'ASTRON ', led by China, has successfully been approved by the International Telecommunication Union (ITU-T SG20).[5] This project provides a reliable technical pathway for BRICS nations to develop their own blockchain standards, demonstrating a viable solution for developing countries to achieve interoperability during the early stages of digitalisation. The 'ASTRON' project has now expanded its international network to include several regions, including Malaysia, while a node in Saudi Arabia is currently under construction. The deployment of these distributed nodes is expected to establish a decentralised foundation of trust for South–South digital trade at both the physical and algorithmic levels, thereby exploring new possibilities for digital economic cooperation among BRICS nations. Through Decentralized Identifiers (DIDs), the Global South can establish reliable trust without relying on third-party intermediaries.

Traditional cross-border payments rely heavily on the SWIFT system and the US dollar-based correspondent banking system. This not only results in lengthy settlement chains and high costs, but also exposes the economic and trade activities of Global South nations to the risk of service disruptions caused by unilateral financial sanctions and 'long-arm jurisdiction'.

The BRICS nations have begun to address these challenges through mechanisms such as the NDB, CBDCs and the CIPS (China International Payment System). With the consolidation of digital infrastructure, standards interoperability, and digital trust, innovation in payment and settlement processes has become a key area for future technological development within the BRICS nations. However, even as these mechanisms have improved payment efficiency and advanced settlement in local currencies, the establishment of a fully integrated and independent parallel financial ecosystem remains a goal that requires further effort.

As the world's largest CBDC project, mBridge has made breakthrough progress in its underlying architecture. Utilising a blockchain-based disintermediated architecture, the platform has drastically reduced cross-border settlement times from the traditional several days to just seven seconds,[6] while cutting transaction fees by up to 50 percent.[7] By early 2026, the platform's cumulative transaction volume had exceeded US$55 billion.[8] Notably, in the early high-frequency settlements, the e-CNY accounted for the vast majority (approximately 95 percent). This demonstrates that establishing parallel settlement channels to reduce reliance on the US dollar is strategically viable. Looking ahead, the technical design of mBridge offers vast scope for in-depth cooperation amongst BRICS nations in the payments sector. Member states will be able to connect directly to the shared platform without altering their traditional domestic payment and clearing systems; this significant reduction in the barriers to entry lays the foundation for the BRICS nations to harness network effects in their future cooperation.

Currently, CIPS, which covers 190 countries and regions,[9] handles existing traditional cross-border clearing, while the e-CNY and mBridge have opened up new channels for sovereign currencies. These multi-pronged approaches grant the BRICS nations greater financial and technological autonomy and control. The e-CNY cross-border settlement capability, launched on Xiamen's Digital Trade Platform at the September 2025 BRICS Forum on Partnership on New Industrial Revolution,[10] is a prime example of this dual-track connectivity mechanism being successfully implemented at a regional hub.

From mBridge's digital payment bridge to CIPS's global reach, the BRICS nations are capturing the innovation dividends of the digital economy. This multi-track settlement network does more than simply offer the BRICS nations diverse currency options, it sets an example for reshaping the international monetary system along more inclusive and balanced lines.

The previously discussed development of digital infrastructure and decentralised payment networks has established a robust economic and financial shield for the Global South. However, as Western nations are increasingly turning emerging technologies from instruments of economic sanctions into weapons for direct military strikes and cyber warfare, the physical and operational security of this nascent architecture faces a severe test of survival. Understanding the urgent need for the BRICS nations to build collective resilience in technological defence requires examining recent attacks on Iran. These events provide practical insights for the bloc's ongoing cooperation in both technological and cyber security.

Principles of Developing Emerging Technologies in Iran

Despite extensive, and in some cases irreparable, damages inflicted upon Iran's knowledge and emerging technology sectors during the two recent wars, the country's resilience stems from macro-level policies and strategies articulated by its highest governance authorities. It must not be overlooked that Western countries and their allies have imposed sanctions on Iran over the past 47 years, particularly targeting Iran's access to modern technologies and scientific knowledge. Among these sanctions—some of which have been further enforced in recent years under the policies of the current United States (US) administration—have been restrictions on Iranian students seeking higher education in certain countries. Consequently, scientific and academic achievements in Iran have primarily relied on domestic capabilities and a highly skilled human resource base, and, in some cases, have been realised through effective collaborations with Global South nations.[11] Iran's success in launching a probe carrying a living organism into space, as well as producing various types of radiopharmaceuticals and recombinant drugs, are just some of the multiple achievements that have been achieved through the efforts of Iranian experts in recent years, and have created promising prospects for the country's scientific future.[a]

a Iran has successfully launched several space probes, including Kavoshgar (Explorer) 1 through Pioneer and Salman, over the past 16 years. These launches are part of Iran's long-term program to send humans into space.

While preparing this article, and as the Islamic Republic of Iran faced military aggression from the US and Israel for the second time, one of the primary objectives of this war was the destruction of the country's power capacities, particularly its scientific capabilities and technological achievements. This section will provide an alternative perspective on Iran's experiences and the effect of the country's resilience in emerging scientific and technological fields during a critical period, and subsequently propose lessons for cooperation among BRICS member states.

Technology and Warfare

Between 28 February and 7 April 2026, with US support, Israel launched a systematic campaign of direct strikes against Iran's emerging technology ecosystem, employing missiles, drones, and cyberattacks. These attacks severely damaged 154 research facilities across 21 universities (including Sharif University of Technology and Shahid Beheshti University) and nearly 3,000 industrial units; the estimated loss in scientific and technological infrastructure alone reached US$200 million.[b] The aggression also claimed the lives of five professors and 60 students.[12] Given that these centres stand at the forefront of global technological advancement, international legal scholars regard their destruction as a grave violation of international law and human rights norms.[13]

This campaign of targeted destruction peaked in early April. On 2 April, the Pasteur Institute of Iran, a long-standing World Health Organization (WHO) collaborating centre vital to regional vaccine development, narrowly escaped total destruction. The attack resulted in the loss of irreplaceable sample repositories, ongoing research projects, and invaluable institutional data, posing a severe threat to public health security across the Eastern Mediterranean.[14] Days later, on 6 April, a strike on the Information Technology building at Sharif University of Technology crippled Iran's largest GPU processing center, thereby disrupting the operation of critical artificial intelligence platforms and data infrastructure nationwide.

b Hossein Afshin, Vice President for Science, Technology and Knowledge-Based Economy, has said that the amount of damage to the country's scientific and research centres was at nearly US$200 million, and emphasised that these attacks were "more than a war crime." See: https://irna.ir/xjX8CJ

Beyond kinetic strikes, organised cyber operations targeted banking, energy, and surveillance systems. These unauthorised intrusions not only paralysed essential services but also directly facilitated targeted operations against key individuals.

The Use of Emerging Technologies for Military Aggression and Legitimate Defence

The reality is that over-reliance on emerging technologies and artificial intelligence (AI) in the pursuit of a swift military victory will have disastrous consequences. In the recent wars against Iran, the world has repeatedly witnessed the tragic consequences of such misjudgements.

It has been reported that during the first strike by the US-Israeli coalition in February 2026, AI-based systems made serious misjudgements, mistaking civilian facilities for military targets. This unwarranted reliance on algorithmic systems led to undeniable atrocities: the bombing of the Shajarat Tayyibe School in Minab, which resulted in the deaths of 165 students, followed by a PrSM missile strike on a sports hall in Lamerd, resulting in the deaths of 24 people;[15] an educational 'police park' for children was also attacked.

However, the criminal liability behind these atrocities must not be simply attributed to 'AI errors'. The root cause of these disasters lies in a series of human and systemic failures. Driven by the pressures of combat and the urgency to strike at Iranian infrastructure, critical verification procedures were overlooked. Ultimately, these incidents serve as a stark warning that over-reliance on emerging technologies without considering their limitations constitutes a strategic error. They also expose the flaws in the verification protocols and the lack of adequate mechanisms to prevent attacks on civilian facilities.

Synthesising the findings obtained thus far, this article draws the following conclusions:

1. Technology alone cannot guarantee victory, particularly in military conflicts. Success in contemporary warfare is the product of resilience and the capacity for asymmetric response to enemy attacks.[16]

2. The objectives of technological development and international cooperation must be conceived exclusively for peaceful purposes, serving as a catalyst for the betterment of human life and existence.
3. The increasing reliance of the United States and Israel on military AI—beyond the catastrophic humanitarian consequences already wrought—may incentivise competitors to pursue the development of their own AI-enabled weaponry. This dynamic introduces significant risks associated with a largely untested technological innovation and exacerbates the infliction of harm and suffering upon civilian populations in armed conflicts.
4. The primary concerns are algorithmic inaccuracy, inherent bias, and the erosion of human accountability in lethal decision-making. When AI proposes targeting solutions, the boundary of responsibility between machine and operator becomes obscured. This represents a calculated mechanism for evading legal and moral responsibility, thereby exposing the most pernicious facets of lethal technology.[17]
5. By leveraging an unconventional 'Way of War', Iran has successfully compensated for its technological deficiencies.
6. The utilisation of asymmetric weapons systems (specifically unmanned aerial vehicles, as well as advanced ballistic missiles) has provided Iran with strategic manoeuvrability and sustained coercive leverage.

Lessons for BRICS: Enhancing Resilience and Cooperation

BRICS member states are seeking to enhance resilience in security and the governance of emerging technologies through joint initiatives in cybersecurity, information sharing, and collaborative AI development, guided by targeted policymaking grounded in peaceful purposes and advanced systems.[c]

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c BRICS members have moved beyond dialogue into tangible action through initiatives like the ICT Security Working Group and CERT-to-CERT MoU for real-time threat intelligence sharing, alongside an Anti-Ransomware Task Force launched in 2024. In AI, the Shanghai-based AI Development and Cooperation Center and virtual joint laboratories host collaborative R&D on healthcare, agriculture, and cybersecurity applications, while China's commitment to training 5,000 AI professionals builds capacity. These efforts are anchored by policy frameworks such as the BRICS Roadmap for ICT Security and the Digital Economy Partnership, with a dedicated submarine cable working group enhancing secure infrastructure. Collectively, these initiatives feature dedicated budgets, secretariats, and annual ministerial reviews, operationalizing resilience in both security and emerging tech governance. https://www.fmprc.gov.cn/mfa_eng/wjbzhd/202606/t20260626_11952752.html

The emphasis is on establishing trustworthy supply chains, advancing scientific cooperation, and strengthening institutional frameworks to ensure sustainable and inclusive technological progress across all member states.

How BRICS Can Strengthen Cyber Resilience through Integrated Policymaking

BRICS has promising pathways towards building a coherent cyber resilience framework:

1. Establishing a Joint Cybersecurity Incident Response Mechanism
2. Creating a Common Cybersecurity Legal Framework
3. Investing in Digital Public Goods and Shared Digital Infrastructure
4. Establishing a BRICS Mutual Cybersecurity Assistance Pact
5. Harmonising Common Interests in Artificial Intelligence and the Smart Governance of Emerging Technologies

Opportunities for Iran-BRICS Cooperation in Emerging Technologies

At the most recent BRICS summit, held in December 2025 in Brazil, member states for the first time recorded quantum computing as one of their common strategic priorities in the final declaration—an action indicating BRICS' transition from the phase of technology monitoring to the phase of targeted and coordinated development of quantum technologies.

For BRICS countries, the technological applications of this field are of great importance. BRICS' focus on quantum computing also signifies an effort to develop quantum hardware, indigenous algorithms, middleware, and shared laboratory infrastructure. In a context where access to advanced chips and specialised quantum equipment is heavily controlled by export restrictions, intra-bloc cooperation can pave the way for the independent development of this technology and reduce dependence on external infrastructure.

In the field of quantum innovation, Iran has established the Iranian Quantum Technologies Research Center (IQTEC), thereby providing a basis for cooperation among BRICS countries in the development, dissemination, and advancement of knowledge and applications of quantum technologies.[d] The Center has designed its core activities around the training of specialised and applied human resources, quantum algorithms, quantum artificial intelligence, quantum simulations, quantum cryptography, quantum hardware, and the launch of a quantum service delivery platform. Utilising the resources it generates, IQTEC designs and manufactures high-performance, advanced, and reliable products. IQTEC is actively developing communication and collaboration with individuals and companies at the international level.

While cooperating with scientific and industrial centres, the Center also fosters the growth of technology teams and facilitates the transfer of advanced technology to core and upstream industries. Its focus on solving creative problems at the cutting edge of global technology reflects an ambition for an international standing in this field. However, structural challenges and international constraints continue to play a role in the pace of progress.

Conclusion

At present, the global majority constitutes a bloc of countries that, through the creation of a new and independent ecosystem, are seeking more effective global governance. BRICS is a leading institution that represents the interests of developing countries in global governance and embodies an example of multipolarity and a structure in which participation enhances the interests of its members and strengthens their credibility.

d Iran's Quantum Technologies Research Center (IQTEC) actively pursues international cooperation through multiple channels: it has secured observer status in the IEC/ISO JTC 3 joint technical committee for global quantum standards development, and plays an active role in the BRICS Quantum Technologies Working Group, having presented its capabilities at the inaugural Moscow meeting and established a joint committee with Russia on quantum, photonics, and AI. Domestically, Iran has operationalised its first Quantum Key Distribution (QKD) network in Tehran—a practical infrastructure for secure communications that offers a testbed for joint projects—while its researchers maintain a track record of peer-reviewed publications and past collaborations with scientists from the US and UK. These capacities, combined with ongoing national policy support for a comprehensive quantum development roadmap, position Iran as a viable partner for standard-setting, joint R&D, and applied quantum security initiatives with other BRICS members and beyond.

BRICS can serve as a unified voice for the Global South in advocating for the peaceful use and application of artificial intelligence for the benefit of humanity, while striving to control the threats posed by AI to the greatest extent possible. Strengthening BRICS' investment capacity through joint cooperation in strategic planning and resource consumption forecasting, within the framework of a consensus-based investment strategy, will help realise the key strategic interests of member states.

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Endnotes

1 Roman Serov, "Building an Intelligent Financial Ecosystem in the Digital Economy Era," New Development Bank, December 22, 2025, https://www.ndb.int/news/keynote-address-by-vice-president-roman-serov-at-the-22nd-china-international-finance-forum/

2 Serov, "Building an Intelligent Financial Ecosystem in the Digital Economy Era."

3 Serov, "Building an Intelligent Financial Ecosystem in the Digital Economy Era."

4 "'BRICS Action Plan on the Initiative for Trade Development and Standards Cooperation (2025–2026)' Released," March 2025, http://m.chinadevelopment.com.cn/Index/index/p/5.html?s=index/article/id/1940864/url/http://www.chinadevelopment.com.cn/xc/2025/0421/1940864.shtml

5 Zhu Wenfeng, "How capable is ASTRON?," CWW, February 20, 2025, https://www.cww.net.cn/article?id=597867

6 Sun Zhaodong, "The Four Pillars of RMB Internationalization: SWIFT, CIPS, mBridge, BRICS Pay," *Tsinghua Financial Review,* October 8, 2024, http://www.thfr.com.cn/wap/index-wap2.php/wp-admin/index-wap2.php?p=101284

7 Zennon Kapron, "Cross-Border CBDC Focused Project MBridge Moves Forward," *Forbes,* June 23, 2024, https://www.forbes.com/sites/digital-assets/2024/06/23/cross-border-cbdc-focused-project-mbridge-moves-forward/

8 Marc Jones, "China-led cross-border digital currency platform sees surge," *Reuters,* January 16, 2026, https://www.reuters.com/world/asia-pacific/china-led-cross-border-digital-currency-platform-sees-surge-2026-01-16/

9 CIPS Participants Announcement No. 115, https://www.cips.com.cn/en/2025-12/03/article_2025120316594298932.html

10 "12 Outcomes Released at the 2025 BRICS Forum on Partnership on New Industrial Revolution," *China News,* September 2025, http://www.chinanews.com.cn/cj/2025/09-17/10483737.shtml

11 I. Rezaeinejad and A. G. Simonov, Entrepreneurial University and Resistance Economy for Mitigating Sanctions and Enhancing National Competitiveness in Iran. In E. G. Popkova, ed., *Management of Digital Technologies in the Innovative Economy* (Springer, Cham: 2025), https://doi.org/10.1007/978-3-031-83331-1_27

12 Wagdy Sawahel and Karen MacGregor, "Attacks on Leading Universities Hit Science and Research," *University World News,* April 10, 2026, https://www.universityworldnews.com/post.php?story=20260410155441391

13 "UN experts denounce aggression on Iran and Lebanon, warn of devastating regional escalation," https://www.ohchr.org/en/press-releases/2026/03/un-experts-denounce-aggression-iran-and-lebanon-warn-devastating-regional

14 “Damages to the Pasteur Institute of Iran Disrupts Key Public Health Functions in the Eastern Mediterranean Region,” *International Journal of Health Policy and Management.* (2026).

15 The New York Times Visual Investigations Team, https://www.nytimes.com/2026/04/10/world/middleeast/iran-us-missle-strike-civilians-lamerd.html

16 Carnegie Endowment for International Peace (May 2026). This policy paper explicitly details how the Iran war is defined by “asymmetric warfare” where Iran used cheap drones and missiles to offset the US technological advantage. It emphasizes “resilience” as a key factor.

17 Zhang Weihua, CASS Institute of International Law (2025). This peer-reviewed legal article directly addresses “algorithmic bias,” “meaningful human oversight,” and the “semantic disconnect” in AI military systems. It argues that AI in decision support undermines IHL compliance.

BRICS Cooperation in Inclusive AI: Landscape, Challenges, and Recommendations

Sameer Patil and Tingyi Wang

Abstract

ARTIFICIAL INTELLIGENCE (AI) HAS EMERGED as a critical arena of geopolitical and geo-economic competition, yet its benefits and governance remain concentrated among a small number of advanced economies and technology companies. This article examines the evolving AI landscape in the BRICS countries, which together account for more than 40 percent of the world's population but remains peripheral to the centres of global AI governance. It highlights disparities in compute capacity, research output, technological innovation, and institutional preparedness, and argues that these asymmetries also create opportunities for South–South cooperation. Tracing the evolution of BRICS declarations and initiatives from 2015 to 2025, the article underlines three interlinked priorities: reducing the AI and compute divide; strengthening capacity building; and minimising AI-related harms. It concludes that BRICS has a unique opportunity to establish practical AI cooperation mechanisms that advance digital sovereignty and promote more inclusive and equitable global AI governance.

Introduction

Artificial Intelligence (AI) has emerged as a transformative technology with the potential to revolutionise sectors, industries, and everyday life. Generative AI and AI-enabled tools are being rapidly integrated across healthcare, the creative economy, manufacturing, enterprise and business operations, fintech, and agriculture. Their deployment in these varied domains demonstrates AI's potential to enhance decision-making, strengthen analytics, improve efficiency, and drive innovation. At the same time, such rapid advancement and widespread adoption also underscore the need for regulatory frameworks to address the ethical and societal challenges associated with AI use.

An overview of the global AI landscape reveals a disparity between centres of AI innovation and centres of AI regulation. The former are dominated by advanced economies, while Europe has emerged as the epicentre of AI regulation, exemplified by the European Union's (EU) 2024 AI Act.[1] This has created a wide gulf between the concentration of critical AI resources and innovation and the development of regulatory frameworks with extraterritorial reach. Consequently, the benefits of AI advances remain unevenly distributed: developing and emerging economies contribute to the evolution of AI solutions but continue to remain on the periphery of their technological and economic benefits.

This power imbalance exacerbates the global digital divide. It is also reflected in the approaches of Western technology companies and platforms, which engage closely with developed economies while overlooking the concerns of much of the rest of the world. The result is a widening gap in AI capability and capacity. Although much of the world's population contributes to the datasets and digital commons that underpin AI systems, it remains excluded from many of their benefits while continuing to bear their risks and harms.

This article proposes a BRICS framework for advancing inclusive AI cooperation based on three interlinked pillars: reducing the AI and compute divide, strengthening capacity building, and minimising AI-related harms. It situates this framework within the evolution of BRICS engagement with AI over the last five years. In proposing this framework, the article will answer two key questions: which domains offer opportunities for cooperation given the grouping's diverse AI capabilities, and what kind of mechanisms—

institutional, financial, technical—can enable practical cooperation on AI? The authors argue that while BRICS has already grasped the significance of AI, the current geo-technological landscape offers an opportune moment for the grouping to translate political declarations into effective operational mechanisms.

The Global AI Landscape and Emerging Challenges

AI is advancing at a pace and scale unimaginable even five years ago. The release of large language models (LLMs) capable of producing human-like text, code, and imagery, together with the rapid onset of agentic AI, has collectively produced a paradigmatic shift whose implications are still being assessed and understood. What is certain is that the capabilities of frontier AI models are outpacing the institutions meant to govern and regulate them. These advances are real and consequential, but they are producing uneven effects and benefits.

The unevenness is evident in recent AI investment trends. In 2025, United States private AI investment reached US$285.9 billion—more than 23 times China's US$12.4 billion and over 100 times the combined total of most countries in the Global South.[2] Moreover, AI venture capital (VC) investment is also becoming geographically concentrated. In 2025, US-based technology firms received about 75 percent (US$194 billion) of global AI VC deal value, compared with 6 percent (US$15.8 billion) for the European Union.[3] In addition, the US hosts 5,427 data centres—more than 10 times that of Germany, the country with the second-highest number—and consumes more energy than any other country.[4] In contrast, most of Africa, much of Latin America, and large parts of South Asia and Southeast Asia compete for only a fraction of these investments and resources.

The concentration of investment is further perpetuated by the structural power that a few tech companies wield at every layer of the AI stack. These firms control the computer infrastructure—the data centres, chips, and cloud infrastructure—on which most of the world's AI activity runs. Just four American tech companies—Meta, Microsoft, Amazon, and Alphabet—are estimated to spend a combined US$5.30 trillion by the end of 2030.[5] This dominant role gives them the power to set the terms of access, the cost models, and the conditions of use for billions of users and organisations worldwide. This is naturally concentrating power and wealth in a handful of American companies.[6]

Exacerbating this is the inadequacy of data in the dominant AI models, which are trained predominantly on databases that are not representative of the diversity of users.[7] This has caused algorithmic bias, skewed performance, and systemic discrimination when applied to the linguistic and socio-cultural realities of the majority of the world's populations. As a result, AI systems have consistently underperformed or made harmful predictions for vulnerable groups.[8] Therefore, minimising AI-related harms presents perhaps the most complex challenge.

These three challenges—the AI and compute divide, the capacity gap, and AI-related harms—are interconnected. For the Global South, the most consequential decisions about AI training data, embedded values, and intended beneficiaries are increasingly made by governments and companies that remain largely beyond their reach or influence. Bridging this AI divide requires affordable, sovereign access to compute, high-quality datasets, and cloud infrastructure to refine models and achieve scale. It also requires significant global cooperation.

When it comes to addressing these issues, the fragmented global regulatory canvas offers little solace. For the BRICS grouping, which represents more than 40 percent of humanity and a growing share of global GDP, this poses a strategic challenge. Yet, it also provides an opening for a collective effort.

The AI Landscape in BRICS

BRICS members exhibit substantial variation in their AI capabilities and preparedness levels. According to the International Monetary Fund's AI Preparedness Index (AIPI), which sums up four key dimensions—digital infrastructure, human capital, technological innovation, and legal frameworks—the 11-member grouping does not constitute an "AI-ready bloc". As shown in Table 1, the AIPI ranks the member between "moderately prepared" and "limited preparedness".

Table 1: AI Preparedness Index for BRICS

Country	AIPI Score	Level of Preparedness
Brazil	0.5013	Moderately prepared
China	0.6355	Moderately prepared
Egypt	0.3941	Partially prepared
Ethiopia	0.2536	Limited preparedness
India	0.4925	Partially prepared
Indonesia	0.5163	Moderately prepared
Iran	0.3783	Partially prepared
Russia	0.5592	Moderately prepared
Saudi Arabia	0.5769	Moderately prepared
South Africa	0.4968	Partially prepared
United Arab Emirates	0.6282	Moderately prepared

Source: International Monetary Fund[9]

Moderately prepared: Emerging and some advanced economies with uneven strengths. They may possess strong human capital but lag in infrastructure, or vice versa. Targeted policy interventions can improve AI readiness.

Partially prepared: Developing economies with gaps across multiple dimensions. AI adoption is likely to remain constrained without coordinated investment in infrastructure, education, and institutions.

Limited preparedness: Fragile or least-developed countries with fundamental infrastructure and governance gaps. AI benefits are likely to remain inaccessible without substantial external support and long-term capacity building.

Three broad tiers emerge from the data. At the top, China and the United Arab Emirates emerge as the AI leaders in the group that combines credible digital infrastructure with active national strategies. The middle tier consists of the majority of members—India, Saudi Arabia, Russia, Indonesia, Brazil, and South Africa—which are making substantial efforts to implement AI-related initiatives but are constrained by investments, infrastructure, and institutions. The bottom tier consists of Egypt, Iran, and Ethiopia, which have substantial gaps in regulation and innovation. In addition, Iran faces restrictions in accessing digital infrastructure due to UN and Western sanctions.

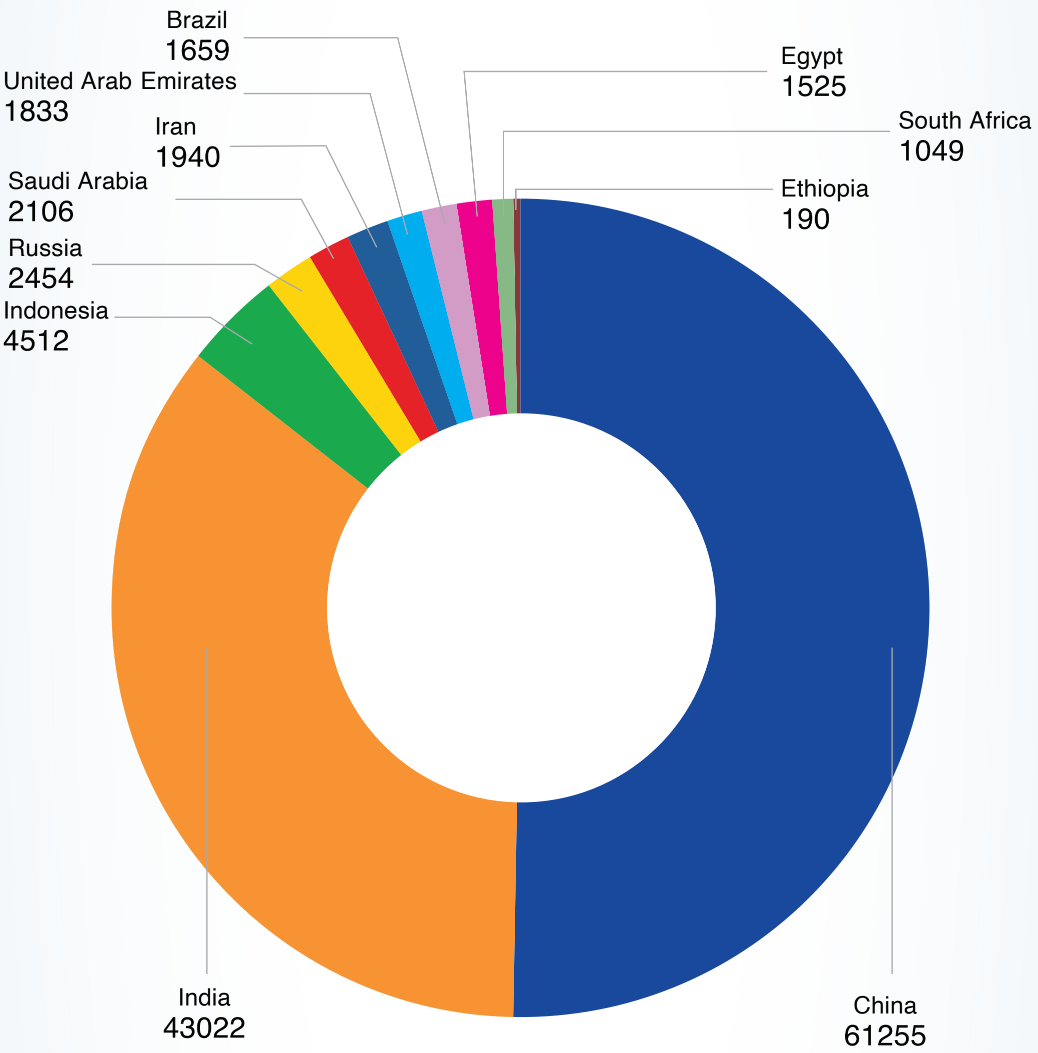
These findings underscore the considerable heterogeneity within BRICS. The nearly 0.4-point gap between China and Ethiopia—the highest- and lowest-scoring members—illustrates the "compute and digital divide" that successive BRICS Summit declarations have identified as a barrier to equitable participation in the AI economy.[10] This also indicates that the intra-bloc capacity-building efforts will need to be as substantive as the bloc's demands for technology transfer from the Global North.

However, the most substantial divergence within the bloc concerns compute, with members pursuing different strategies to secure compute resources and attain a degree of digital sovereignty. The UAE (through MGX and G42) and Saudi Arabia (through Humain) have utilised their sovereign wealth capital to buy high-end chips and build large-scale data centres.[11] Meanwhile, China has implemented resource optimisation (achieving algorithmic efficiency via the DeepSeek R1 LLM) and domestic substitution to build compute capacity.[12] In 2024, India launched the ambitious IndiaAI mission and a common compute facility (consisting of 38,000 Graphics Processing Units) for startups and academia.[13] Likewise, Brazil has unveiled the Artificial Intelligence Plan 2024–2028, which earmarks 25 percent of its funding for infrastructure and computing development (approximately US$5 billion).[14] The rest of the BRICS members lack comparable sovereign compute capabilities.

BRICS
INDIA 2026

Another stark contrast is in research output, as measured by Scopus-indexed publications in AI. As Figure 1 shows, China and India dominate with more than 61,000 and 43,000 documents, respectively, grabbing three-quarters of the share of all BRICS AI research.

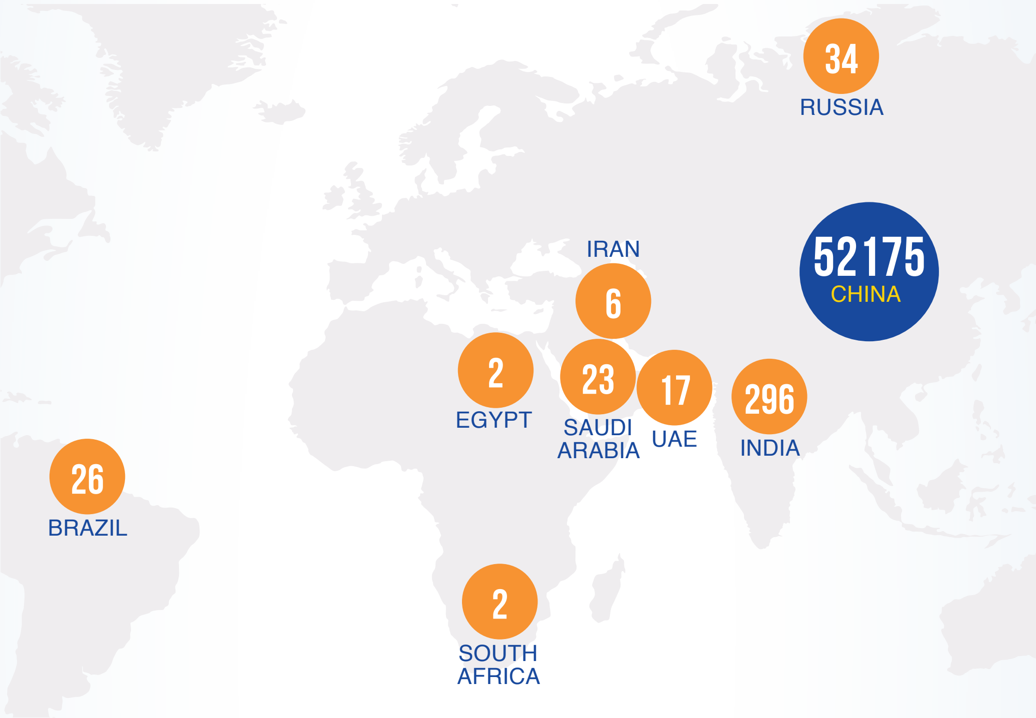
Figure 1: AI Research Output, BRICS+ Countries



Source: SCImago Journal & Country Rank[15]

This concentration is even more pronounced in AI-related patent publications filed by applicants from BRICS countries during 2023–2024. According to the World Intellectual Property Organization's intellectual property statistics, China recorded 52,175 AI-related patent publications, followed by India with 296 patents and Russia with 34 patents (see Figure 2). The ratio of China's patents to India's is roughly 176:1, and to Brazil's is approximately 2007:1.

Figure 2: AI-Related Patent Publications, BRICS Countries



Source: WIPO IP Statistics Data Center[16]

The numbers suggest that while certain BRICS members produce a meaningful volume of AI research, these do not translate to patentable innovation or commercially deployable technologies. The latter remains overwhelmingly concentrated in one member. This concentration illustrates that despite emphasising South-South cooperation, AI knowledge production remains heavily skewed. This reinforces the case for joint research programmes within the bloc. Moreover, it demonstrates the critical importance of capacity-building programmes that seek to help members move from knowledge production to technology commercialisation.

BRICS Cooperation on AI

BRICS cooperation on AI has evolved through three broad phases. During the first phase (2015–2019), AI featured within the broader science, technology, and innovation agenda, with cooperation centred on information and communication technology (ICT).[17] In the second phase (2020–2023), the grouping distinctly recognised the policy relevance of the digital economy and AI. By 2021, it had acknowledged the developmental potential of AI, big data, and data-driven governance, particularly in relation to pandemic response, digital public goods, and sustainable development. In 2022, the focus expanded to trustworthy, ethical, and responsible AI, with concerns about privacy, bias, accountability, and governance. At the Johannesburg Summit in 2023, the bloc established the Digital Economy Working Group.[18] During the same Summit, Chinese President Xi Jinping had floated the proposal to establish an 'AI Study Group' for the bloc.[19]

The third phase (2024–2025) marked AI's emergence as a strategic priority. BRICS endorsed a United Nations (UN)-centred framework for global AI governance, prioritised capacity building for developing countries, promoted fair and inclusive data governance, and supported the responsible, human-centred deployment of AI while addressing its social, economic, and security risks. Throughout this period, the bloc framed AI and big data primarily through the lens of sustainable development and the achievement of the 2030 Agenda.[20] Specifically, regarding the three challenges, the BRICS discourse has evolved as follows:

The AI and Compute Divide

Between 2020 and 2025, BRICS shifted from expressing broader concerns about the digital divide to advocating equitable AI governance.[21] The 2020 Moscow Declaration called for a "dedicated focus on overcoming the digital divide" in the context of e-commerce but made no reference to AI. The 2021 New Delhi Declaration marked a shift by identifying AI, big data, and large-scale e-governance platforms as tools for development and urging the international community to promote "equitable and inclusive access of digital resources for all people, irrespective of where they live."[22]

The 2022 Beijing Declaration acknowledged that BRICS members were at different stages of digital development. From the 2023 Johannesburg Summit onwards, the bloc's position became more defined. As noted earlier, the summit established the Digital Economy Working Group. The 2024 Kazan Declaration subsequently called for "fair, inclusive, and equitable governance of data" to enable developing countries to benefit from AI. Building on this, the 2025 Rio de Janeiro Declaration adopted a dedicated leaders' statement on the Global Governance of AI, stressing that governance "must address the needs of all countries, including those of the Global South."[23] This demonstrates that the bloc has now settled on a structured political demand for equitable participation in the AI economy that spans data governance, infrastructure and standard-setting.

The Capacity Gap

Capacity building has been a consistent theme in BRICS discussions, with successive summits exploring mechanisms for intra-BRICS cooperation. Within the broader sustainable development agenda, the grouping has urged developed countries to honour their Official Development Assistance commitments and facilitate technology transfer.[24] The 2021 New Delhi Declaration endorsed the BRICS Platform on Digital Public Goods as a repository of open-source technologies.[25] The 2022 Beijing Summit expanded this agenda by launching several institutional mechanisms to harness opportunities arising from the New Industrial Revolution (NIR), including the BRICS Centre for Industrial Competences, the PartNIR Innovation Centre, the Innovation Launchpad, and the Startup Forum Meeting.

Between 2023 and 2025, this institutional architecture expanded alongside the bloc's recognition of AI as a strategic technology. The 2024 Kazan Declaration welcomed a UN General Assembly resolution on AI capacity building and called for stronger collaboration "to help developing countries strengthen AI capacity building" through the Institute of Future Networks (BIFN) Study Group on AI.[26] The 2025 Summit operationalised this by proposing a study for a high-speed undersea cable network linking BRICS countries and adopting terms of reference for the BIFN Study Group on AI and next-generation communications.[27] Additionally, it unveiled the Action Plan for Innovation 2025–2030, with AI and quantum technologies as explicit priorities. This overview highlights the shift from the demands of technology transfer to self-initiated cooperation aimed at closing the capacity gap from within.

AI-Related Harms

BRICS treatment of AI-related harms has evolved from a narrow focus on ICT-centric risks to a broader, multidimensional risk framework. Earlier declarations addressed issues such as cybercrime, the criminal use of ICTs, and disinformation. The 2022 Beijing Declaration was the first to label AI-specific harms such as privacy, manipulation, bias, employment effects and singularity.[28] It called for a "common governance approach" to ethical and responsible AI with specific emphasis on marginalised and vulnerable groups. The 2024 Kazan Declaration flagged the risks of "malicious use, misinformation, privacy leakage, prejudice and discrimination" arising from AI and underlined the need to uphold a human-centred, development-oriented, inclusive, and sustainable approach to technologies.[29]

The 2025 Rio de Janeiro Declaration broadened the harm lens to cover labour-market disruption. It noted that "women, youth, older workers, people with disabilities and other people in vulnerable situations are especially at risk from the adverse impacts of digital transition." Additionally, it flagged new risks related to AI training on intellectual property and "misappropriation and misrepresentation of knowledge, heritage, and cultural values that are insufficiently represented in data sets and AI models."[30]

BRICS AI Cooperation Framework

This article proposes a BRICS AI cooperation framework anchored in five principles: digital sovereignty with interoperability; development orientation; equity in access; multi-stakeholderism; and complementarity with the UN system. The three pillars of this framework are organised around this article's three themes and are intended to be sequenced and mutually reinforcing.

Pillar 1 – Reducing the AI and Compute Divide

- **Establish a BRICS AI Compute and Cloud Cooperation Platform**

  One of the most pressing challenges facing many BRICS members is unequal access to computing infrastructure. The grouping should establish a shared AI compute cooperation mechanism that connects national supercomputing facilities and cloud resources through a federated architecture. Countries with relatively advanced capabilities—including China, the United Arab Emirates, Saudi Arabia, India, and Brazil—could contribute excess computing resources to support research institutions and startups in less-developed member states. Such a platform would lower barriers to entry while enhancing digital sovereignty, technological resilience, and equitable access to AI resources.

- **Mobilise Sustainable Financing for AI Infrastructure**

  Bridging the AI divide requires sustained long-term investment. The New Development Bank and national sovereign wealth funds should jointly establish dedicated financing windows to support AI infrastructure, green data centres, semiconductor ecosystems, digital connectivity, and cloud computing facilities. Blended financing models involving both public institutions and private investors would help narrow infrastructure and funding gaps across developing member states.

Pillar 2 – Capacity Building

- **Launch a BRICS AI Capacity-Building and Talent Mobility Initiative**

  Human capital remains the foundation of long-term AI competitiveness. BRICS should establish joint fellowship programmes, researcher exchanges, doctoral scholarships, executive training initiatives, and AI summer schools to facilitate the mobility of students, researchers, and policymakers across member states. A dedicated BRICS AI Academy or virtual learning platform could provide standardised training in machine learning, AI governance, cybersecurity, and responsible innovation, while supporting countries with lower levels of AI preparedness.

- **Promote Joint Research, Open Innovation, and Technology Commercialisation**

  Although several BRICS members generate substantial academic research, the translation of research into patents and commercially deployable technologies remains uneven. The grouping should establish competitive research grants, cross-border innovation funds, startup incubators, and intellectual property cooperation mechanisms to encourage collaborative AI research and accelerate the commercialisation of technological innovations across member states.

Pillar 3 – Minimising AI-Related Harms

- **Create a BRICS Framework for Mitigating AI-Related Harms**

  Member states should strengthen cooperation to address algorithmic bias, misinformation, privacy protection, intellectual property disputes, labour market disruption, and cybersecurity risks. Joint research centres and regulatory dialogues could facilitate information sharing on AI incidents and best practices while developing common methodologies for auditing and evaluating high-risk AI systems.

- **Coordinate AI Governance and Common Standards**

  Rather than creating an alternative regulatory regime, BRICS should coordinate its positions on global AI governance by promoting principles of inclusiveness, development, transparency, fairness, and respect for national sovereignty. A permanent BRICS AI Study Group could formulate voluntary guidelines on AI safety, data governance, model evaluation, and risk assessment while articulating a coherent Global South perspective in multilateral forums. Some of this can also be implemented by partnering with the UN Global Dialogue on AI Governance and the International Independent Scientific Panel on AI, with an objective to avoid regulatory fragmentation.

Conclusion

Over the past decade, BRICS has moved AI from the periphery to the centre of its cooperation agenda. The 2025 Leaders' Statement on the Global Governance of AI showcases the group's potential in shaping the normative debate on regulating AI. The next step is to translate this political convergence into practical cooperation by pooling compute resources, sharing datasets, establishing AI safety institutes, training regulators and the workforce, and strengthening the grouping's overall AI preparedness.

Sustainable AI cooperation must align with the respective national interests and strategies of the members. The framework proposed in this article may appear ambitious, but it makes the most of the current geo-technological moment to elevate the bloc's standing. It recognises the diversity of its members and, in turn, fosters constructive engagement to initiate meaningful operational change.

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Endnotes

1 European Parliament and Council of the European Union, "Regulation (EU) 2024/1689 of 13 June 2024 Laying Down Harmonised Rules on Artificial Intelligence and Amending Certain Union Legislative Acts (Artificial Intelligence Act)," *Official Journal of the European Union* L 2024/1689 (July 12, 2024), https://eur-lex.europa.eu/eli/reg/2024/1689/oj/eng.

2 Stanford Institute for Human-Centered Artificial Intelligence, *The 2026 AI Index Report*, 2026, https://hai.stanford.edu/assets/files/ai_index_report_2026.pdf.

3 Organisation for Economic Co-operation and Development (OECD), "AI Firms Capture 61% of Global Venture Capital in 2025," OECD, February 16, 2026, https://www.oecd.org/en/about/news/announcements/2026/02/ai-firms-capture-61-percent-of-global-venture-capital-in-2025.html.

4 "The 2026 AI Index Report, 2026".

5 Jennifer Sor, "AI Spending from 4 Tech Giants Will Exceed the GDP of Japan Through 2030, Goldman Says," *Business Insider*, June 2, 2026, https://www.businessinsider.com/ai-capex-boom-meta-microsoft-amazon-alphabet-goldman-sachs-2026-6.

6 Issie Lapowsky, "This Is Unprecedented: America's AI Boom Is Leaving the Rest of the World Behind," *Rest of World*, March 31, 2026, https://restofworld.org/2026/us-ai-investment-global-funding-gap/.

7 Matthew G. Hanna *et al.*, "Ethical and Bias Considerations in Artificial Intelligence/Machine Learning," *Modern Pathology* 38, no. 3 (2025): 100686, https://doi.org/10.1016/j.modpat.2024.100686.

8 Yoshua Bengio *et al.*, *International AI Safety Report 2026*, 2026, https://internationalaisafetyreport.org/publication/international-ai-safety-report-2026.

9 International Monetary Fund, "AI Preparedness Index (AIPI)," World Open Data (via World Bank), 2023, https://worldopendata.com/worldbank/indicator/IMF_AI/IMF_AI_AIPI_IX.

10 Tianjiao Jiang, "Opportunities and Challenges of BRICS Cooperation in Artificial Intelligence," BRICS Policy Center, May 15, 2026, https://bricspolicycenter.org/wp-content/uploads/2026/05/Policy-Brief-Opportunities-and-Challenges-of-BRICS-Cooperation-in-Artificial-Intelligence.pdf.

11 Nusrta Dearden, "The Gulf Bets Big on AI as It Seeks the 'New Oil'," *BBC News*, July 30, 2025, https://www.bbc.com/news/articles/cvg8z2mx508o.

12 He Yin, "China Committed to Open-Source Development for Greater Innovation, Shared Gains," *Qiushi Journal* (People's Daily), June 9, 2026, https://en.qstheory.cn/2026-06/09/c_1189256.htm.

13 Press Information Bureau, Government of India, https://www.pib.gov.in/PressReleasePage.aspx?PRID=2178092&reg=3&lang=2.

14 "Brazil Launches the Brazilian Artificial Intelligence Plan 2024-2028," *UNCTAD Investment Policy Monitor*, United Nations Conference on Trade and Development, July 30, 2024, https://investmentpolicy.unctad.org/investment-policy-monitor/measures/4930/launches-the-brazilian-artificial-intelligence-plan-2024-2028.

15 SCImago, "Country Ranking: Artificial Intelligence (2024)," *SCImago Journal & Country Rank*, https://www.scimagojr.com/countryrank.php?category=1702&area=1700&year=2024.

16 World Intellectual Property Organization, "WIPO Patent Search," *WIPO IP Statistics*, https://www3.wipo.int/ipstats/ips-search/patent.

17 6th BRICS Science, Technology and Innovation Ministerial Meeting, "Durban Declaration," Department of Science and Innovation, South Africa, July 3, 2018, https://www.dsti.gov.za/images/BRICS-STI-Durban-Declaration-NEW-VERSION.docxFINAL-AGREED-VERSION.pdf.

18 XV BRICS Summit, "XV BRICS Summit Johannesburg II Declaration: BRICS and Africa: Partnership for Mutually Accelerated Growth, Sustainable Development and Inclusive Multilateralism," South African Government, August 24, 2023, https://www.gov.za/sites/default/files/speech_docs/Jhb%20II%20Declaration%2024%20August%202023.pdf.

19 "BRICS Creates an AI Research Group," IndiaAI, August 23, 2023, https://indiaai.gov.in/news/brics-creates-an-ai-research-group.

20 Basu Chandola and Sameer Patil, "Balancing Development and Digital Harms: Assessing the BRICS Digital Agenda," Observer Research Foundation, June 8, 2025, https://www.orfonline.org/research/balancing-development-and-digital-harms-assessing-the-brics-digital-agenda.

21 XVII BRICS Summit. "Rio de Janeiro Declaration: Strengthening Global South Cooperation for a More Inclusive and Sustainable Governance," Ministry of Foreign Affairs and the Social Communication Secretariat of the Presidency of the Republic of Brazil, July 6, 2025, https://brics.br/en/documents/presidency-documents/250705-brics-leaders-declaration-en.pdf.

22 XIII BRICS Summit, "XIII BRICS Summit: New Delhi Declaration," Ministry of External Affairs, Government of India, September 9, 2021, http://www.brics.utoronto.ca/docs/210909-New-Delhi-Declaration.html.

23 XVII BRICS Summit, "Rio de Janeiro Declaration: Strengthening Global South Cooperation for a More Inclusive and Sustainable Governance".

24 XV BRICS Summit, "XV BRICS Summit Johannesburg II Declaration: BRICS and Africa: Partnership for Mutually Accelerated Growth, Sustainable Development and Inclusive Multilateralism".

25 XIII BRICS Summit, "XIII BRICS Summit: New Delhi Declaration".

26 XVI BRICS Summit, "XVI BRICS Summit Kazan Declaration: Strengthening Multilateralism for Just Global Governance and Sustainable Development for the Benefit of All," The President of the Russian Federation, October 24, 2024, http://static.kremlin.ru/media/events/files/en/RosOySvLzGaJtmx2wYFv0lN4NSPZploG.pdf.

27 XVII BRICS Summit, "Rio de Janeiro Declaration: Strengthening Global South Cooperation for a More Inclusive and Sustainable Governance".

28 XIV BRICS Summit, "XIV BRICS Summit Beijing Declaration," Ministry of Foreign Affairs of the People's Republic of China, June 23, 2022, https://brics2022.mfa.gov.cn/eng/hywj/ODS/202207/t20220705_10715631.html.

29 XVI BRICS Summit, "XVI BRICS Summit Kazan Declaration: Strengthening Multilateralism for Just Global Governance and Sustainable Development for the Benefit of All".

30 XVII BRICS Summit, "Rio de Janeiro Declaration: Strengthening Global South Cooperation for a More Inclusive and Sustainable Governance".

V.

The Future of BRICS

Forging the Future: India's BRICS Vision in a Fragmented World

Harsh V. Pant

INDIA'S BRICS CHAIRMANSHIP this year has come at a pivotal moment, both for the grouping and for New Delhi's growing role in shaping the strategic agenda of the Global South. Having leveraged its G20 presidency to foreground the concerns of developing nations, India has used the opportunity to steer an expanded BRICS towards greater institutional coherence and policy relevance. The chairmanship theme, "Building for Resilience, Innovation, Cooperation and Sustainability," is not empty rhetoric but reflects New Delhi's attempt to recast BRICS as a pragmatic platform for collective problem-solving rather than an ideological coalition defined simply by opposition to the West.

The significance of this moment lies as much in the changing character of BRICS as in India's evolving foreign policy. The grouping now comprises 11 emerging economies—Brazil, China, Egypt, Ethiopia, India, Indonesia, Iran, Russia, Saudi Arabia, South Africa, and the United Arab Emirates—which together account for a considerable share of global population, economic output, and energy resources. Expansion has enhanced BRICS' geopolitical weight and political diversity, even as it has introduced greater strategic complexity to the grouping. For India, therefore, the challenge was to ensure that a larger BRICS translates to enhanced effectiveness in global governance systems.

New Delhi has consistently articulated a distinctive vision for BRICS. Unlike typical narratives that portray the grouping as an anti-Western alliance, India has viewed it as an additional pillar of an increasingly multipolar international order. India's approach does not seek to replace existing institutions but to reform them while simultaneously strengthening alternative platforms that are a better reflection of contemporary geopolitical realities. As New Delhi has repeatedly argued, the objective is to make global governance more representative without forcing countries into rigid geopolitical camps. This gives India a unique position within BRICS—as a bridge between the Global South and established powers, and between competing strategic perspectives within the grouping itself.

Resilience naturally assumes prominence in this framework. The disruptions of recent years—the COVID-19 pandemic, supply chain breakdowns, climate-related disasters, and conflicts—have underscored the importance of building stronger national and regional capacities. India's priorities thus extend beyond crisis management to strengthening systemic resilience across food security, energy access, healthcare, disaster preparedness, and critical mineral supply chains. Drawing on its domestic experience in digital governance, pharmaceutical production, and agricultural innovation, India has sought to position BRICS as a platform where practical solutions can be shared across developing economies confronting similar development challenges.

Innovation constitutes the second pillar of India's agenda and reflects one of its strongest comparative advantages. India's success in developing digital public infrastructure has demonstrated how technology can be deployed at scale to expand financial inclusion, improve governance, and reduce transaction costs. Initiatives surrounding interoperable payment systems, fintech collaboration, artificial intelligence governance, startup ecosystems, and MSME partnerships seek to transform BRICS into an incubator for development-oriented technological solutions. Rather than viewing emerging technologies solely through the prism of strategic competition, India emphasises their developmental potential, particularly for countries seeking affordable and scalable digital transformation.

Cooperation remains the organising principle that binds these priorities together. As BRICS expands, maintaining internal cohesion becomes increasingly important. India has therefore focused on strengthening collaboration across the grouping's traditional pillars—political and security dialogue, economic and financial cooperation, and people-to-people exchanges—while advancing long-standing demands for the reform of global governance institutions. Greater trade facilitation, stronger support for the New Development Bank, wider use of local currency settlements, and closer coordination on development finance are intended to produce measurable outcomes far beyond declarations and promises. At the same time, cooperation on counter-terrorism, maritime security, and transnational challenges reinforces the grouping's broader strategic relevance. India's emphasis on consensus and sovereign equality reflects a recognition that institutional durability depends less on ideological alignment and more on sustained political accommodation.

Sustainability completes the framework and reinforces India's attempt to reconcile developmental priorities with climate responsibilities. For much of the developing world, the challenge is not whether to pursue green transitions but how to do so without compromising growth or poverty reduction. India accordingly prioritises climate resilience, green finance, technology transfer, and equitable energy transitions that recognise unique national circumstances. This approach aligns environmental sustainability with development imperatives, ensuring that climate policy remains responsive to the needs of vulnerable populations rather than becoming another source of geopolitical contestation.

Taken together, these four priorities provide a coherent strategic direction for BRICS at a time when questions about its future relevance are becoming more prominent. India's objective is to move the grouping beyond rhetorical assertions of multipolarity towards functional cooperation that delivers tangible public goods. Whether through development finance, digital connectivity, health partnerships, or climate action, BRICS must demonstrate its capacity to address the concrete challenges confronting the Global South. By focusing on deliverables instead of ideological positioning, New Delhi has sought to preserve the grouping's credibility and broaden its appeal.

India's BRICS chairmanship has underlined New Delhi's growing capacity to shape multilateral platforms while simultaneously engaging across a wide spectrum of strategic partnerships, from BRICS and the G20 to other minilateral arrangements. For India, greater coherence within the grouping while accommodating increasingly diverse strategic interests would strengthen BRICS' institutional legitimacy, reinforce demands for the reform of global governance, and provide developing countries with additional avenues for economic cooperation and development finance.

India's BRICS engagement reflects a broader evolution in its foreign policy. New Delhi is no longer content merely to participate in international institutions; it increasingly seeks to shape their agendas. By emphasising resilience, innovation, cooperation, and sustainability, India has worked to position BRICS as a constructive force within an evolving multipolar order, one that complements rather than disrupts the international system, amplifies the voice of the Global South, and contributes to a more balanced and representative global governance architecture. As BRICS continues to expand and adapt to shifting geopolitical and economic realities, its future relevance will depend on its ability to translate shared aspirations into effective cooperation while accommodating the diverse interests of its increasingly heterogeneous membership.

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The Future of BRICS: A Perspective from Ethiopia

Jafar Bedru Geletu

ETHIOPIA JOINED BRICS IN January 2024 at a particularly challenging time in our nation's history: debt restructuring under the G20 common framework, recovery from the destructive conflict in the northern region, and homegrown economic reforms that included a long-planned currency unification effort.[1] Despite the daunting task of bringing the political and economic situation back on a stable path of growth, Ethiopia took the daring step of joining BRICS in the hope that the benefits would outweigh the costs.[2] Yet, this is why the country's choice carries significance. All nations join the most important groupings of states when they need support to overcome a crisis, rather than when things are settled and the economy is growing.

Ethiopia and other African countries joined the expanded BRICS in hopes that a time will come when African states will have some space to make their own decisions, where they could be heard and garner support for the aspirations they hold to grow their nations and build states that primarily serve the interests of their people. BRICS was a once-in-a-generation opportunity in which aid or alignment was not required to get the much-needed resources for the continent's generational aspirations in the post-colonial era. The challenge now is to seize the moment and utilise the opening with the vigour and seriousness that it deserves.[3]

In the past 20 years, BRICS has grown in ways its early authors did not anticipate. The grouping started as an investment category for people who tracked financial and economic opportunities in frontier markets. The name was a reference to the identification of large economies that were rising outside the traditional global political and economic powerhouses in the West. Twenty years since its inception, the group has blossomed into a significant and influential global platform. The Yekaterinburg (2009) and Brasilia (2010) summits transformed the BRIC concept into an institutionalised partnership, establishing regular leaders' meetings and a framework for South-South cooperation. This process later culminated in the creation of the New Development Bank (NDB) and the Contingent Reserve Arrangement (CRA) at the Fortaleza summit in 2014, reflecting broader aspirations for a more representative and equitable global institutional order.

BRICS gave shape to long-held aspirations and has now entered a new chapter that is broader in membership and more vocal in its ambitions. In this phase, the collective speaks for a significant share of humanity and for the demand for effective global outputs. Each phase of the grouping's growth is built on the successes of the past. The recent expansion should be viewed as maturation rather than a dilution of the original idea. A collective that began as an investment shorthand has grown into a genuine platform for the majority of the world to frame the agenda and coordinate actions, which is no mean feat in a world of rising fragmentation and tension.

At this point, it is fair to ask what Africa has gained so far from BRICS. While the grouping has the potential to deliver more, it has already provided benefits that are often overlooked. Although it is too early to declare success, ongoing BRICS initiatives to promote trade and financial transactions in local currencies suggest the emergence of an alternative global financial architecture. Such arrangements could help African economies reduce their exposure to external currency shocks.[4] The NDB has been expanding its portfolio with funds for infrastructure projects throughout the continent. More importantly, BRICS has altered the actual bargaining environment on debt, climate change, and global trade reforms. Due to global diplomatic alignments in traditional forums, African voices have gained more audiences than they otherwise would have.

African nations are now seated across a greater variety of partners, all of whom are aware of options other than those previously available. The bargaining position of African states has improved even with traditional partners, who have responded by deepening their engagement with Africa. On balance, competition for partnerships benefits the continent.

Ethiopia's decision to join BRICS falls within this larger context. It is consistent with a diplomatic tradition that extends back to Adwa (1896), the League of Nations (1923), and the founding of the African Union in Addis Ababa (1963).[5] The country has long acknowledged that strategic autonomy is a daily practice supported by both the depth of its partnerships and its legal position. The Grand Ethiopian Renaissance Dam, which is currently providing energy, is the most visible example of this strategy in our time. This initiative was funded and built by Ethiopians, and it demonstrates the possibility for dramatic change for a country that matches its internal drive with external alliances.

Participation in BRICS allows for the application of the same reasoning in a new context. It creates new avenues for funding industrial parks in Hawassa and Bole Lemi for the value-addition needed by the textile, leather, and coffee industries, and for technology collaborations that would enable Ethiopian manufacturing to advance. None of these results is predetermined; they are closer now.

Making the most out of the opening is the work that belongs to Ethiopia and other African states, which are already part of the grouping. BRICS participation can be instrumental and will be scaled through the African Continental Free Trade Area (AfCFTA); the more it functions, the more meaningful the engagement will be. Positioning Africa on a common platform ahead of BRICS summits will transform African presence into leverage. BRICS engagements are transformed into productive capacity through domestic reforms in capital markets, customs, and the legal framework for cross-border trade. These are not conditions imposed from outside. Rather, they are the goals that Africa has already established for itself, and BRICS provides them with new allies and resources. The bloc enhances the quality of the work rather than replacing it.

Realistic limitations exist, and they ought to be identified. BRICS members have their own conflicts and objectives; thus, the alliance is not uniform. The institutional capabilities of the bloc are still developing, and it could sometimes take longer than required for a communiqué to be disbursed. Africa will need to negotiate with a level of coherence that it has not always attained. This does not undermine the relevance of the collective in any way. It calls for patience and skill—for the methodical institution-building that has characterised every successful regional bloc in history, particularly those that now appear to be permanent. In what is supposed to be a lengthy project, BRICS is just in its early decades. As the bloc expands, so too, will Ethiopia's and Africa's voices within it.

From Ethiopia's perspective, the future of BRICS is better seen as a collaborative construction project rather than a completed gift. The walls are being raised, and the space is now larger than it was. The African continent comes with its own resources: the AfCFTA, a youthful population, genuine economic aspirations, and a diplomatic heritage that understands its interests and aspirations and the ways to achieve them with its own mixed company. Africa has already selected the destination it desires; BRICS provides a more capable platform to pursue it. BRICS provides a worthwhile offer, one that merits careful consideration and a serious response. To avoid missing out on these opportunities, both Ethiopia and Africa must focus and take the time seriously.

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Endnotes

1 BRICS, "Johannesburg II Declaration XV BRICS Summit Sandton, Gauteng, South Africa Wednesday 23 August 2023," 2023, pp. 1-26.

2 D. A. Ahimed and Abiy Ahmed, "Prime Minister Abiy Ahmed's Remarks During the BRICS Plus Summit in South Africa," Office of the Prime Minister, YouTube Video, 7:23 min, August 28, 2023, minhttps://www.youtube.com/watch?v=_r3ThTWEDgM Title.

3 T. W. Ossa, "Ethiopia's Membership in BRICS: Opportunities and Challenges," *International Journal of Research and Innovation in Social Science* 10, no. 5 (2026): 315–320, doi: 10.47772/IJRISS.

4 P. Roman, "Enhancing Cross-Border Settlement Mechanisms Among BRICS Member State," 2025.

5 M. Muchie, "The Great Adwa Victory Relevance for Global South," *Africa (Lond)* 69 (2016): pp. 52–55.

The Future of BRICS: Building for Resilience, Innovation, Cooperation, and Sustainability

Osama El-Gohary

AFTER TWO DECADES OF COOPERATION, BRICS is entering a new chapter marked by expanded membership, deepening economic linkages, and a broader development agenda. This evolution presents an important opportunity to reflect on its trajectory so far, while also charting a forward-looking path that strengthens its role as a platform for resilience, innovation, cooperation, and sustainability. With the grouping accounting for approximately 49 percent of the world's population, around 40 percent of global Gross Domestic Product (GDP, in purchasing power terms), and nearly 26 percent of global trade,[1] BRICS is increasingly positioned as an important entity in shaping global economic and development governance. It has remarkable potential to influence the evolving international economic and political order, further reinforced by strengthened South-South cooperation and its capacity to advance a more unified voice for the Global South in global decision-making.

Under India's 2026 chairmanship, and guided by the theme 'Building for Resilience, Innovation, Cooperation and Sustainability', BRICS is advancing a comprehensive agenda aimed at enhancing its collective capacity to respond to global shocks, accelerate technological transformation, deepen economic integration, and support sustainable and inclusive development. This framework reflects the interconnected pillars that will shape the bloc's long-term trajectory and its ability to translate scale into meaningful structural impact.

At its core, the future of BRICS will depend on strengthening economic resilience and advancing deeper integration among member economies. Intra-BRICS trade has expanded,[2] though its potential remains constrained partially by structural and regulatory frictions. Addressing these gaps will be central to enhancing supply chain connectivity, improving market efficiency, and strengthening long-term economic stability. In this context, BRICS is increasingly positioned not only as a coalition of large emerging economies but as a platform for coordinated development strategies and more cohesive economic cooperation.

A key dimension of this agenda relates to financial systems and access to capital. Small and medium-sized enterprises (SMEs) across BRICS economies continue to face high borrowing costs and limited credit access. This calls for more diversified financing channels such as development banks, fintech solutions, guarantee schemes, and alternative instruments, alongside stronger financial governance and regulatory convergence.[3] At the same time, growing climate and development financing needs highlight the importance of unified sustainable finance frameworks to support low-carbon transitions.

Trade and investment cooperation also remains important, requiring reduced regulatory fragmentation, simplified procedures, and improved trade facilitation. Greater alignment of standards, stronger legal frameworks, and more predictable investment environments would enhance competitiveness, strengthen investor confidence, and deepen industrial cooperation across member states.

Industrial development remains a cornerstone of BRICS economies, particularly given its role in productivity growth, export competitiveness, and employment generation. As member states pursue modernisation, the transition to greener and more technologically advanced industrial systems becomes increasingly important. This includes supporting green industrial policies, accelerating digital transformation in manufacturing, and promoting circular economy approaches. Coordinated efforts in technology sharing and innovation cooperation will be essential to ensuring that industrial upgrading remains both competitive and sustainable.

Infrastructure development further underpins the BRICS cooperation agenda. Improved connectivity in transport, logistics, and digital infrastructure is critical for strengthening trade flows and enhancing supply chain resilience. With infrastructure investment needs estimated at approximately US$4.5 trillion by 2040 across emerging economies,[4] mobilising long-term financing will be essential. Institutions such as the New Development Bank (NDB) play a key role in supporting sustainable, low-carbon infrastructure projects that enhance long-term economic productivity and integration.

Artificial Intelligence (AI), digital infrastructure, and digital finance are increasingly central to shaping the bloc's future development model.[5] Recent initiatives, including the BRICS AI Research and Innovation Centre, the Digital Cloud Corridor, and financial support mechanisms for digital infrastructure, reflect a growing commitment to strengthening technological sovereignty and innovation capacity. Progress in cross-border payment systems and central bank digital currency initiatives further highlights the importance of digital finance in enhancing financial connectivity and reducing transaction costs.[6]
At the same time, ensuring inclusive digital transformation remains a shared priority. Expanding access to broadband connectivity, strengthening cybersecurity frameworks, and improving digital literacy are essential to closing the digital divide across member states. Investment in 5G networks, fibre-optic infrastructure, cloud computing, and satellite systems will further support the development of resilient digital ecosystems. In parallel, strengthening cooperation between the public and private sectors will be key to accelerating the responsible and inclusive adoption of emerging technologies across sectors such as healthcare, education, agriculture, and trade.[7]

Sustainability remains a pillar of the BRICS agenda as member states confront shared priorities related to energy security, climate resilience, and environmental protection. Cooperation is expanding across renewable energy, energy efficiency, sustainable transport systems, and low-carbon infrastructure development. This is further supported by financing and knowledge-sharing platforms such as the NDB and the BRICS Energy Research Cooperation Platform.[8]

The expansion of BRICS has also contributed to a more diversified sustainability agenda as member states bring complementary experience across different areas of the green transition. Brazil contributes expertise in forest protection and biodiversity conservation through initiatives such as the Amazon Fund,[9] which supports efforts to prevent deforestation and promote the sustainable use of the Brazilian Amazon. Saudi Arabia is expanding its sustainability agenda through the Saudi Green Initiative[10] and investments in renewable energy and green hydrogen, while the United Arab Emirates is implementing its Net Zero 2050 Strategy, covering renewable energy, sustainable transport, green buildings, nature-based solutions, and carbon-management technologies.[11] Egypt has similarly identified renewable energy and low-carbon hydrogen as pillars of its transition towards a greener economy.[12] This diversity strengthens the bloc's ability to develop comprehensive sustainability solutions that reflect different economic structures, development priorities, and national capabilities.

In parallel, advancing sustainable development requires increased investment in renewable energy, clean technologies, and climate-focused innovation. Strengthening climate finance mechanisms and improving access to concessional and development-oriented funding will be essential to supporting inclusive green transitions and ensuring equitable access to resources needed for adaptation and resilience.

Ultimately, the future trajectory of BRICS will depend on its ability to translate its collective economic weight into deeper structural integration and coordinated action. Strengthening financial systems, improving trade and investment frameworks, and accelerating industrial transformation will be central to long-term resilience. At the same time, sustained investment in digital infrastructure, innovation, and cybersecurity will be critical to ensuring inclusive technological progress.

Equally, advancing cooperation in renewable energy, sustainable finance, and climate innovation will reinforce the bloc's development objectives. Through coordinated efforts across economic, technological, and sustainability domains, BRICS is well positioned to strengthen its role as a resilient and forward-looking platform that will contribute to a more balanced global order.

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Generative AI tools were used for language editing and structural refinements.

Endnotes

1 "BRICS India 2026, "About Us," BRICS India Presidency 2026, https://www.brics2026.gov.in/about-us/.

2 UNCTAD, *Two Decades of Intra-BRICS Trade: Trends, Patterns, and Policies*, March 2026, United Nations Trade and Development, 2026,1-2, https://unctad.org/publication/two-decades-intra-brics-trade-trends-patterns-and-policies.

3 BRICS, *Annual Report 2025,* BRICS, 2025, https://docs.brics-pay.com/BRICS_ar_2025.pdf

4 "Annual Report 2025".

5 BRICS, *BRICS Leaders' Statement on the Global Governance of Artificial Intelligence,* July 2025, BRICS, 2025, http://www.brics.utoronto.ca/docs/250706-ai.html.

6 "Joint BRICS Projects in Artificial Intelligence," BRICS Expert Council Russia, https://bricscouncil.ru/en/analytics/sovmestnye-proekty-stran-briks-v-oblasti-iskusstvennogo-intellekta.

7 "Annual Report 2025".

8 "BRICS Cooperation in Sustainable Development," BRICS Expert Council Russia, March 27, 2026, https://bricscouncil.ru/en/analytics/sotrudnichestvo-stran-briks-v-oblasti-ustoychivogo-razvitiya.

9 The Amazon Fund finances initiatives to prevent and monitor deforestation and promote conservation and sustainable development in the Brazilian Amazon, https://www.amazonfund.gov.br/en/home/?utm.

10 Saudi Green Initiative, https://www.vision2030.gov.sa/en/explore/projects/saudi-green-initiative.

11 The UAE's Net Zero 2050 Strategy, https://u.ae/en/about-the-uae/strategies-initiatives-and-awards/strategies-plans-and-visions/environment-and-energy/the-uae-net-zero-2050-strategy.

12 National Strategy for Low-Carbon Hydrogen, https://sis.gov.eg/en/media-center/strategies/national-strategy-for-low-carbon-hydrogen.

A Platform, Not a Bloc

Nickolay E. Mladenov

WHEN THE UNITED ARAB EMIRATES (UAE) joined BRICS on the first day of 2024, Abu Dhabi was deliberate about the terms of its membership. The UAE did not see accession as entering a bloc; rather, it was a way of diversifying its partnerships and markets while preserving its long-standing relations with Europe, the United States, and Asia. Two years since, that distinction has become the single most important question about the grouping's future. Will BRICS mature into a platform for cooperation, or harden into an ideological camp that even its most ardent members can neither shape nor comfortably inhabit?

In barely two years BRICS has doubled in size and reach. The 2024 enlargement brought in Egypt, Ethiopia, Iran, and the UAE; Indonesia joined as a full member in 2025; and a new partner-country category now extends cooperation to a further tier of emerging economies. That mechanism lets BRICS absorb genuine demand from the Global South, as more than 30 countries have expressed interest, while keeping the core manageable.

Breadth alone, however, will not carry the grouping forward. Its real test is found not in the guest list but in the work streams, where the record is more substantive than media headlines may suggest. The New Development Bank (NDB) remains the most concrete asset BRICS has built so far, and the one where communiqués meet implementation. Its mandate to expand local-currency lending, de-risk sustainable infrastructure, and bring in private capital speaks directly to the development needs of its members. Payment interoperability, energy cooperation, food security, climate finance, and inclusive technology governance are all areas where the grouping can deliver measurable value, and none requires anyone to choose sides.

Much of the current commentary about BRICS focuses on “de-dollarisation” and “a common currency”. There is no serious BRICS proposal for a shared currency. Newer members can support local-currency settlement where such lower costs and improve resilience, while steering the group away from a confrontational monetary project that would divide it and invite avoidable retaliation.

This year’s events have made the argument for pragmatism harder to ignore. In May, the BRICS foreign ministers’ meeting in New Delhi ended without a joint statement for the first time in the group’s history, as members held sharply divergent views on the conflict between the US and Israel and Iran, and the latter’s attacks on the Gulf states. The UAE has stated its own position clearly and without apology, but the institutional lesson is larger than any single dispute: an enlarged BRICS that includes rivals as well as partners will not facilitate consensus on every contested question, and it should not pretend otherwise. The maturity of a platform is measured by its ability to foster cooperation on shared interests even when it cannot agree on all the issues on the table. India, as 2026 chair, handled the moment with pragmatic realism, precisely the steer the grouping now requires.

That episode also clarifies what BRICS should not attempt to be. A grouping that is characterised by such massive diversity, spanning democracies and monarchies, energy exporters and importers, rival powers and states with very different relationships to the West, cannot function as a loyalty test. The moment membership implies a required geopolitical posture, the group will lose the very middle powers that give it balance and credibility. Consensus is the only way a grouping, as diverse as this, may preserve its legitimacy.

For the UAE, the value proposition has always been optionality rather than alignment. Abu Dhabi's foreign policy is grounded in international law, sovereignty, dialogue, and diplomatic solutions, and its interest in BRICS is pragmatic, not ideological, driven by engagement with regions where trade, energy, technology, and development demand are growing fastest. China and India are now among the UAE's largest trading partners, and a network of Comprehensive Economic Partnership Agreements ties it to markets across Asia and Africa. BRICS complements that strategy. The Emirates' partnerships with Washington, Brussels, and Tokyo are not in question. The UAE can help the group speak the language of bridges rather than blocs, and demonstrate that a country can sit inside BRICS while remaining a trusted partner to everyone else.

India's 2026 leadership offers the right frame for the next phase. Its theme—building for resilience, innovation, cooperation and sustainability—reads almost as a checklist for a functional grouping of countries that cooperate in some areas, but do not necessarily see eye-to-eye on everything. Resilience speaks to supply chains, food, energy and finance; innovation to AI; cooperation to the habit of finding common ground; and sustainability to a shared climate agenda that connects the UAE Consensus of COP28 with the group's own energy work. Those four words are a better test of the group's future than any argument about currencies or camps.

The future of BRICS will be decided in its work streams, in payments, energy, food security and climate finance, far more than at its summits. For newer members, BRICS is most valuable not as a bloc *against* others, but as a platform *with* others.

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BRICS: Strengthening Cooperation in a Multipolar World

Alireza Khoda Gholipour

BRICS HAS RISEN TO PROMINENCE among groupings of emerging economies over the last two decades. What started as an informal grouping between Brazil, Russia, India, China, and South Africa, has widened with an expanded membership, underlining the growing standing of the bloc in global geo-economics and geopolitics. Collectively, BRICS members constitute a formidable share of the world population, global output, natural resource endowment, and trade.

As the global economic and political order shifts inexorably from unipolarity to a more dispersed multipolar configuration, the organisation is poised to play a larger role in fostering economic development, financial stability, technological advances, and South-South cooperation.

Yet its longer-term trajectory hinges less on expanding membership than on improving internal policy coordination, increasing institutional collaboration, and converting political consensus into effective action on the ground. In the short term, the intensification of economic integration among the current members should be a priority for BRICS. While intra-BRICS trade has increased in recent years, there remains scope for growth. Reducing existing trade barriers, synchronising customs procedures, upgrading cross-border transport infrastructure, and implementing more sophisticated digital trade platforms will facilitate the movement of goods, services, and investments within the group.

Deeper integration not only promotes economic growth but also reduces over-reliance on external markets, making member economies more resilient to global economic fluctuations. Facilitating stronger linkages among small and medium enterprises across the membership, as well as strengthening regional supply chains, would give further momentum to sustained long-term development. Another critical priority would be to increase the New Development Bank's (NDB) mandate and reach. Since its inception, the bank has proved to be a reliable source of financing in developing economies, but it needs to be more active in providing necessary support for members.
Over time, the NDB's scope has broadened to cover financing for larger infrastructure projects, renewable energy programmes, digital development plans, and healthcare infrastructure, as well as initiatives to bolster education and climate resilience investments. Increasing lending in local currencies would reduce risks from fluctuating exchange rates and lend greater regional financial stability, while growing the NDB's capital base and streamlining execution would allow it to play a leading role in financing BRICS' future development agendas. More broadly, in the financial space, increasing the use of national currencies in trade settlement should also be a primary objective.

The goal does not necessarily have to be to challenge the existing international financial order but rather to enable gradual bilateral trade settlement in members' currencies. Robust cross-border payment systems, closer central-bank cooperation, and modernising financial infrastructure, would reduce transaction costs and dependency on a single reserve currency, enhancing members' economic resilience to counter unilateral sanctions and other means of economic pressures. Technological innovation will be crucial in shaping the future competitiveness of BRICS economies. Rapid progress in fields such as AI, biotechnology, and quantum computing, semiconductors, cyber security, and digital infrastructure, are reshaping production and competition in many parts of the world. Creating research centres, expanding academic partnerships, and encouraging research on best practices and joint research and development projects could enhance the ability of BRICS members to collectively advance technological catch-up and innovation while strengthening members' long-term competitiveness and reducing dependencies on external expertise and technology.

In many ways, the biggest challenge to BRICS' future development will likely come from the members' diverse political systems, divergent levels of economic development, different external relations and, in certain cases, competing national interests which make agreeing on a consensus and taking collective action much more difficult. Rather than aiming for a politically homogeneous bloc, BRICS members should focus on areas where there is a tangible overlap of interests and objectives, focusing on policy coherence in specific areas rather than attempting to enforce a rigid political alignment. Deepening the dialogue structures, expanding ministerial meetings, strengthening permanent working groups, and creating working mechanisms to coordinate policy on specific issues and improving dispute resolution mechanisms will improve the coherence of the organisation without compromising its flexibility. Practical cooperation based on shared interests rather than an imposed uniformity should be the watchword of the future of BRICS.

Building institutional capacity is also of utmost importance. Compared to far more deeply integrated regional organisations, BRICS is still a developing institution relying on its leaders' summits. Developing a stronger permanent secretariat, strengthening mechanisms to coordinate policy and improve information sharing, implementing regular review processes to ensure policy objectives are being achieved, and developing specialised bodies in fields such as finance, technology, and climate change will enhance institutional efficiency. These mostly can be pursued through the BRICS Think-Tank Council (BTTC).

Climate change and sustainable development are another area where BRICS could play an important role. Most members are facing similar challenges in environmental degradation, energy security, sustainable agriculture, or water security. Cooperation on renewable energy investments, clean-tech research, biodiversity protection, or climate adaptation strategies could advance growth while also contributing to global climate efforts. It would also raise the group's profile as a responsible stakeholder in sustainable development efforts. Sustained cooperation cannot be only top-down and government-centric; it requires greater involvement of societal interactions between the peoples of these five nations.

Increasing educational exchanges, enhancing joint research projects, supporting scholarship programmes, cultural initiatives, and youth leadership projects among the member countries would foster mutual understanding over time and build a stronger foundation for further intergovernmental partnership. Through developing joint degree programmes, comparative research initiatives, and strong people-to-people linkages, universities and research centres within the member countries would build social capital and expertise, creating a stronger future for collaboration. Furthermore, with its growing membership and capabilities, the organisation is increasingly poised to exert influence over existing international organisations as well. By coordinating positions on issues such as global financial governance reform, sustainable development strategies, food security, and global public health responses, as well as standards-setting in digital technologies and AI, BRICS members can amplify their voice.

While a perfect convergence may not be feasible given the members' differing external and domestic agendas, consistency on key priorities will increase BRICS' relevance in global governance spaces. Finally, BRICS has numerous avenues for increased cooperation across various areas. To enhance accountability and effectiveness, these areas could be supported by quantitative targets and tangible milestones, established at each summit and monitored throughout the year.

BRICS is not an anti-West grouping, but it is non-West and its member states do not shy away from prioritising their collective and national interests over those of others. The future of BRICS will depend far more on the depth of interaction and cooperation among its members than on the size of the group itself. Despite real and significant national and policy differences, BRICS can build on commonalities through enhanced economic integration, strengthen regional financial architecture, broaden cooperation on technology, and invest in inclusive and sustainable development as well as education. By further solidifying its institutions, BRICS may soon evolve into an influential player in a developing new multipolar order. If the group continues to prioritise tangible cooperation, mutual respect, and development for all its members, BRICS may yet play a sizeable role in shaping a new global balance of power that will serve to foster peace and prosperity in the years to come.

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