



Series Report on the BRICS PartNIR Innovation Center

Bridging the Industrialization Gap: BRICS PartNIR Empowers Africa's Transformation and Development

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I. Foreword

Nowadays, the world is witnessing a new wave of industrial revolution, which is reshaping the global political and economic landscape, with profound and far-reaching implications for the world economy, global governance, and international development. BRICS countries, i.e. Brazil, Russia, India, China, and South Africa, deem the New Industrial Revolution (NIR) as a crucial measure for facilitating national development transformations, driving cooperation among BRICS nations, and enhancing the international influence of BRICS cooperation. Specifically, South Africa has established the Presidential Commission on the Fourth Industrial Revolution (FIR); China has proposed and set up the innovation center for BRICS PartNIR, and in February 2023, released the *Overall Layout Plan for the Construction of Digital China*; India has been vigorously promoting the BRICS Innovation Action plan 2021-2024. It has become a significant strategic choice for both BRICS nations and other countries worldwide to embrace the historical opportunities brought by the NIR. For late-developing countries, including those in Africa, the NIR is also perceived as a key opportunity for making leapfrog advancements and economic strides, bypassing traditional stages of development. As can be seen from above, the NIR serves as a breakthrough point for connection between the BRICS mechanism and Africa's development, and represents a crucial pathway for enhancing the BRICS PartNIR and boosting the global influence of the BRICS mechanism.

In 2023, the 15th BRICS Summit was held in Johannesburg, South Africa. Under the theme of "BRICS and Africa: Partnership for Mutually Accelerated Growth, Sustainable Development and Inclusive Multilateralism", it placed on its agenda five priorities, including developing a partnership towards an equitable Just Transition, transforming education and skills development for the future, unlocking opportunities through the African Continental Free Trade Area, strengthening post-pandemic socio-economic recovery and the attainment of the 2030 Agenda on Sustainable Development, and strengthening multilateralism. These five priorities are closely tied to the NIR, and with a core focus on digital economy, cooperation in high-tech new industries, and innovation-driven development, the NIR will play a crucial role in advancing the goals outlined in these agenda priorities. In the 15th BRICS Summit Johannesburg II Declaration, the BRICS leaders stated that

"We commit to strengthening intra-BRICS cooperation to intensify the BRICS PartNIR and create new opportunities for accelerating industrial development. We commit to strengthening intra-BRICS cooperation to intensify the BRICS PartNIR and create new opportunities for accelerating industrial development. We support intra-BRICS cooperation in human resource development on new technologies through the BRICS Centre for Industrial Competences (BCIC), BRICS PartNIR Innovation Centre, BRICS Startup Forum and collaboration with other relevant BRICS mechanisms, to carry out training programmes to address challenges of NIR for Inclusive and sustainable industrialization. We reiterate our commitment to continue discussion on the establishment of BCIC in cooperation with UNIDO to jointly support the development of Industry 4.0 skills development among the BRICS countries and to promote partnerships and increased productivity in the NIR. We look forward to the cooperation with UNIDO and request the PartNIR Advisory Group to coordinate with UNIDO."

In this context, this report places a primary focus on the BRICS partnership with Africa on the NIR. First and foremost, in an effort to elucidate the essence, impacts, and developmental trends of the NIR, the report examines the African countries' perception, strategy planning, development needs, and steep gaps in relation to the NIR; secondly, building upon this, it analyzes the role of the BRICS PartNIR in driving the economic development and national transformation of African countries, particularly the value and potential of the BRICS PartNIR Innovation Center within this framework; furthermore, by referring to the theme and agenda of the BRICS Summit held in South Africa, it makes a comparison between the "supply" of the BRICS PartNIR with the "demand" from African countries, and then outlines the prospects for cooperation between the BRICS mechanism and Africa on the NIR and proposes feasible pathways for collaboration.



II. The NIR Offers a Strategic Opportunity for Africa to “Leapfrog”

NIR, a term that originally appeared in *The New Industrial Revolution*, a book written by Peter Marsh, a journalist at the *Financial Times*. It was introduced by him to describe the global production relationships transformed by technological changes. Distinguishing itself from previous industrial revolutions leading to regional disparities, the NIR is expected to usher in a true era of “industrial democracy” for the global market. This era features an equitable distribution of production relationships on a global scale.¹

Opportunities and Challenges Brought by the FIR

The NIR, also known as the Fourth Industrial Revolution (FIR), represents another leap forward in human progress. Historically, the First Industrial Revolution mechanized production using water and steam power, the Second Industrial Revolution introduced large-scale production with electricity, and the Third Industrial Revolution automated production through electronic information technology. Now, the FIR is unfolding based on the Third Industrial Revolution that has been ongoing since the mid-20th century. The FIR is a term used to describe the blurring of boundaries among the physical, digital, and biological worlds. It encompasses the advancements in various cutting-edge technologies, including artificial intelligence (AI), robotics, the Internet of Things (IoT), Web3, blockchain, 3D printing, genetic engineering, quantum computing, and more.

The FIR marks the beginning of the age of imagination. Klaus Schwab, founder and executive

¹ Marsh, Peter. *The new industrial revolution: consumers, globalization and the end of mass production*. Yale University Press, 2012, p.215.

chairman of the World Economic Forum, is one of the earliest to refer to today’s advancements as a new revolution, and is also the author of the book *The Fourth Industrial Revolution*. Schwab stated, “Like the revolutions that preceded it, the FIR has the potential to raise global income levels and improve the quality of life for people around the world.” In the era of the NIR, the restructuring of traditional production relationships will help to shape fairer collaboration for production. “In the future, technological innovation will also lead to a supply-side miracle, with long-term gains in efficiency and productivity. Transportation and communication costs will drop, logistics and global supply chains will become more effective and the cost of trade will diminish, all of which will open new markets and drive economic growth.” It is estimated that the FIR will create up to \$3.7 trillion in value for global manufacturing companies, benefiting consumers significantly, and has so far made a great difference, as evidenced by breakthroughs in fields such as healthcare, agriculture, energy, education, and telecommunications.

Facing the transition from simple digitization, namely the Third Industrial Revolution, to innovation based on technology combinations, i.e. the Fourth Industrial Revolution, businesses have to reevaluate their operational approaches. The accelerated pace of innovation and disruption presents an actual challenge to a company’s survival and growth. There is clear evidence that the technologies of the FIR are having a significant impact on businesses across all industries. However, the NIR is not just about opportunities; it may also bring potential risks and even exacerbate inequality. One of the key concerns is that the primary beneficiaries of innovation tend to be innovators, shareholders, and investors, who are providers of intellectual and material capital, potentially widening wealth disparities. The demand for high-skilled workers increases while the demand for lower-educated and lower-skilled workers decreases, resulting in strong demand at both the high and low ends of the job market but leading to hollowness in the middle.

The NIR has exerted a profound influence on government and national governance. As the physical, digital, and biological worlds continue to converge, new technologies and platforms have been increasingly enabling citizens to interact with the government, express their opinions, coordinate efforts, and even bypass public authorities’ supervision. Meanwhile, empowered by new technologies, governments are strengthening their control over their populations through pervasive surveillance systems and control of digital infrastructure. However, with the addition of new competition sources together with the redistribution of power and devolution of authority brought about by new technologies, governments have been under increasing pressure to reform their approaches to public engagement and policy-making, which will diminish the government’s core role in implementing policies.

The Predicament of Africa’s Industrialization

The industrialization in Africa dates back to the colonial era when European colonial powers established industrial systems in Africa primarily based on resource extraction. After gaining independence, many African countries aspired to develop autonomous industrial production systems, often based on the primary sector, such as expanding industries of food processing, textiles,

and footwear on the foundation of agriculture.² However, Africa has achieved overall limited progress in industrialization, between which and mainstream global industrial development is a gap constantly widening. Africa has long faced persistent challenges in achieving effective industrialization, which are reflected in two aspects: one is grappling with the technology and capital gap in the process of traditional industrialization; the other is overcoming the legacies of colonial-era economic structures and establishing more just and equitable economic cooperation both domestically and internationally. Typically speaking, traditional industrialization requires substantial initial investments for acquiring production equipment, training workforce, constructing factories, building infrastructure, etc.³ In the past decades, many African countries have failed to make significant advancements in industrialization because their traditional industrialization has not been advanced very well.

Traditional industrialization in Africa was driven by historical legacies such as colonial exploitation, which have inflicted on the African people complex emotional memories and historical burdens. After World War II ended, as anti-imperialist and anti-colonial movements swept across Asia, Africa, and Latin America, major developing regions including Africa made attempts to break free from dependence on colonial powers and establish industrialization paths that were in line with local development realities and possessed capabilities for endogenous development. However, the majority of developing countries' attempts to come up with an approach for local industrialization ended up in failure, as evidenced by numerous cases of failure cited in the book *The Elusive Quest for Growth*, written by economist William Easterly at the World Bank.⁴

Africa's self-driven industrialization faces both structural and historical challenges. According to the development indicators system established by American economist Hollis Chenery and the historical experiences of the industrialization processes of major global economies, most developing countries and regions are constrained by factors such as savings, capital, and technology in their industrialization processes.⁵ Within the global economic system or global supply chains, the practical challenge confronting African countries is how to narrow the development gap with the rest of the world, address the deficits of development, and tackle issues of how to integrate into the global market in reciprocity. Globalization is rife with encroachment by major powers on the development right of late-developing countries, and this prevailing paradigm of globalization has only been reinforced by the current competition among global superpowers. To seek survival in the midst of this competition, African nations must make concessions in terms of political or economic development right to gain access to market technology and industrial support from other countries. For this reason, local emerging industries in these countries still rely on external support, which will inevitably lead to dependence and vulnerability in development.⁶

² Zhao Guizhi, Zhang Zhe. Development Process of Industrialization in Africa——Based on Influence Factors and Path Choices [J]. *African Studies* (No.1,2016,Vol.8).

³ Liu Shijin. Correctly Understanding "New Industrialization" [J]. *China Industrial Economics*. 2005 (11).

⁴ Bill Easterly. *The Elusive Quest for Growth: Economists' Adventures and Misadventures in the Tropics* [M]. The MIT Press, 2002.

⁵ Hollis Chenery, Sherman Robinson; and Moshe Syrquin. *Industrialization and Growth: A Comparative Study*. [M] Truth & Wisdom Press/Shanghai Readway/Shanghai People's Publishing House. 2005 (5), pp42-88.

⁶ Prebisch, Raúl. Socio-economic structure and crisis of peripheral capitalism [C]. *Multimedia Databases & Image Communication*, Second International Workshop, Mdic, Amalfi, Italy, September. 1978.

From a historical perspective, Africa's industrialization process is closely intertwined with the history of Western colonialism. Since gaining independence, the history of industrialization in Africa has featured a strong rejection of colonialism. In modern times, since African countries have always lagged behind in advanced industrial sectors, the African region has been struggling to change its role as a supplier of raw materials in the industrial division with developed countries. For many African countries, industrialization in Africa is seen as a potential form of new colonial exploitation. Despite their need for external assistance to address their own development challenges, there has always been a contradictory mindset when it comes to handling foreign relations, characterized by a tension between "industrial development and anti-colonial sentiments." Apart from traditional developed countries, emerging major countries like China have started to make investments and conduct trade in Africa, and to some extent, they face pressure from African countries related to "decolonization."

The FIR: Opportunities for Africa's "Leapfrog"?

According to the African Union, the FIR marks a watershed in Africa's development. Driven by the FIR, Africa's demand for food processing and production grows 1.5 times faster than the global average, while the expansion of demand for products such as automobiles, metal goods, and industrial machinery surpasses the global average growth rate, which presents favorable opportunities for local businesses to scale up and enhance productivity. Mr. Victor Harrison, Commissioner for Economic Affairs at African Union Commission (AUC), notes that the rapid growth in the tech sector is an indication of a positive shift towards the 4th Industrial Revolution which the continent, if it prepares itself through adequate policies and readiness of the private sector, could enormously benefit through industrial development, digitalization and greater integration, which in turn would result in greater opportunities for the growing youthful populations.⁷

The FIR will offer unique opportunities to Africa. According to a report compiled by the African Development Bank, the 4IR has the potential to transform Africa's economy, increase its productivity and enhance its global trade. It may bring about possibilities to better address pressing societal and environmental challenges, while alleviating poverty and raising people's wellbeing. Advancements in virtual spaces (IoT, blockchain) and logistics possibilities (drones) are set to overcome geographical and productivity limitations in Africa, opening up new possibilities for development.⁸ Emerging industries such as artificial intelligence, big data, blockchain, the Internet of Things (IoT), drones, additive manufacturing, quantum computing, virtual reality, and robotics have already taken root in the African continent. These industries are being applied in traditional sectors such as agriculture, healthcare, and education, gradually improving the living environment and competitive foundation in Africa.⁹ Over the past decade, African countries have increased investments in digital-related technologies and infrastructure, resulting in significant growth. According to a report by the African Union, the contribution of ICT to Africa's GDP increased from 5.12% in 2013 to 7.23% in 2020.¹⁰

⁷ AU, "The Industrial Revolution, a Watershed Moment for Africa's Development", African Union, Feb.26, 2020, <https://au.int/fr/node/38163>

⁸ AfDB, "Potential of the fourth industrial revolution in Africa", African Development Bank Group, 2019, p.36.

⁹ African Development Bank Group. *Unlocking the Potential of The Fourth Industrial Revolution in Africa*, Study Report, October 2019.

¹⁰ African Union Development Agency. *Second Continental Report on the Implementation of Agenda 2063*, Feb. 2022.

Some research has summarized the opportunities of the FIR for Africa into six aspects. Firstly, promoting economic growth and structural transformation. The development of information and communication technology (ICT) in Africa has already created 1.7 million direct employment opportunities including formal and informal jobs, contributed \$144 billion in economic value, which is 8.5% of Sub-Saharan Africa's GDP, and provided \$15.6 billion in tax revenue to the public sector.

Secondly, reducing poverty and inequality. The promotion of digital technology helps to formulate more targeted and effective poverty-reduction strategies, providing opportunities for ordinary households and the public to participate in economic activities.

Thirdly, reshaping labor, skills, and production. Amid the e-commerce boom, massive African youth are attracted to enter the e-commerce industry through the internet, becoming a significant driver in unleashing consumer potential. In 2023, the number of e-commerce users in Africa reached 435 million, a 144% increase from five years ago, with an average annual growth rate of nearly 30%. It is projected that by 2027, there will be 609 million e-commerce users in Africa.¹¹ Young consumer groups are also engaged in e-commerce through social media platforms like Facebook, Instagram, and TikTok, leading to an African-style influencer economy, which will accelerate the flow of capital factors, and transmit the vibrancy in the realm of goods to the production sector. The growing e-commerce user base will continuously drive the growth of other industry forms, and sectors related to e-commerce, such as production, sales, logistics, and distribution, will absorb more young labor. This production-consumption cycle will help to maximize synergies across multiple industries and production stages.

Fourthly, increasing financial services and investments. The combination of digitization and inclusive finance has sparked innovations of financial technology in Africa. These innovations have broken traditional physical and policy constraints, making financial services more inclusive and providing more opportunities for the development of businesses and individuals.

Fifthly, facilitating modernization in agriculture and agro-processing. Access to information on grain pricing, crop monitoring, disease prevention techniques, and disaster support may potentially transform the agricultural sector, boosting income, output, and demand across the African continent. Increased market demand and improved analytical capabilities will also encourage companies to make more investment in agro-processing, such as food and beverage processing, thereby enhancing domestic production levels in African countries.

Sixthly, healthcare and medicare. Technological innovations, including digitization, mobile technology, and telemedicine, will contribute to the development of healthcare systems in Africa, and particularly will be a great help in addressing the realistic challenges faced by fragile national healthcare systems.¹²

¹¹ Statista: "Number of users of e-commerce in Africa 2017-2027" , Jun 28, 2023. <https://www.statista.com/statistics/1190579/number-of-online-shoppers-in-africa/>

¹² Njuguna Ndung'u, Landry Signe, "The Fourth Industrial Revolution and Digitization will Transform Africa into a Global Powerhouse" , in Brahim S. Coulibaly, eds., *Foresight Africa: Top Priorities for the Continent 2020-2030*, Brookings, 2020.

In general, African countries are looking to achieve industrialization leaps through the NIR. The idea of skipping traditional industrialization is not entirely new, as some East Asian economies like Singapore and South Korea have successfully implemented this strategy, achieving rapid economic growth. Singapore transformed from labor-intensive industries to a knowledge-based economy in a relatively short period. South Korea skipped the traditional industrialization stage in the 1980s, becoming a global leader in electronics and information technology. Evidence and experiences from other countries suggest that this strategy is feasible. If this development strategy is applicable to African countries, the NIR can help them to leapfrog the stages of industrialization. Currently, major African countries are adopting this policy and path in their specific policy strategies.

However, nearly all developing countries face the dilemma of choosing between their development stage and industrialization development strategy. As the wave of the Fourth Industrial Revolution sweeps across the world, the fundamental question Africa faces remains whether it can break free from the traditional dependent development and the vertically specialized industrialization system, and whether it can enhance its industrial system's self-reliance and competitiveness to participate in the global market on equal terms. Amid the global industrial landscape featuring fierce competition and highly specialized industrial division, African countries, especially low- and middle-income nations, face a prominent challenge: whether they need to follow the traditional path of industrialization before achieving a new form of industrialization, or if they can directly leapfrog the stage of industrial foundation accumulation, bypassing the constraints of traditional comparative advantages, and realizing the so-called "late-comer advantage."¹³ If Africa fails to make further endeavors in innovation and embrace the digital growth model, it will see a widening digital divide and a competitiveness drop in the global market.

The NIR Strategy for Africa

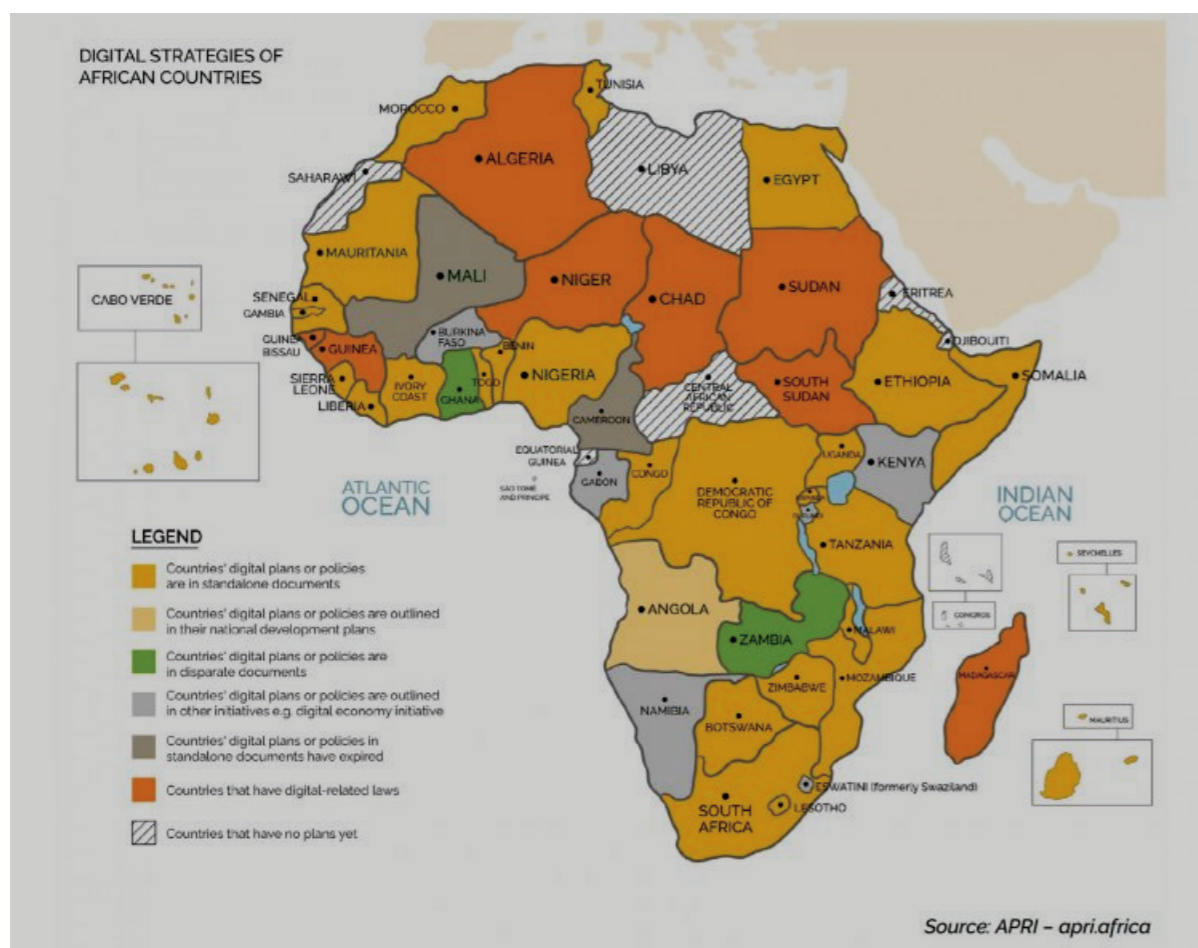
The NIR is driving African nations to expedite the formulation and implementation of development strategies tailored to their region, which has become even more pronounced and practical in significance after the outbreak of the COVID-19 pandemic in 2020. At the continental level, the African Union adopted the "Science, Technology, and Innovation Strategy for Africa 2024" (STISA-2024) in 2014, which called for member states to "to accelerate Africa's transition to an innovation-led, knowledge-based economy," one of the long-term goals of the Agenda 2063 released by the African Union. In 2020, the African Union Summit endorsed The Digital Transformation Strategy for Africa, with its core objective being encouraging Africa to harness digital technologies and innovation to transform African societies and economies to promote Africa's integration, generate inclusive economic growth, stimulate job creation, break the digital divide, and eradicate poverty for the continent's socio-economic development and ensure Africa's ownership of modern tools of digital management. This strategy not only complements vital African integration initiatives and frameworks but also significantly empowers the accelerated implementation of other plans, such as the Policy and Regulation Initiative for Digital Africa (PRIDA), the Accelerated Industrial Development for Africa (AIDA), the Programme for Infrastructure Development in Africa (PIDA), the African Continental Free Trade Area (AfCFTA), the African Union Financial Institutions (AUI),

¹³ Shankar, Venkatesh, et al. "Late Mover Advantage: How Innovative Late Entrants Outsell Pioneers." *Journal of Marketing Research*, vol. 35, no. 1, 1998, pp. 54-70. JSTOR, Accessed 6 Aug. 2023.

the Single African Air Transport Market (SAATM), the Free Movement of Persons (FMP), to support the development of an African Digital Single Market (DSM). As such, the African Union has set a goal to establish a single digital market by 2030.

At the sub-regional level, sub-regional communities such as the Southern African Development Community (SADC) have placed industrial development at the very core of their regional integration agendas. In 2014, the SADC launched the *Regional Indicative Strategic Development Plan (2015-2020)*, which prioritizes industrialization as a key area for integration, aiming to accelerate market integration and promote common development among member states through industrial cooperation. To this end, the SADC developed the *Industrialization Strategy and Roadmap (2015-2063)* to coordinate the implementation of regional industrial plans and projects, with a focus on agro-processing, mining, and pharmaceuticals to enhance the regional value chain of the SADC. In 2017, the SADC Ministers responsible for Information and Communication Technologies (ICT) issued the *SADC Declaration on the Fourth Industrial Revolution*, committing to drive the Digital SADC 2027 objectives. In July 2018, the SADC also held a policy dialogue and coordination session about the Southern African countries' stance on the FIR, identifying digitization, technology, and

At the national level, digital agendas have taken on an increasingly dominant role in African countries' policies and planning, and have become a crucial measure for addressing future challenges and achieving national transformative development. Based on statistics, most African countries have incorporated digital agendas into their national development plans. Some countries have formulated dedicated digital strategy documents, while others have developed specific policies and strategic plans covering areas such as e-commerce, cybersecurity, digital privacy, and e-government.¹⁴ Egypt is currently the only African country that has developed a national strategy for artificial intelligence. South Africa established the Presidential Commission on the Fourth Industrial Revolution in 2019, which comprises approximately 30 individuals with backgrounds in academia, industry, and government. Furthermore, they also established an inter-ministerial committee on the FIR. Mauritius has formulated the Digital Mauritius 2030 Strategic Plan, defining ICT as the third pillar of the national economy and specifying five key directions for the digital strategy: ICT infrastructure and broadcasting, e-government and business facilitation, talent management, cybersecurity and cybercrime, and innovation and emerging technologies. Kenya has developed the Digital Economy Blueprint, identifying digital government, digital business, infrastructure, innovation-driven entrepreneurship, and digital skills and values as pillars of the digital economy. In October 2020, Uganda's National 4IR Strategy was passed, with a focus on e-government, urban management (smart cities), healthcare, education, agriculture, and the digital economy. Other countries such as Ghana, Zambia, Gabon, The Gambia, Namibia, and others, while not having separate digital strategy documents, have all incorporated digital strategies into their national development plans.



innovation as priority directions for development in Southern African countries. In the same year, the SADC ICT Sub-Committee (SCOM) recommended drafting an SADC cybersecurity action plan, an SADC strategic position paper on big data and an SADC resolution.

14 Olumide Abimbola, Faten Aggad and Bhaso Ndzendze, "What is Africa's Digital Agenda?" Policy Brief No. 3. Berlin: APRI, 2021. <https://afripoli.org/what-is-africas-digital-agenda>

III. Remarkable Outcomes Achieved by BRICS-Africa PartNIR

The BRICS PartNIR is an important manifestation of developing countries' efforts to address the challenges of the NIR. Represented by China-Africa cooperation, BRICS countries have established South-South cooperation and international cooperation with Africa, which play an exemplary role and contribute significantly to Africa's development and transformation. In the era of the NIR, deepening cooperation between BRICS and Africa and building a BRICS-Africa PartNIR are the common needs of BRICS and African countries. To drive the innovative development of the BRICS-Africa PartNIR, it not only requires both BRICS and African countries to strengthen strategic planning, policy coordination, and practical cooperation, but also requires them to leverage existing mechanisms and platforms, such as the BRICS PartNIR Innovation Center.

BRICS-Africa Partnership under Construction

As Africa entered the 21st century, it has undergone two significant transformations. First, there has been a noticeable increase in Africa's demand for transformation and development. A demand for endogenous transformation with a core focus on changes in economic structure, together with external normative pressures oriented at energy and green transformation, are expediting the development and transformation progress of African countries. Driven by the need to address domestic structural challenges, African countries are in urgent need of new partners, opportunities, and technologies to support their aspirations for self-driven, sustainable, and inclusive development. Industrialization, digital transformation, and green energy transformation have become the core demands in Africa's development agenda. Second, the trends of "the shift from West to East and from North to South in the balance of global power in Africa" have become increasingly prominent. Emerging countries, with China as a prominent example, have rapidly developed cooperation with Africa and gradually become essential external forces promoting Africa's development.

On a bilateral level, BRICS countries are all significant international cooperation partners for Africa, boasting unique advantages in facilitating Africa's development. Since the Forum on China-Africa Cooperation (FOCAC) was inaugurated in 2000, the China-Africa relationship has witnessed ever-accelerating development. China has become Africa's largest trading partner, the largest source of bilateral official financing and infrastructure financing, a significant aid provider, and a new source of investment. China-Africa cooperation is premised on the needs and realities of Africa, and priorities are given to critical sectors such as infrastructure, energy power, and telecommunications, which play a key role for the transformative development of Africa and yield magnificent economic and social benefits. China has played a more prominent role than many multilateral institutions and Western countries in boosting the economic transformation of Africa and other developing countries.¹⁵

Africa's self-driven development and united cooperation are rising as a new, significant trend of international development nowadays, which further highlights the potential of BRICS countries in accelerating Africa's development. Firstly, each BRICS country places great importance on Africa and has established cooperation mechanisms with the continent, for example, the India-Africa Forum Summit, the Russia-Africa Summit, and the Africa-South America Summit initiated jointly by Brazil and Nigeria. As such, BRICS nations serve as significant cooperation platforms, and there is broad space for them in strengthening and leading cooperation with Africa. Secondly, South Africa is one of Africa's important advocates. Both in the cooperation with G20 and BRICS, South Africa's primary goal is to voice the concerns of African nations and encourage the BRICS group to place great emphasis on Africa and increase their investments in the continent. Through the unremitting efforts of South Africa, the BRICS-Africa partnership has remained a central theme in the BRICS summits of 2013, 2018, and 2023. During the 2023 BRICS summit in Johannesburg, all African national leaders were invited to attend the 2023 BRICS summit, which undoubtedly marks the beginning of a new chapter in BRICS-Africa relations. Thirdly, the similarities in development experiences and philosophies provide BRICS countries with a significant comparative advantage in cooperation with Africa. Over years of collaboration, each BRICS nation has established its own areas of comparative advantage in Africa, for instance, China's role in African infrastructure and economic development, Russia's involvement in African mining, and India's experience in African retail, pharmaceuticals, telemedicine, and education and training, to name just a few. All BRICS countries are emerging market nations with comparative advantages in areas such as technology, markets, resources, capital, and labor. This, combined with complementary industries, experience sharing, and technology transfer, makes them key players in Africa's development transformation and capacity building.

At the multilateral level, BRICS cooperation plays a unique role in supporting Africa's development and transformation. As important representatives of developing nations, BRICS countries share with African countries similar principles and positions when it comes to global political and economic order. By furthering reforms in the international financial system and global governance, BRICS nations can help create a favorable international environment for Africa's development. As BRICS cooperation pushes ahead, these countries have also established a series of cooperation mechanisms, with higher capacity to provide public goods. The New Development Bank (NDB) and the BRICS PartNIR Innovation Center are significant achievements of BRICS' practical cooperation, and have become important sources of BRICS' attractiveness. Additionally, BRICS nations have established institutions such as the BRICS Business Council, BRICS Science, Technology and Innovation

¹⁵ Axel Dreher, Andreas Fuchs, Bradley Parks, Austin M. Strange, Michael J. Tierney, *Banking on Beijing: The Aims and Impacts of China's Overseas Development Program*, Cambridge University Press, 2022, pp.220-222.

Center, and BRICS Energy Cooperation Forum, among others. These mechanisms serve as vital platforms for BRICS and other developing countries to increase infrastructure investment, enhance industrial capacity, and achieve sustainable development.

The BRICS cooperation mechanism has indeed begun to benefit Africa magnificently. During the 2013 BRICS summit in Durban, South Africa, BRICS leaders and representatives reached several agreements, including the consent for establishing the NDB and two financing agreements, namely the BRICS Multilateral Infrastructure Co-financing Agreement for Africa and the BRICS Multilateral Cooperation and Co-Financing Agreement for Sustainable Development with a focus on green economy and infrastructure financing in Africa. The former agreement aims to explore the feasibility of providing joint financing for African infrastructure, while the latter one seeks to establish bilateral cooperation and co-financing arrangements, especially in areas related to sustainable development and green economy elements. In 2016, the NDB granted a loan of \$180 million to Eskom, South Africa's national power utility, marking the first loan that South Africa received from the NDB. The NDB African Regional Center, established in 2017, has become the first regional center established by the NDB. As of August 2023, the NDB has provided South Africa with 14 loans totaling approximately \$7.4 billion.¹⁶ The outcomes of past BRICS summits have indeed provided valuable assistance in Africa's development transformation. The achievements of the 2022 BRICS summit, such as establishing the Forum on Agricultural and Rural Development, endorsing the BRICS Digital Economy Partnership Framework, and establishing the BRICS network of technology transfer centers and inaugurating the BRICS Technical and Vocational Education and Training Cooperation Alliance, have played a crucial role in alleviating food crises in Africa, promoting its digital economic development, enhancing its technological innovation capabilities, and pushing it a step further in achieving sustainable development.¹⁷

Table: Size and Rankings of Digital Economy in BRICS Countries in 2021

Country	Size of Digital Economy (100 Million USD)	Ranking	GDP Ranking
China	70576	2	2
India	6799	8	5
Brazil	3513	12	12
Russia	3348	13	8
South Africa	801	28	31

Data Source: China Academy of Information and Communications Technology (CAICT), and International Monetary Fund (IMF)

¹⁶ NDB, "South Africa", https://www.ndb.int/projects/all-projects/?country=south-africa&key_area_focus&project_status&type_category&pyearval#038;key_area_focus&project_status&type_category&pyearval#paginated-list

¹⁷ Ministry of Foreign Affairs: The BRICS Summit's Eight Remarkable Outcomes for the Benefit of Africa written by Chinese Ambassador to South Africa Chen Xiaodong. 2022.06.19. https://www.mfa.gov.cn/wjdt_674879/zwbdt_674895/202206/t20220629_10711884.shtml.

Progress in BRICS PartNIR

In 2013, South Africa assumed the chairmanship of the BRICS summit for the first time, and set its theme as "BRICS and Africa: Partnership for Development, Integration, and Industrialization." The BRICS-Africa partnership, African integration, and industrialization have become the primary agendas that South Africa aims to promote within the BRICS framework. In 2016, during the 8th BRICS Summit, the leaders of BRICS countries endorsed the "Goa Declaration," which emphasized the importance of digital cooperation among BRICS nations. They are committed to strengthening joint efforts to improve cooperation between technical, law enforcement, R&D and innovation in the field of ICTs and capacity building institutions. They affirm their commitment to bridging digital and technological divides, in particular between developed and developing countries. They recognise that their approach must be multidimensional and inclusive. In 2017, during the BRICS Summit in Hangzhou, the outcomes of the 2nd BRICS Industry Ministers Meeting were released, known as the "Action Plan for Deepening Industrial Cooperation among BRICS Countries." This action plan has outlined seven major directions for industrial cooperation among BRICS countries, including strengthening industrial capacity cooperation, strengthening the coordination and match-making in the field of industrial policies and development strategies, promoting the cooperation in the development of new industrial infrastructure, expanding cooperation in technological development and innovation, deepening cooperation in the field of SMEs, strengthening cooperation in the areas of standardization, and facilitating all-round cooperation with the United Nations Industrial Development Organization (UNIDO). BRICS PartNIR has since then played a key role in the cooperation with BRICS nations.

In 2018, the BRICS Summit was themed on the NIR, and China, in collaboration with South Africa, formally introduced the "BRICS Partnership on New Industrial Revolution (BRICS PartNIR)" as part of the "Johannesburg Declaration of the 10th BRICS Summit."¹⁸ BRICS PartNIR aims at deepening BRICS cooperation in digitalization, industrialization, innovation, inclusiveness and investment, and seeks to transform the vision of the second "Golden Decade" of BRICS cooperation into a practical reality. The construction of this partnership has become a flagship project in leading practical cooperation among BRICS nations, and plays a key role in nurturing and enhancing the international competitiveness of BRICS countries. Specific areas of cooperation within the partnership include: policy coordination amid the NIR; opportunities for cooperation in advanced technology skills and training; exchange of information and best practices in digitization; capacity building; projects aimed at ensuring inclusive and equitable growth; collaboration with stakeholders to enhance synergy in human and financial resources; the Advisory Group is required to cooperate closely with BRICS Business Council (BBC) and encourage the private sector's involvement and participation in BBC working groups, to promote mutually beneficial industry cooperation across a wide variety of industrial and manufacturing sectors. In December 2018, representatives of BRICS countries held the first Meeting of BRICS PartNIR Advisory Group in South Africa. In 2019, representatives from BRICS countries convened for the second Meeting of BRICS PartNIR Advisory Group in Brasília, Brazil. During the latter meeting, they adopted the scope of work and work

¹⁸ http://bricspic.org/Upload/file/20230410/20230410105835_5659.pdf. Declaration of the 3rd BRICS Industry Ministers Meeting. 2018.07.04.

plan of BRICS PartNIR Advisory Group, and determined work orientation of PartNIR, laying the groundwork for a comprehensive launch of the partnership.¹⁹

In November 2020, during the 12th BRICS Summit, BRICS countries formulated the *Strategy for BRICS Economic Partnership 2025*, with the digital economy being one of the three key areas of cooperation. The strategy proposed cooperation in the field of digital governance within the framework of the Digital BRICS Task Force on the NIR and similar structures. It confirms its will to address digital divide by bridging the gap in access of BRICS population to digital infrastructure, digital skills and digitally-enabled services, ensure inclusion of digitally deprived segments of society by laying special stress on improving the access and connectivity of people living in rural areas to the Internet, and expand BRICS collaboration on software and ICT equipment.²⁰ During the summit, Chinese President Xi Jinping announced the establishment of a BRICS PartNIR Innovation Center. In September 2021, the BRICS PartNIR Innovation Center was inaugurated in Xiamen as BRICS Forum on Partnership on New Industrial Revolution took place in the city.

On June 23, 2022, the 14th BRICS Summit was successfully held. At the summit, the BRICS leaders reached consensus on the *BRICS Digital Economy Partnership Framework*, which marks an important milestone in deepening cooperation on digital economy among BRICS nations, ushering in a new phase of collaboration in digital economy. The framework is a forward-looking, inclusive, and action-oriented document containing important achievements. As the first document dedicated to cooperation in digital economy in the field of economics & trade compiled by BRICS countries, the framework incorporates cutting-edge areas of the digital economy, such as digital authentication, electronic payments, electronic transaction documents, data privacy and security, and online dispute resolution. Moreover, it contains agreements for collaboration on emerging technologies like artificial intelligence so as to accelerate digital transformation collectively. Acknowledging that BRICS members are at different levels of digital development, the framework prioritizes BRICS cooperation on overcoming the digital divides as one of the key tasks. It encourages members to share policies & practices and carry out digital economy capacity building initiatives aimed at effectively addressing the digital divides by closing the gaps in access to digital infrastructure and digital technologies, digital services and digital skill development. It also encourages them to collectively rise to the challenges arising from trade and investment in the digital era. The framework outlines specific directions and key areas of cooperation in the field of digital economy, and proposes 17 cooperation measures oriented at areas like trade facilitation, investment cooperation, support for small and medium-sized enterprises (SMEs), and capacity building, including enhancing digitalization in ports, encouraging investment in digital infrastructure, and boosting the capabilities of SMEs, among others, with the goal of unleashing the full potential of cooperation in digital economy among BRICS nations.

The BRICS PartNIR has achieved significant milestones, elevating the level of cooperation among BRICS nations in the field of the NIR. The partnership has transitioned from fictitious to substantial.

¹⁹ <http://www.bricspic.org/Pages/Home/AboutDetail.aspx?rowId=2&classId=10>. Official Website of the BRICS PartNIR Innovation Center: Partnership

²⁰ Liu Jinqian, Sun Xiao: Status Quo and Outlook for Cooperation on Digital Economy among BRICS Nations. *Contemporary International Relations*. 2022 (No.1). pp.46.

Since 2018, the BRICS PartNIR has evolved from an initial proposal to consensus-building and comprehensive implementation of cooperative mechanisms. Nowadays, a series of key projects related to the BRICS PartNIR have been launched, such as the BRICS PartNIR Innovation Center, the BRICS-UNIDO BRICS Centre for Industrial Competences (BCIC), the BRICS Startup Forum, the BRICS Technology Transfer Center, and the BRICS Institute of Future Networks.

Furthermore, a series of significant achievements related to partnership building have been made through various means such as publishing research results, developing forums and mechanisms, conducting competitions and training sessions, and developing and implementing projects. The BRICS PartNIR Innovation Center has yielded substantial results in areas such as policy coordination, talent cultivation, project development, and training programs, such as regularly hosting BRICS policy lectures, launching training programs on high-quality development of marine economy, organizing the BRICS Skills Competition and the BRICS Skills Development & Technology Innovation Competition, and inaugurating the Xiamen BRICS New Industrial Capacity Enhancement Center; collaborating with local governments, businesses in Brazil and India, as well as domestic local governments and institutions on cooperative projects; completing numerous training programs such as the Training Competent Personnel for the BRICS Industrial Internet Program, BRICS Online Training for Global Cross-border E-commerce Personnel, BRICS Data Personnel Serial Training Courses, and BRICS Green Finance Training Series.

Additionally, efforts based on the BRICS PartNIR Innovation Center has yielded more achievements in mechanism construction and collaboration. These include the establishment of the Industrial Innovation Alliance of BRICS PartNIR Innovation Center in 2022, which has been designed to promote collaboration on projects related to the NIR, build platforms for transfer and application of technology innovations, increase stability in the industrial and supply chains, and foster cultural exchanges; the convening of the BRICS Seminar on Development of Industrial Internet and Digital Manufacturing in March 2022. The BRICS Forum on Development of Industrial Internet and Digital Manufacturing was held in May 2022, launching a significant outcome, the *BRICS Initiative for Cooperation in the Digital Transformation of the Manufacturing Industry*. The Global Development Initiative Partnership on New Industrial Revolution Symposium was held in April 2023, marking the launch of Network of Partnership on New Industrial Revolution under the Framework of Global Development Initiative. The first innovation training base of the Global Development Promotion Center was established in January 2023, harnessing the resources of the BRICS PartNIR Innovation Center. The continuous development and achievements of the BRICS PartNIR have played a crucial role in helping a wide range of developing countries, including BRICS nations, to seize opportunities arising from the NIR and to facilitate cooperation among nations in industrialization, digitization, technology innovation, and sustainable development, contributing magnificently to the implementation of the United Nations 2030 Agenda for Sustainable Development.

Pragmatic Cooperation between BRICS PartNIR Innovation Center and Africa

On November 17, 2020, the BRICS PartNIR Innovation Center was inaugurated in Xiamen, China, marking the transition of the BRICS PartNIR from an initiative to a reality. This has opened up new directions and expanded the scope of practical cooperation among BRICS nations. Guided by the

spirit of South-South cooperation, the BRICS PartNIR Innovation Center is committed to providing a platform for BRICS countries and other developing nations to collaborate on the NIR. Currently, it focuses primarily on three key areas, namely policy coordination, personnel training, and project development. These areas align well with the realities of African countries and precisely satisfy their development demand, making the innovation center a highly-promising supporter for African development.

Function Orientation of the BRICS PartNIR Innovation Center

The BRICS PartNIR Innovation Center follows the principle of “promoting multilateralism through bilateral cooperation and fostering official cooperation through non-governmental exchanges”. It focuses on the theme of the “NIR” and reinforces the foundation of “partnership”. Operating with a three-tier structure consisting of a Council, a Strategic Advisory Committee, and physical entities, it concentrates its efforts on three key areas, namely policy coordination, personnel training, and project development. The BRICS PartNIR Innovation Center serves as the operating team for base management, and is responsible for implementing decisions and directives from the Council. It comprises various departments, including Comprehensive Support, Policy Coordination, Personnel Training, Project Development, and International Cooperation, to handle operational and support-related functions. The BRICS PartNIR Innovation Center, as a significant practical platform for the BRICS PartNIR, has gradually evolved into a crucial bridge and link for deepening practical cooperation among member nations. It has also become a major platform for China, particularly Xiamen, Fujian, to promote high-standard opening-up and innovative cooperation.

The BRICS PartNIR Innovation Center’s Potential for Supporting the Development of Africa

The BRICS PartNIR Innovation Center has secured significant progress since its establishment over two years ago. During this period, it has accomplished several milestones, releasing 100 key task lists, establishing eight empowerment platforms in the field of the NIR, launching over 100 demonstration projects, signing agreements for 40 collaborative projects, and conducting 21 sessions of talent training activities that benefit more than 130,000 participants from over 28 countries.²¹ These achievements demonstrate the potential of BRICS countries in contributing more to the development of African countries.

Training sessions launched by the BRICS PartNIR Innovation Center	Interpretation of Macroeconomic Policy	Program on the “Practical Strategies for Entering the Chinese Market”
		“BRICS Plus” New Economy Pioneer Program
	Cross-cultural Exchanges and Integration	Advanced Seminar on the Cross-cultural Exchanges and Integration with BRICS Countries and Post-Pandemic Innovation and Transformation

		Enterprise Internationalization Operational Capability Enhancement Training Program: “Learning Internationalization from Huawei”
	Smart Urban Management	Urban Mass Transit Operation and Management Training Program
	Smart Industry Field	Industrial Digital Transformation & Upgrade Talent Training Program
		Smart Aquaculture Talent Training Program
	Smart Manufacturing Field	Additive Materials Manufacturing Training Program
		“Internet+” Enterprise Core Competency Building Training Program

Firstly, it promotes coordination of Africa policy and enhances Africa’s participation in joint research in the field of the NIR. The BRICS PartNIR Innovation Center has been intricately designed, establishing a series of major platforms aimed to facilitate the exchange of ideas, the convergence of wisdom, policy communication, and cooperative dialogues among related nations. For example, the Xiamen BRICS PartNIR Innovation Center (BPIC) Think Tank Cooperation Alliance was launched by the office of the leading group for developing the BRICS PartNIR Innovation Center in Xiamen; the BRICS PartNIR Innovation Center joined hands with domestic and foreign institutions to co-hold a series of online and offline academic seminars and lectures, and compile reports like the BRICS Standards Research Report, which boosts the development and mutual recognition of standards in the NIR field among BRICS nations; Xiamen Customs and Durban Customs of South Africa have initiated collaborations on policy exchanges, such as customs facilitation and smart customs. Moreover, African countries can benefit from participating in these policy dialogues and cooperation activities hosted by the BRICS PartNIR Innovation Center. This engagement can facilitate policy communication and coordination between Africa and BRICS nations in the construction and cooperation related to the NIR field, helping to bridge policy gaps and information deficits, and expediting the construction of new industrial business forms and systems in Africa. It strengthens the dialogue, exchanges, and consensus-building between African and BRICS countries, ultimately giving them a stronger voice in global economic structural adjustments. It also helps to make global governance more in line with the aspirations of the broadest group of developing countries, including Africa and BRICS nations, making it more inclusive, representative, and participatory.

Secondly, enhancing cooperation with Africa in talent development, and accelerating the transformation and implementation of BRICS-Africa cooperation achievements. The BRICS PartNIR Innovation Center advances talent development through various effective measures such as hosting competitions, carrying out international project collaboration, and establishing training bases, thereby accelerating the transformation and implementation of cooperation achievements. First, the BRICS PartNIR Innovation Center has hosted the final of the BRICS Skills Competition and the BRICS Skills Development and Technology Innovation Competition, focusing on key areas such as advanced manufacturing, digital economy, new industries, new business forms, and new technologies. The BRICS PartNIR Innovation Center has also launched the BRICS Academy

²¹ Liu Xiaoyu, Shen Xiaoxiao: Jointly Promoting Global Sustainable Development. People’s Daily. June 24, 2022. P6.

of Future Skills Development and Technology Innovation to speed up the transformation of competition results, and transform the design of competition items, tasks, and training methods into standard courses for long-term use in skills training and talent development. Second, in terms of international collaboration on research projects, the BRICS Cardiovascular Health Innovation Center was established as a demonstration project of the BRICS PartNIR Innovation Center in September 2022. It focuses its efforts on talent development and academic exchanges related to cardiovascular health, facilitation of “cardiovascular +” cooperation, and provision of international medical services in cardiovascular health. This greatly benefits BRICS countries and related nations. Third, the BRICS PartNIR Innovation Center has been vigorously building the Xiamen BRICS New Industrial Capacity Enhancement Center, which has collaboratively developed training programs and courses in the fields of smart industry, smart cities, and intelligent manufacturing within the NIR domain, and has conducted online and offline talent training and exchange activities involving 46 countries. By participating in talent development and exchange cooperation activities launched by the BRICS PartNIR Innovation Center, African countries can improve the connectivity in talent, industry, and innovation chains between Africa and BRICS countries, share innovative achievements, enhance the expertise and skills of African talent in relevant fields, and facilitate the transformation of project and training cooperation into tangible outcomes in fields such as industrial internet, artificial intelligence, big data, and biomedicine, thereby driving the economic transformation and industrial upgrading in Africa.

Thirdly, promoting development of projects for cooperation with Africa and advancing practical cooperation between China and Africa. The BRICS PartNIR Innovation Center, following the theme of the NIR, has developed and launched numerous projects, including a series of demonstration projects on BRICS cooperation that cover various fields such as industrial smart manufacturing, green health, investment & trade, and cultural exchanges. These projects have significantly contributed to the industrial capacity building of relevant countries, as is attested by the fact that in the fields of intelligent manufacturing and the digital economy, the center has introduced a batch of characteristic application carriers in the new industrial field, such as the BRICS Future Innovation Park and the BRICS Intelligent Manufacturing Industrial Park. To promote economic and trade cooperation, the BRICS PartNIR Innovation Center has established the commodity service center for products of BRICS countries, where it has introduced over 700 specialty products from the brand-owners and marketing channels of BRICS countries, including cosmetics, food, and beverages. “BRICS Boutique” has been launched on e-commerce platforms such as Amazon and AliExpress to facilitate the development of cross-border e-commerce among BRICS countries; the BRICS+ Accelerator and the Watson Build Innovation Center (BRICS Zone) have been established to serve as platforms for project matching and innovative development of SMEs from BRICS countries.²² African countries can leverage their comparative advantages by participating in project development and cooperation with the BRICS PartNIR Innovation Center, thereby expanding channels for BRICS countries to cooperate with Africa, enhancing investment and trade cooperation with BRICS countries, and achieving more practical cooperation results in key areas of Africa’s development and transformation, such as digitalization, industrialization, technological innovation, and green transformation.

²² Strengthening Interactive Cooperation Among BRICS Countries and Promoting High-level Opening-up— On the Occasion of the 2nd Anniversary of the Establishment of the BRICS PartNIR Innovation Center. 2022.11.17, <http://fj.people.com.cn/n2/2022/1117/c181466-40198022.html>.

IV. Empowering Africa’s Transformation and Development: The Development Approach of the BRICS-Africa PartNIR

The XV BRICS Summit was hosted by South Africa, under the theme of “BRICS and Africa: Partnership for Mutually Accelerated Growth, Sustainable Development and Inclusive Multilateralism”. This edition of summit represents a significant effort by South Africa to further implement the BRICS-Africa partnership. Against the backdrop of global development transformation and Africa’s economic transformation, how to bring into play the role of the BRICS PartNIR in stimulating industrialization and developmental transformation in Africa not only is a key approach to address the development challenges and practical needs of Africa but also presents a significant opportunity to enhance the relevance and influence of BRICS on the global stage.

The Agenda of the XV BRICS Summit: PartNIR

South Africa has remained a steadfast supporter of the BRICS PartNIR. When South Africa chaired the BRICS Summit in 2013 and 2018, industrialization and integration were important topics it aimed to promote. This, to a large extent, echoes the important aspirations of developing countries, especially those in Africa. It is estimated that the Fourth Industrial Revolution could create additional 860,000 jobs in South Africa by 2025 and increase its GDP by \$20 billion.²³ The five priorities of

²³ Government of South Africa and United Nations Development Programme, South Africa National Human Development Report 2022 (Pretoria: UNDP, 2023), p.40.

this year's summit are as follows: 1) Developing Partnerships: Focusing on achieving a fairer energy transition to address climate change and ensuring that people do not fall back into poverty. 2) Future Education and Skills Development: Recognizing education and skills development as long-term solutions for sustainable development and poverty alleviation. 3) Leveraging Opportunities: Utilizing the opportunities brought by the African Continental Free Trade Area (AfCFTA) to build mutually beneficial partnerships between BRICS and African nations, and promoting trade, investment, and infrastructure development. 4) Post-pandemic Economic and Social Recovery: Advancing economic and social recovery post-pandemic and striving to achieve the 2030 Agenda on Sustainable Development. 5) Strengthening Multilateralism: This includes efforts to reform global governance institutions, promoting global peace and enhancing women's participation in peace and competition. According to the BRICS Summit Johannesburg II Declaration, BRICS nations will support the BRICS Centre for Industrial Competences (BCIC), BRICS PartNIR Innovation Centre, BRICS Startup Forum and collaboration with other relevant BRICS mechanisms. Meanwhile, they will cooperate with UNIDO to jointly establish the BCIC, support the development of Industry 4.0 skills development among BRICS countries and promote the BRICS PartNIR. To address various digital divides, the BRICS Digital Economy Working Group has been established to enhance cooperation on the connectivity of supply chains and payment systems.

Apart from the BRICS Summit, South Africa has also been making vigorous efforts to advance the PartNIR through various ministerial meetings within BRICS, including the BRICS Industry Ministers Meeting, the Meeting of the BRICS Trade Ministers, and the BRICS Science, Technology and Innovation (STI) Ministerial Meeting.

The BRICS Industry Ministers Meeting serves as a direct mechanism for BRICS countries to cooperate on the NIR. Under South Africa's coordination, BRICS nations once again emphasized the importance of digitization, industrialization, innovation, inclusivity, and investment, and recognized the increasingly significant role of Industry 4.0 and other emerging technologies in driving the digital transformation of all economic sectors. According to the declarations of the BRICS Industry Ministers Meetings, human resource development, skill enhancement, and retraining are crucial for BRICS countries to address the impacts of the NIR. BRICS countries will commit themselves to deepening industrial cooperation, expediting the recovery and growth of the Industrial Economy through jointly creating an open, fair, vibrant, and resilient environment, and helping SMEs to better integrate into global industrial, supply, and value chains to achieve diversification. Meanwhile, they will also need to create market opportunities within BRICS countries, drive inclusive growth, and provide support for women, youth, and marginalized groups so that they can own and manage projects.

On August 7, the 13th Meeting of the BRICS Trade Ministers was held virtually. During the meeting, the trade ministers approved the *Joint Communiqué of the 13th Meeting of the BRICS Trade Ministers* and delivered five outcome documents covering areas such as digital economy, supply chains, micro, small, and medium-sized enterprises (MSMEs), and support for the multilateral trading system. One of the key outcomes was related to strengthening cooperation in emerging fields such as digital economy and green development. They approved the Terms of Reference of the Digital BRICS Task Force and Work Plan of the Digital BRICS Task Force, which outline specific approaches for

cooperation in areas like application of electronic bills of lading and energy transition investments, further unleash the potential for collaboration and enable BRICS countries to seize the historic opportunities presented by the new wave of technological revolution and industrial transformation. 2022 marked a significant milestone in the science policy development of South Africa, and in this year, the Ten-Year Plan for Science and Technology was approved by the Cabinet of South Africa. During the 2023 BRICS Science, Technology and Innovation (STI) Ministerial Meeting, South Africa expressed its commitment to enhancing cooperation among BRICS nations, with a specific focus on vaccine manufacturing, the hydrogen economy, and marine science.

By putting Africa on top agenda, the 2023 BRICS Summit held in South Africa sheds great light on how BRICS countries can support the industrialization and development transformation of Africa. Firstly, it addresses how BRICS nations can support the establishment of the African Continental Free Trade Area (AfCFTA); secondly, it focuses on how BRICS countries can seize the historical opportunity presented by Africa's urgent need for industrialization, which is particularly evidenced by Africa's demand for digital economy, energy technology, and technology-driven industrialization; and thirdly, it explores how BRICS countries can engage in practical cooperation with African nations to overcome Africa's developmental bottlenecks, especially its shortages in critical areas of new industrialization, including deficiencies in infrastructure, education, human resources, and investment.

Moreover, the China-Africa Leaders' Dialogue co-hosted by China and South Africa provides significant insights into the development of BRICS-Africa PartNIR. To support the integration and modernization of Africa, China has launched the Initiative on Supporting Africa's Industrialization, which is aimed at assisting Africa in developing its manufacturing industry, achieving industrialization, and diversifying its economy. In conjunction with the implementation of the Nine Major Projects of the Forum on China-Africa Cooperation (FOCAC), this initiative seeks to channel aid, investment, and financing resources towards industrialization projects. China will launch the Plan for China Supporting Africa's Agricultural Modernization. China will help Africa to expand grain plantation, encourage Chinese companies to increase agricultural investment in Africa, and enhance cooperation with Africa on seed and other areas of agro-technology, thereby supporting Africa in transforming and upgrading its agricultural sector. China will launch the Plan for China-Africa Cooperation on Talent Development. China plans to train 500 principals and high-caliber teachers of vocational colleges every year, and 10,000 technical personnel with both Chinese language and vocational skills for Africa. China will invite 20,000 government officials and technicians of African countries to participate in workshops and seminars. To support Africa in strengthening education and innovation, China will launch the China-Africa Universities 100 Cooperation Plan and 10 pilot exchange programs of China-Africa partner institutes.²⁴ These three initiatives are all closely tied to the BRICS PartNIR, echoing three core issues of African Industrialization: industry development, agricultural modernization and talent.

²⁴ http://www.news.cn/world/2023-08/25/c_1129823246.htm

Keynote Speech by H.E. Xi Jinping, President of the People's Republic of China at China-Africa Leaders' Dialogue, Xinhua News Agency, August 25, 2023.

The Cooperation Directions of the BRICS-Africa PartNIR

For African countries and many developing nations, developing a digital economy and new industrialization solely based on their own resources often presents significant difficulties and challenges. Despite a strong demand for new industrialization, African countries tend to suffer from many systemic issues such as inadequate infrastructure, limited human resources, small markets, and fragile industrial supply chains. Overcoming and addressing these challenges can be daunting for African countries, who have to resort to the support of investment & financing, transfer of industry and technology, as well as experience exchange provided by other countries. Hence, the BRICS PartNIR represents a collective effort by developing countries to address the challenges posed by the NIR. It not only provides new opportunities for cooperation for African countries but also offers valuable demonstrations of success. Meanwhile with the progress of the AfCFTA and the development of a large African market, Africa has been becoming a potential and significant market for international industry transfer and technology application. Therefore, planning government-level cooperation and mobilizing private sector to make investments in Africa are the two main approaches for the BRICS PartNIR.

Firstly, establishing a linkage mechanism between the BRICS PartNIR and African development. It is true that Africa is a key part of the BRICS+ partnership; however, BRICS cooperation, as a whole, has primarily been inward-focused, with a stronger emphasis on intra- BRICS cooperation. This indicates that BRICS has significant untapped potential to play a more substantial role in supporting the development of Africa. It has become an important breakthrough point to establish a linkage mechanism between the BRICS PartNIR and African development. This mechanism should transform the BRICS PartNIR into an open, international platform, with a focus on digital economy, emerging industries, information & communication technology, the Internet of Things, and technology-enabled transformation of traditional African sectors. By facilitating government-level cooperation, industrial investments, and technology and knowledge sharing, this mechanism should further stimulate the development of the BRICS-Africa PartNIR.

Secondly, focusing efforts on strengthening infrastructure cooperation. Currently, the most significant bottleneck for the African NIR is the lack of adequate infrastructure, which is similar to that facing traditional industrialization. As economist Lin Yifu pointed out, “Last but not least, economic transformation in low-wage developing countries will not come to fruition unless the right conditions are created. Without these soft and hard infrastructures in place, low-wage developing countries will lose the opportunity of industrial upgrading and economic transformation.”²⁵ In the era of the NIR, infrastructure primarily includes communication infrastructure, digital skills, data infrastructure, and cloud computing infrastructure, which constitute the core foundation for artificial intelligence, the Internet of Things, and emerging industries. Africa boasts the rapid expansion of mobile communication networks, but the penetration and utilization rates of broadband networks are still relatively low, which is a major characteristic of digital infrastructure development in Africa. Less than one-third of Africa’s population has access to broadband networks. Moreover, 21 out of the world’s 25 least connected countries are in Africa. The continent has an internet penetration rate

²⁵ Ethiopia, Compiled by Arkebe Oqubay, and Lin Yifu. Translated by Song Chen. *China-Africa and an Economic Transformation*. Peking University Press. 2023. pp199-200.

of only 36%, compared to the global average of 62.5%. In sub-Saharan Africa, the penetration rate of fiber-optic broadband services to households is still below 2%, with nearly half of all fiber-optic broadband users in sub-Saharan Africa being from South Africa.²⁶ According to research, for low- and middle-income countries, every 10% increase in broadband penetration leads to a 1.38% increase in economic growth.²⁷ Therefore, compared to developed and emerging countries, addressing the issue of insufficient infrastructure remains the core demand for the African NIR. BRICS countries have a significant advantage and play a crucial role in supporting the development of digital infrastructure in African countries. Nearly 80% of Africa’s 3G network infrastructure has been constructed by Huawei and ZTE, with approximately 70% of 4G networks invested and built by Huawei. Currently, Huawei and ZTE are also assisting Africa in building 5G networks.

Thirdly, strengthening cooperation between BRICS countries and African nations in the fields of education and human resource development. Without education and skill development, it is impossible for developing nations to foster people with talent for the NIR through their own efforts, which is a long-term weak link for them. The NIR places higher demands on the quality rather than the quantity of the workforce, and many African countries, including South Africa, are facing varying degrees of an “education quality crisis.” According to research, South Africa is experiencing severe skills shortages in various economic sectors, particularly information technology, engineering, finance, and healthcare. Furthermore, political instability in South Africa in recent years has exacerbated the brain drain of higher education talent, leading to a decline in the quality of education in South Africa’s higher education institutions, and a direct strike against the country’s capacity for technological innovation.²⁸ According to a latest PwC survey, more than a quarter of global executives (28%) are extremely concerned about the lack of digital skills in their regions. This concern is particularly pronounced in South Africa (49%), China (51%), and Brazil (59%).²⁹ For instance, in the field of industrial internet, a report by the China Academy of Industrial Internet indicates that with the continuous development of industrial internet technology, there will be an increasing demand for talent in this field. It is estimated that by 2025, there will be a talent gap of approximately 2.54 million people in China’s core industrial internet industries.³⁰

Fourthly, strengthening cooperation in the field of digital economy. While there is no globally shared concept or standard for the digital economy, different regions and countries have been increasingly viewing it as a critical component of their national economies and a means of economic transformation. The African Union launched *The Digital Transformation Strategy for Africa (2020–2030)*, which aims to achieve universal digital access and a single pan-African digital market by 2030. The World Bank estimates that a 10% increase in mobile internet penetration in Africa will lead to a 2.5% increase in GDP. Therefore, the development of digital economy is not only significant for

²⁶ Amaury de Feydeau, Martin Menski, Suzanne Perry, “Africa’s Digital Infrastructure Transformation”, White&Case, May 26, 2022,

²⁷ World Bank, *Information and Communication for Development: Extending Reach and Increasing Impact*, 2009

²⁸ Liu Jisen. *Research Report on Industrial Issues in Africa (2022)*. Social Sciences Academic Press (China). 2022. p.136.

²⁹ Michaël Valentin: *Super Manufacturing: The New Model of the Fourth Industrial Revolution in the Post-Lean Production Era* (Translated by Chen Minghao), Social Sciences Academic Press (China). 2022. p.16.

³⁰ Han Xin. *Digital Occupation Provides New Employment Space (People’s Livelihood Sight)*. People’s Daily. May 26, 2023. P19.

Africa's development and transformation but also presents important opportunities for international partners. Digital economy initiatives such as e-commerce, electronic payments, a single digital market, technology-enabled agriculture, mining, manufacturing, and tourism are having a positive impact in Africa. The digital economy is a new area for deep cooperation among BRICS countries. Under the BRICS Digital Economy Partnership Framework, BRICS nations have reached a high level of consensus on accelerating the digitalization, networking, and intelligent transformation of traditional industries, strengthening cooperation in the construction of digital infrastructure, making extra efforts to support industries such as big data and the Internet of Things, and promoting the development of artificial intelligence. More than that, BRICS nations have formed a comprehensive cooperation framework on many cutting-edge topics in the digital economy, including digital authentication, electronic payments, electronic trade documents, data privacy, and security. Related data indicates that the five BRICS countries saw the number of online shopping users increase to 1.35 billion people, accounting for 61% of the global total. Their cross-border online retail sales reached \$553.6 billion, making up 41% of the global total.³¹

Countries like China have accumulated important experience and practices in the development of the digital economy and international cooperation. Siyabonga Cyprian Cwele, the South African Ambassador to China, stated that South Africa is currently undergoing its own digital development, which is not as advanced as some other nations however. This is why it's essential for countries to promote cooperation. He believes that South Africa can learn from China in terms of digital transformation. Ambassador Cwele mentioned that South Africa has already established the necessary infrastructure, including 5G. South Africa plans to collaborate with Chinese companies such as Huawei and ZTE in the field of fiber optics, which is the foundation of the 5G industry. The two companies are working with Africa to build digital infrastructure. Furthermore, China and South Africa have extensive cooperation in the field of e-commerce. Nowadays, South Africa has an e-commerce penetration rate of only around 30%, which, however, may be one of the highest in Africa. South Africa aims to accelerate progress in this area, especially because young people prefer online shopping over traditional methods.³²

Alibaba has launched Africa's eWTP (World Electronic Trade Platform) in Kigali, the capital city of Rwanda. The specialty products produced by Rwandan can be exported to the vast Chinese market through cross-border e-commerce and livestreaming sales channels. In May 2020, during a livestreaming sales event organized by Alibaba and the Rwandan Embassy in China, a total of 1.5 tons of Rwandan coffee beans were sold out within seconds. Digital companies in China are also transforming the daily payment methods in Africa. Services like WeChat Pay and Alipay have been made available in countries such as South Africa and Nigeria, providing greater convenience for African consumers. China's digital technology is empowering various industries in Africa. Thanks to China's digital and drone technologies, smart farms have been established in countries like Mozambique and Ghana. China is collaborating with Rwanda on a smart fisheries demonstration project. These initiatives can potentially be expanded to other regions in Africa in the future. These

³¹ Zhang Rui: BRICS Countries Are Expected to Increase International Influence Through Expansion. China Business News. June 26, 2023. PA11.

³² Zhang Rui: BRICS Countries Are Expected to Increase International Influence Through Expansion. China Business News. June 26, 2023. PA11.

experiences provide valuable lessons for BRICS countries to enhance their cooperation with African nations in the digital economy.

Fifthly, supporting industrialization aimed at creating employment. The rapid growth of the African population, especially the youth population, presents a significant challenge in terms of employment. The Fourth Industrial Revolution, on one hand, is creating new job opportunities, most of which are formal ones, but it demands higher skill levels from the workforce. On the other hand, it is causing significant disruptions in traditional industries and job roles. Both these impacts highlight the employment challenges faced by African nations, where employment is often considered a top national development priority. Employment challenges highlight the importance of creating new jobs through industrial development. BRICS countries have significant opportunities to cooperate with African nations in industrial transfer and capacity-building cooperation. Currently, some traditional industries in countries like China are under pressure for transformation and relocation. Africa has become an important destination for industrial transfer by BRICS countries in sectors like steel, cement, construction materials, textiles, and clothing, which create huge amounts of jobs for Africa. The Fourth Industrial Revolution, in particular, will provide new momentum for the transfer of these industries, which will not be simply replicated, but instead will be reconstruction based on new technologies and standards. For instance, as China's digital transformation in manufacturing further deepens, the integration of informatization and industrialization is progressing towards a deeper and richer level. By the end of July 2022, there were over 3,100 "5G+ Industrial Internet" projects under construction in China, creating new scenarios, models, and formats. There were over 150 industrial Internet platforms with significant industrial and regional influence nationwide, while major platforms connected more than 79 million pieces of industrial equipment and served over 1.6 million industrial enterprises, helping the manufacturing industry to reduce costs and increase efficiency. After intelligent transformation, on average, production efficiency of 110 intelligent manufacturing demonstration factories increased by 32%, comprehensive resource utilization rates improved by 22%, product development cycles shortened by 28%, operating costs decreased by 19%, and product defect rates declined by 24%.³³ The cooperation between BRICS countries and African nations in industrialization offers a significant pathway for industrialization in African countries and other developing nations.

Sixthly, empowering the AfCFTA through science and technology. AfCFTA is a strategic initiative for African countries to achieve development, attract investments, and enhance regional competitiveness. Over the years, African integration has been constrained by factors such as low intra-regional trade and interdependence, a weak regional industrial chain, inadequate connectivity infrastructure, as well as policy and standard misalignments. Nowadays, the technological and industrial innovations brought about by the Fourth Industrial Revolution offer a significant opportunity to expedite the development of AfCFTA. The development of technologies like big data, e-commerce, smart governance, and the Internet of Things (IoT) can help to break down the information barriers that have long hindered economic interactions between African countries, and provide impetus for economic acceleration, thus forcing African countries to adopt policy reforms. Therefore, technology

³³ He Lifeng: Report on the Development of the Digital Economy by the State Council, <http://www.npc.gov.cn/npc>. November 14, 2022. <http://www.npc.gov.cn/npc/c30834/202211/dd847f6232c94c73a8b59526d61b4728.shtml>

empowerment is becoming an important pathway to advancing the construction of AfCFTA. Supporting the development of AfCFTA was a crucial agenda for the 2023 BRICS Summit, and empowering AfCFTA through the BRICS PartNIR will become a significant highlight of BRICS-Africa partnership.

Seventhly, fully exploring and utilizing the role of the BRICS PartNIR Innovation Center in leading the BRICS-Africa PartNIR. The innovation center represents a significant achievement of the BRICS PartNIR, with enormous potential to play a crucial role in implementing, leading, and innovating the NIR partnership between BRICS countries and Africa. In theory, the BRICS PartNIR is driven by three main forces: The first is the global trends in technology and industrial innovation, which are led by developed economies, serve as a major driving force for BRICS countries to catch up with, learn from, and apply; the second is the need for BRICS countries to elevate their industrial development and innovation by means of technology and industry collaboration. The third is the need to connect with developing countries, especially in Africa. Within the global industrial, value, and supply chains, BRICS countries or emerging countries, represented by China, are less powerful than developed economies, but more advanced than African countries. They possess significant regional and comparative advantages in terms of industrial transfer, technology application, and experience sharing. Leveraging the regional and comparative advantages of BRICS countries is undoubtedly a key way of enhancing the relevance of the BRICS PartNIR. In this sense, the BRICS PartNIR Innovation Center is possessed with great potential. The innovation center is designed with three main functions: policy coordination, personnel training, and project development. While these functions are applicable to intra-BRICS cooperation, they are even more applicable to the cooperation between BRICS and African countries. Comparatively speaking, these three functions are more likely to yield progress and results in Africa. Therefore, BRICS countries and African nations should focus on the BRICS-Africa PartNIR and emphasize the major directions of policy coordination, personnel training, and project development, working to improve the role of BRICS countries in accelerating Africa's new industrialization.

V. Conclusion and Outlook

To quote Victor Hugo's famous line, "There is one thing stronger than all the armies in the world, and that is an idea whose time has come," always holds true. As an inevitable trend in the course of history, the NIR is a significant driving force for the advance of human society. Seizing the opportunities presented by the NIR while effectively addressing its accompanying challenges is a shared responsibility for every nation. In the midst of the wave of the NIR, each country and region, while vigorously promoting its own strategies for industrial development and sharpening its international competitiveness, are increasingly dependent on open international cooperation. Thus, it is safe to say that the cooperation among the BRICS nations, the collaboration between BRICS and Africa, South-South cooperation, and international cooperation are not just a practical necessity, but also a historical imperative.

Being the most influential club of emerging economies and the continent home to most developing nations, BRICS countries and the continent of Africa have huge room for cooperation. It goes without saying that the cooperation centered around the NIR holds strategic and historical significance for shaping the future development of BRICS nations and Africa. The key lies in whether and how to build the BRICS-Africa PartNIR. Whether based on international development trends or the dynamics of supply and demand and theories of industrial transfer, the BRICS-Africa PartNIR has promising prospects. The NIR strategy, with the digital economy at its core, has become a crucial development agenda for African nations. Building global development partnerships to harness the opportunities of the NIR is an important aspiration of African countries. BRICS countries place high importance on the opportunities the NIR offers for their own development and actively drive international industrial cooperation in the new era through the BRICS PartNIR. Simultaneously, as BRICS countries continue to develop economically and industrially, they have a strong demand for overseas investment & financing, as well as industrial and technological transfers. Given their comparative advantages compared to developed countries and their regional advantages constructed by industrial supply chains, BRICS countries are more likely to generate a structural impact on infrastructure, industrialization, technology transfer, and knowledge sharing when cooperating

with African nations. The establishment of the BRICS PartNIR Innovation Center represents a major practical step in BRICS cooperation, demonstrating their collective will to embrace the NIR. It not only serves as a platform for BRICS cooperation but also accumulates experience, insights, and opportunities for cooperation between BRICS countries and African nations, South-South cooperation, and broader collaborative efforts. In short, the BRICS-Africa PartNIR not only has the potential to drive Africa's development transformation, but also plays a pivotal role in enhancing the relevance of BRICS cooperation and exerting influence in South-South and global cooperation.

To this end, it should become a crucial direction for BRICS cooperation and international cooperation with Africa to plan the BRICS-Africa PartNIR in the new era. This will follow two fundamental approaches: One is strengthening strategic planning and policy guidance. BRICS countries and African nations need to collaboratively develop short-term, medium-term, and long-term cooperation plans based on the principle of pragmatic cooperation and a gradualist approach. These plans should be formulated in response to real needs and challenges. In the short term, since the core needs for new industrialization of African nations include essential infrastructure, skills development, human resources, e-commerce, e-governance, and cybersecurity, BRICS countries can leverage their own experience and resources to enhance intra-BRICS coordination & cooperation and provide support for the development of African nations. In the medium term, the focus should be on facilitating industrial transfer and building industrial and value chains. African countries have a strong demand for absorbing international industrial transfers, which is evident in their regional industrial and value chain's goals centered around the AfCFTA and their development strategies and industrial policies. Likewise, BRICS countries, with China as a representative, have their own needs for industrial transfer and maintenance of industrial and supply chains. For this reason, BRICS countries and African nations should strengthen cooperation in efficiently developing resources, upgrading their positions in industrial and value chains, and reinforcing support for cooperation on Africa's integration process. In the long run, the essence of the NIR lies in breakthroughs and innovations, and BRICS countries and African nations should attach more importance to the role of people and technology. For now, global innovation remains dominated by the West. BRICS countries and African nations should intensify their collaborative efforts to catch up with a focus on their respective advantages and specific areas, increase investments in human resources and technology, and continuously enhance the innovation capabilities of developing countries for future development.

The second approach is to leverage the investments made by private sector. History and reality have shown that while industrial policy and development require the government to play a key stimulating role, industrial innovations and sustainable development rely on private enterprises and sector. This implies that the BRICS-Africa PartNIR is not limited to government-led planning and project design, and that it is even more important to leverage the investments and innovations of the private sector. This requires BRICS countries and African nations to create favorable institutional and business environments for the development of private sector and overseas investments. Additionally, they need to support and safeguard investments from private sector in Africa through policy

incentives, innovative financing mechanisms, and project-driven approaches. Chinese companies like Alibaba, JD.com, Tencent, and Huawei have already made substantial investments in Africa's telecommunications infrastructure, e-commerce, and the digital economy. This has been attracting more enterprises to focus on and make investments in Africa. Meanwhile, efforts should be made to increase investment in Africa's private enterprises and sectors, and stimulate market expansion and industrial growth in African countries. By means of empowerment through science and technology, this can provide greater impetus for sustainable development in Africa.

ABOUT SIIS

Founded in 1960, the Shanghai Institutes for International Studies (SIIS) is a government-affiliated high-caliber think tank dedicated to informing government decision-making by conducting policy-oriented studies in world politics, economics, foreign policy, and international security. SIIS maintains intensive and extensive exchanges and cooperation with research institutions at home and abroad, bolstering China's international influence and soft power.

SIIS boasts an authorized size of 106 full-time research fellows and staff, including 60 percent senior fellows. SIIS was ranked one of the top ten Chinese think tanks for the long time being. SIIS comprises six institutes and six research centers, namely, the institute for global governance studies, the institute for foreign policy studies, the institute for world economic studies, the institute for international strategic studies, the institute for comparative politics and public policy, the institute for Taiwan, Hong Kong & Macao Studies, the center for American studies, the center for Asia-Pacific Studies, the center for Russian and Central Asian Studies, the center for West Asia and Africa studies, the center for European studies, and the center for maritime and polar studies. SIIS has also set up six in-house research platforms, i.e., the research base on people's diplomacy of Shanghai, center for the study of Chinese diplomatic theory and practice, center for world politics and political parties, center for China-South Asia cooperation, center for BRI and Shanghai studies, and center for international cyber governance. In addition, SIIS is an institutional member of the Shanghai International Strategic Studies Association and the Shanghai International Relations Association.