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Leonid Tsukanov

TECHNOLOGICAL RENAISSANCE IN SUB-SAHARAN AFRICA: CHALLENGES AND OPPORTUNITIES FOR RUSSIA



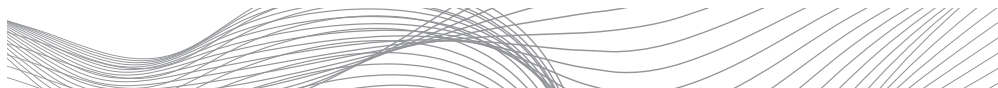
Non multa, sed multum



1994-2024

priority2030⁺
leaders are made, not born

MOSCOW, 2024



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This occasional paper takes a look at the potential of Sub-Saharan African (SSA) states in the field of high technologies and the prospects for promoting Russia's interests in this area. The research focused on studying several categories within the high-tech group, to which Moscow pays increased attention (cybersecurity and emerging technologies, energy, space research, biotechnology). The long-term interests of the SSA States and their achievements in each high-tech sphere, as well as the level of their cooperation with Russia and other global leaders, are assessed.

This occasional paper and other materials are available at:

<https://nonproliferation.world/en/security-index>

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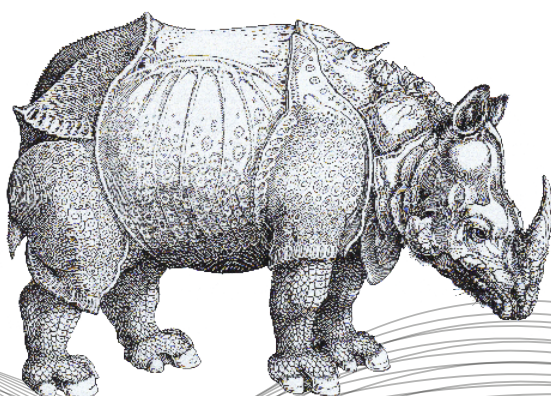
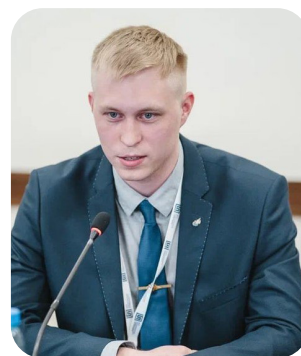
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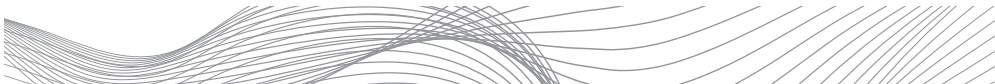
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Highlights

- The technological dimension of Sub-Saharan African countries is in a phase of active transformation. The majority of regional states view the high-tech sector as a potential area for development and express readiness to invest in its advancement. However, only a smaller portion of them has sustainable positions. The most active players capable of operating in high-tech industries on a global level include South Africa, Nigeria, Ghana, and Kenya.
- There is a clear trend towards the transfer of the *palm* in the competition for influence in the African technological sector to Asian states – and, first of all, to China. On the other hand, Western countries still have fairly strong positions in a significant part of *sensitive* areas, including digital technologies and pharmaceuticals.
- Overall, favorable conditions have emerged in the region for Russia to increase its presence in the national high-tech markets – primarily in the areas of cybersecurity, E-Gov, electronic education, as well as atomic and hydro energy.
- Russia is less subject to the influence of colonial discourse than most competitors, but it faces other restraining factors. Moscow is still in a *catch-up* position in the race for influence in Sub-Saharan Africa, which is due, among other things, to the long period of *absence* of stable conductors of Russian interests in the region.



Technological Renaissance in Sub-Saharan Africa: Challenges and Opportunities for Russia

Leonid Tsukanov

As the global world order is transforming, the role of the African countries in the system of international relations is also changing. The region is increasingly viewed not only as an *exporter of instability* and a platform for geopolitical clashes of superpowers but also as a rapidly developing market for high technologies. The *New Africa*, which experts have been talking about since the 2000s, is gradually taking shape and *declaring its rights* to a share of the high-tech market.

It is important to pay attention to Sub-Saharan Africa (SSA), a large cluster where the continuing influence of previous ties (the so-called *colonial legacy*) is combined with the desire of nation states to play the role of trendsetters in advanced economic sectors. This, in turn, is causing both interest and deep concern in the expert community and among decision-makers, as Africa's transformation path is linked to numerous international security risks.

Against this background, it is important to assess the current positions of African states in the high-tech market, as well as the role that external players (including Russia) can play in the ongoing transformation of the region. When conducting the study, emphasis was placed on studying a number of categories of the *high-tech* group. In particular:

- cybersecurity and emerging technologies;
- energy;
- space research;
- biotechnology.

The sources of the research included materials from international organizations, reports and papers from ministries and departments of the regional states, media materials, and statistical databases. Methods such as system analysis, event analysis, modelling, case study, and a number of other methods of scientific knowledge were used.

ASSESSING THE HIGH-TECH SECTOR COMPETENCIES OF SUB-SAHARAN AFRICAN COUNTRIES

Cybersecurity and emerging technologies

As the world becomes increasingly digital, African states are focusing on developing national capabilities in the areas of digital security and high technology. The last decade has seen a dramatic increase in Internet penetration in Africa, driven largely by the expansion of mobile infrastructure. This growth in connectivity has, in turn, positioned Africa as an emerging market for ICT-actors, including cloud service providers, telcos, and equipment vendors.

In terms of digital security, Mauritius is the leading power in the region (it is also the only Sub-Saharan African country in the ITU's top 20 cyber powers rating)¹. This East African country's high position is explained by its systematic efforts to develop a national legal framework for digital security, as well as its focus on public-private partnerships and international cooperation. In addition to Mauritius, the top ten cyber powers in Sub-Saharan Africa include Tanzania, Ghana, Nigeria, Kenya, Benin, Rwanda, South Africa, Uganda and Zambia².

At the same time, a common problem for most African countries in matters of developing digital projects remains the poor adaptation of the legislative framework to the rapidly changing realities of the digital world. In addition, the vast majority of regional players do not have a long-term strategy for developing competencies in the field of information states, and the functionality between the responsible institutions within the states is unevenly distributed: duplication of functionality and bureaucratization of the system remain a common occurrence.

At the same time, it is premature to say that the digital sector of Africa is in a stagnant state: the presence of acute problems encourages national governments to forcefully strengthen its most sensitive components. Thus, in 60% of the countries in the region, a legislative basis for the protection of personal data has been formed; another 10% of countries are actively working in this industry. In addition, every second state in Sub-Saharan Africa has created Computer Emergency Response Teams (CERTs) – in a number of countries, there are also private and industry monitoring groups³.

It is also important to mention the consolidating role of regional organizations – first and foremost, the African Union, on the basis of which modular projects and recommendations are being elaborated for the development of national competencies in the field of cybersecurity, and measures are being taken to improve the qualifi-

¹ Global Cybersecurity Index (2020) // ITU. URL: https://www.itu.int/dms_pub/itu-d/opb/str/D-STR-GCI.01-2021-PDF-E.pdf

² Ibidem.

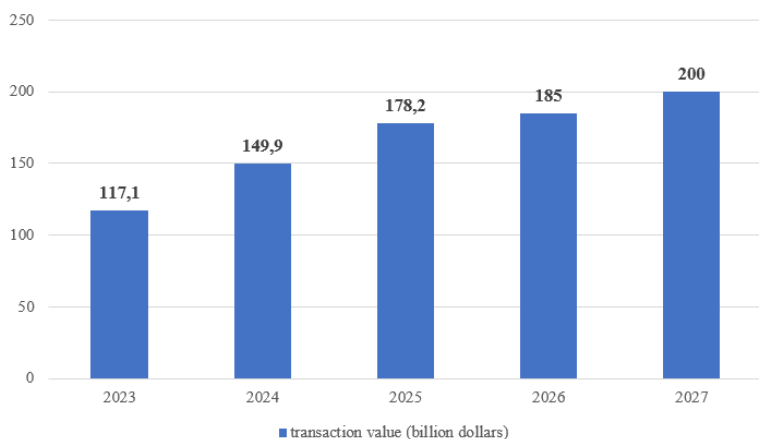
³ AfricaCERT. URL: <https://www.africacert.org/african-csirts/>



cations of decision-makers in the digital sector.

African countries are showing increased interest in the FinTech industry. This area is significantly ahead of other technological sectors of the continent's economy in terms of development. The rapid development of the financial technology industry in the region was seriously facilitated by the COVID-19 pandemic: in 2020, Sub-Saharan Africa recorded an increase in the volume of mobile transactions to \$490 billion (i.e. almost twice)⁴, and the figure continues to grow rapidly. As of the beginning of 2023, it amounted to about \$650 billion⁵. In addition, the shortage of stationary ATMs played a role, forcing the banking sector to develop alternative solutions.

The financial technology market of Sub-Saharan Africa relies on three countries – Nigeria, Kenya, and South Africa: they have the largest number of startups. Senegal and Tanzania are also demonstrating success in developing specialized solutions. Other regional players prefer to purchase ready-made products. The largest investors in the African fintech market are American and Chinese companies.



Graph 1. Transaction value using cryptocurrency in the region (2023-2027), billion dollars

Based on: Statista Market Insights

Particular attention should be paid to the situation in the regional cryptocurrency asset market. Despite the fact that Sub-Saharan Africa has long been considered an *outsider* in the global digital asset trading system, its position has strengthened significantly in recent years. This was facilitated, on the one hand, by the COVID-19 pandemic, which gave additional impetus to the development of digital sectors of the economy, and the gradual strengthening of the reputation of the *oldest* cryptocurrency (Bitcoin) among the

local population. As a result, in 2023, this segment accounted for about 2.3% of the global transaction volume (equivalent to \$ 117.1 billion), and by mid-2025, according to forecasts, it will exceed the 3.5% mark (\$ 178.2 billion)⁶.

In terms of legislative regulation of crypto asset turnover, the situation in Sub-Saharan Africa is ambiguous. According to the IMF, only 10 countries in Sub-Saharan Africa have adopted legislative measures to positively regulate mining and crypto trading and have taken steps to attract investors, while other powers, on the contrary, have introduced restrictive measures. In addition, the turnover of crypto assets is officially prohibited in 6 countries in the region (Cameroon, Sierra Leone, Ethiopia, Lesotho, the Republic of

⁴ Kenyanito A. An African Sunrise Sector: The Growth of Fintech // ORF. URL: <https://www.orfonline.org/expert-speak/an-african-sunrise-sector-the-growth-of-fintech/>

⁵ The 2023 SOTIR Regional Cuts: Charting mobile money in Africa and Asia // GSMA. URL: <https://www.gsma.com/mobilefordevelopment/resources/the-2023-sotir-regional-cuts-charting-mobile-money-in-africa-and-asia/>

⁶ Fintech investment pours into Africa // KPMG. URL: <https://kpmg.com/xx/en/home/insights/2022/01/pulse-of-fintech-h2-2021-emerging-markets-africa.html>

Congo, Tanzania)⁷.

The African segment of the robotics market also requires attention. The vast majority of countries strive to automate key processes in the industrial sector and improve labor efficiency in general, which contributes to the accelerated implementation of robotic solutions. As of 2023, at least 35 large startups in the field of robotics are registered in Sub-Saharan Africa – most of them serve the interests of the agro-industrial complex. At the same time, the largest number of companies are registered in South Africa (15 startups), as well as in Nigeria and Kenya (7 and 3 companies, respectively). Rwanda and Ghana also demonstrate some growth in representation. Côte d'Ivoire, Namibia and Burkina Faso are showing interest in robotics projects⁸.

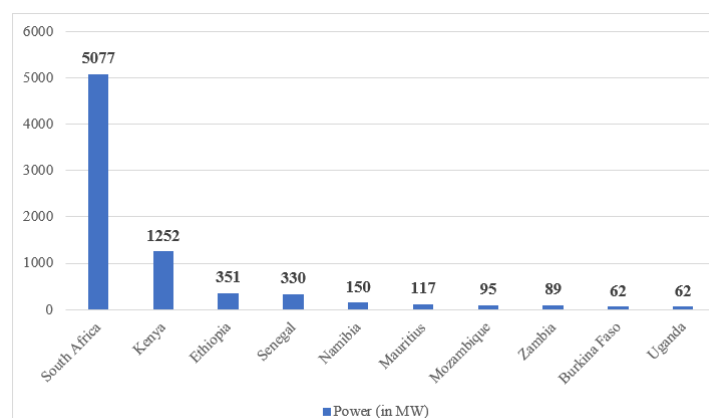
On the other hand, the African robotics market still faces a number of constraints, the elimination of which in the short term seems unlikely. The main ones include the imperfection of the regulatory framework (and in some cases, the lack of efforts to develop it on the part of responsible institutions), an acute shortage of qualified personnel, as well as the high level of political instability characteristic of the region as a whole.

Energy

Increasing the level of energy security is one of the long-term development priorities of Sub-Saharan African countries. The growing needs of the population of the countries of the region for electricity, coupled with the proclaimed *ethics of green transition*, have determined the increased attention of African states to the development of renewable energy systems.

Today, South Africa has the most developed infrastructure of solar power plants (SPP) and wind power plants (WPP) – the total capacity of the facilities is more than 5 GW. The emphasis on the use of alternative energy sources, in general, can be seen in most countries of the region – in all countries (with the exception of Guinea, Lesotho, Sao Tome and Principe) at least the beginnings of generation systems (with a total capacity of 1 MW or more) have been created. In most cases, these are small SPP.

The more actively the solar and wind power generation sector



Graph 2. Total capacity of solar and wind power plants in Sub-Saharan Africa, in MW (TOP-10 countries)

Based on: World Energy Statistics Yearbook

⁷ Ndemo B. The role of cryptocurrencies in sub-Saharan Africa // Brookings Institute. URL: <https://www.brookings.edu/articles/the-role-of-cryptocurrencies-in-sub-saharan-africa/>

⁸ Robotics. Industry Applications Startups in Sub-Saharan Africa // Tracxn. URL: <https://tracxn.com/d/explore/robotics-industry-applications-startups-in-sub-saharan-africa/>



develops, the more intense the competition for participation in African energy projects becomes. In addition to Russia, which has confirmed its interest in participating in the development of green projects on the African continent, China is also active: Beijing, since 2017, has been systematically working to deepen cooperation with regional powers in the area of renewable energy sources, positioning these efforts as an element of building the *Community of Common Destiny*. In addition, Gulf (Saudi Arabia, the UAE), Turkish and European (France, Norway, Germany) contractors operate in the region.

The hydropower sector, which has attracted increasing attention in recent years, should be considered separately. According to RusHydro, the African continent has a hydrological potential of 630 GW, of which only 38 GW have been developed to date⁹. Thus, more than 93% of the generation potential remains unused.

The recognized leader of the sector is Ethiopia, whose water capacity exceeds 4 GW. And Addis Ababa continues to make a systemic bet on this sector. Thus, in 2022, Ethiopia launched the first hydroelectric unit of the Grand Ethiopian Renaissance Dam (also known as Hidase HPP, 375 MW) – a large-scale energy project on the Blue Nile, the implementation of which began in 2011¹⁰. On the other hand, increasing the volume of water discharge required for electricity generation will most likely damage the ecosystem of the Nile and its tributaries, which in the long term will lead to their shallowing, exacerbating the country's relations with its neighbors.

The development of the hydroelectric power station system in the Democratic Republic of the Congo (the DRC) is promising: according to experts, the total hydroelectric resources of the Congo River are about 400 GW (1/6 of the world's potential), which determines the increased attention of Kinshasa to specialized projects. Kinshasa expects a quick breakthrough in the field of hydropower. Thus, in 2019, the construction of the *Grand Inga III* hydroelectric power station (planned capacity – 40 GW) began in the country, built with significant participation of the PRC¹¹. If successfully implemented, the project will provide energy not only to the population of the DRC, but also to neighboring countries. In addition, the launch of the *Grand Inga III* hydroelectric power station may become a prologue to the *renaissance* of large dam hydroelectric power stations, from the construction of which they previously sought to distance themselves not only in Africa, but also in other regions.

In general, the positions of regional powers in the field of hydro-

⁹ RusHydro has announced the need for comprehensive development of hydropower in Africa // TASS. 28.07.2023. URL: <https://tass.ru/ekonomika/18395231> (in Russ.).

¹⁰ Ethiopia's Renaissance Hydroelectric Power Plant Begins Generating Electricity // Neftegaz Portal. URL: <https://neftegaz.ru/news/energy/726891-ges-vozhrozhdenie-v-efiopii-nachala-vyrabotku-elektroenergii/> (in Russ.).

¹¹ DRC Electricity & Water Access and Governance Project // The World Bank. URL: <https://documents1.worldbank.org/curated/en/231141609951093070/pdf/Concept-Project-Information-Documents-PID-DRC-Electricity-Water-Access-and-Governance-Project-P173506.pdf>

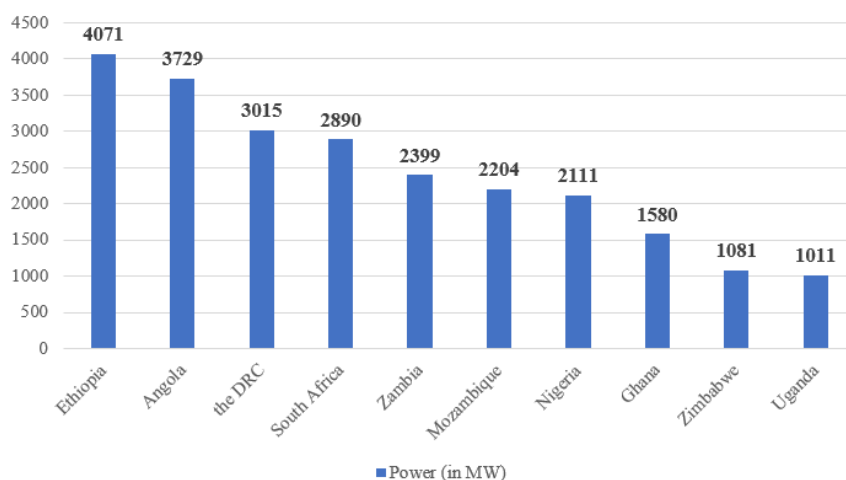
power are characterized by heterogeneity, which is due to the peculiarities of their geographical location (the presence/absence of rivers in the territory), as well as the availability of funds for financing specialized projects.

Africa's advantageous geographical position partly favours its transformation into a centre for green hydrogen exports to world markets, which is why the European energy business is actively paying attention to this developing industry. According to estimates by the European investment bank, by 2035, the average annual production of *green* (i.e., produced by electrolysis) hydrogen will exceed \$1 trillion¹². At the same time, the core of regional hydrogen energy will be South Africa and Namibia – these countries have significant reserves of platinum group metals, which are needed to produce electrolyzers with a polymer electrolyte membrane. On the other hand, not all countries of Sub-Saharan Africa can join the development of this industry – due to the high cost and multi-stage nature of the projects being developed.

Also, a number of African countries located in the East African Rift Valley are seeking to rely on geothermal energy to compensate for growing energy consumption. Kenya is the leader in this sphere. Nairobi provides more than 45% of its electricity consumption through geothermal energy, and in terms of the total capacity of geothermal generation facilities, it is among 10 global leaders in this field¹³.

Other countries in the East African Rift Valley region demonstrate much more modest indicators of geothermal energy production – in most cases, there are no permanently operating generating facilities. Nevertheless, all countries in this group declare their intentions to develop the geothermal energy sector and consider it a promising direction for capital investment.

Nuclear energy is a controversial area of development. There is only one NPP in the region – Koeberg NPP (South Africa) – commissioned in 1984 (declared total capacity: 1880 MW) and providing up to 5% of energy consumption. Other countries, although showing interest in the nuclear industry, at this stage do not have the financial and technical capacity to develop projects.



Graph 3. TOP-10 countries in the region by total capacity of hydropower facilities, in MW

Based on: World Energy Statistics Yearbook

¹² Global Gateway: EU and US boost cooperation on green energy in Africa // EU. URL: https://ec.europa.eu/commission/presscorner/detail/es/ip_22_6083

¹³ Kenya is betting big on geothermal installations // Power Technology. URL: <https://www.power-technology.com/comment/kenya-betting-big-geothermal-installations/>



Space research

African countries are striving to join the exploration of outer space on an equal basis with other powers. There are 22 national space agencies operating on the continent, a significant portion of which are in the countries of Sub-Saharan Africa. Nigeria and South Africa are the *flagships* of space program development in SSA region. At the same time, South Africa is also the absolute leader in the number of launched satellites. In addition, Rwanda, Tunisia, Ghana,

Senegal and Kenya are increasing investments in the space industry, reducing the gap with regional leaders, and Botswana and Côte d'Ivoire are developing competencies in terms of improving the satellite program.

It should be noted that the emphasis on the development of space programs (primarily satellite) in Africa is explained by the desire to improve food and climate security, as well as to solve problems in the telecommunications sector, ensuring more stable and high-quality communications and television and radio broadcasting.

According to experts, one of the drivers of the development of the African space industry in the future will be the so-called *NewSpace* – a system of private space agencies operating without being tied to government projects. According to the reports of the *Space Africa* project, more than 60% of specialized companies are registered in South Africa, another 24% is the combined figure of Mauritius and Nigeria (each country has 4 *NewSpace* companies registered). Kenya is also showing interest in space startups, but at the moment only one specialized company has been created there¹⁴.

In general, the space market of the region is characterized by a significant degree of activity of external players – in addition to Russian business, specialists from China, the USA, and EU countries are also interested in participating in African projects; Indian capital is also showing interest.

Biotechnology

The largest number of leading biotech companies created with the participation of people from African countries are currently registered in South Africa, Nigeria and Kenya (they together account for up to 80% of the companies from the TOP-50 group). Certain qualitative growth is demonstrated by Rwanda, Senegal and Ghana, which have consolidated their efforts in the field of vaccine and

¹⁴ NewSpace Africa Industry Report // Space in Africa. URL: <https://africanews.space/newspace-africa-industry-report/>

Graph 4. Number of satellites launched by African countries (as of 2023)

Based on: Space Africa

serum development¹⁵.

At the same time, despite the noticeable qualitative transformations that have occurred in the biotech industry of Sub-Saharan Africa, the development of the market is still associated with significant risks: many investors do not show much interest in developing contacts with African biotech centers, fearing the impact of political and economic upheavals typical for the region on the dialogue. In addition, the biotech industry of African countries (with the exception of South Africa and Kenya) is experiencing an acute shortage of qualified personnel – a *brain drain* occurs both abroad and to African countries with a more developed medical technology market.

ASSESSING THE POSSIBILITIES OF STRENGTHENING RUSSIA'S POSITION IN THE REGION

Russia's approach to building relations with the SAA states has undergone significant changes in recent years. Since 2019, when the first Russia-Africa summit was held, the number of areas of interaction covered within the framework of the multilateral dialogue has gradually expanded.

Moscow is interested in increasing the export of its own solutions to African markets (especially in light of the ongoing foreign policy reorientation of the region's states). Let us briefly consider the situation in each of these areas.



Russia-Africa Summit, July, 28, 2023

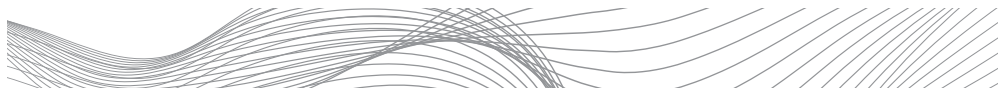
Source: www.kremlin.ru

Cybersecurity and emerging technologies

Until recently, Russian specialists were not very involved (in comparison with other foreign competitors) in the development of digital systems of African states, although domestic ICT-companies began to develop the African market back in the 2010s. Cooperation was episodic and was concentrated mainly in the private sector.

However, the change in priorities of Russia's foreign policy, coupled with increased attention to the development of the technology sector in Africa as a whole, contributed to the revision of the current model. In particular, the intention of African governments to develop information security strategies with requirements and regulations that will help protect critical infrastructure from cyberattacks coincides with the interests and capabilities of Moscow, which has

¹⁵ 2022 Africa Health Tech 50 // Holon IQ. URL: <https://www.holoniq.com/notes/2022-africa-health-tech-50>



PIR Center lecture “Digital Development in Sub-Saharan Africa: Opportunities and Challenges” in the fields of the 1st Russian-African Forum of Young International Relations Professionals on Security and Development, October 2023

Source: nonproliferation.world

significantly increased its level of cyber preparedness¹⁶.

Sub-Saharan African countries and Russia are mutually interested in the joint development of FinTech solutions. The rapid development of this industry on the continent and the emergence of the first independent major players exporting their own fintech solutions abroad (Nigeria) opens up broad opportunities for the implementation

of multilateral projects. The most promising areas of cooperation are seen as the development of solutions for the automation of the public sector (tax collection and tracking system, electronic document management, etc.)¹⁷.

Energy

The expansion of Russia's participation in the development of the African energy market began back in 2022: Moscow announced several dozen projects in the field of *green energy*, with an emphasis on the development of hydroelectric power plants. Russia also expects to take part in the solar and wind energy market, relying on its own experience in this industry¹⁸. However, given the fundamental changes that have occurred in the energy sector in recent years, this direction is unlikely to become the leading one.

Moscow still has a strong position in the nuclear market. Rosatom State Corporation strives to demonstrate a flexible and adaptive approach, offering partners various solutions – in particular, low-power nuclear power plants¹⁹.

Space research

Russia demonstrates its intention to deepen cooperation with SAA countries in the field of space research. The long-term goal of Russian-African cooperation should be the creation of a separate orbital module as part of the Russian Orbital Service Station (ROSS)²⁰. At the same time, in the field of space research, the question of the

¹⁶ Russia and Africa to strengthen cooperation in cybersecurity // RIA. URL: <https://ria.ru/20230728/bezopasnost-1886989243.html> (in Russ.).

¹⁷ Africa needs fintech as convenient as Russia // RBC. URL: <https://companies.rbc.ru/news/WyYzcJk24y/afrike-nuzhen-takoj-zhe-udobnyij-finteh-kak-v-rossii/> (in Russ.).

¹⁸ Russia and Africa: a new stage of big energy // Energy Policy Portal. URL: <https://energypolicy.ru/rossiya-i-afrika-novyy-etap-bolshoj-energetiki/regiony/2023/12/19/> (in Russ.).

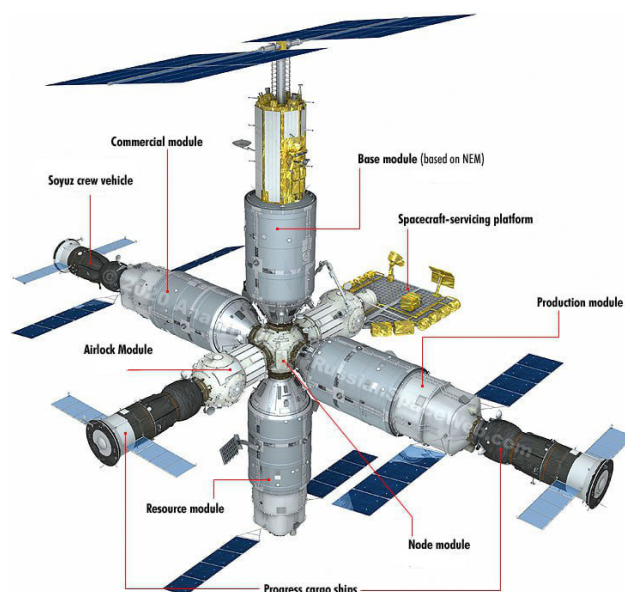
¹⁹ Rosatom CEO Announces African Countries' Interest in Russian Floating Nuclear Power Plants // Interfax. URL: <https://www.interfax.ru/russia/913852> (in Russ.).

²⁰ Roscosmos has proposed to African countries the creation of national modules for the ROSS // RIA. URL: <https://ria.ru/20230630/moduli-1881562484.html> (in Russ.).

prospects for Russia to build a cosmodrome on the continent remains unresolved – the project is still under active discussion.

Biotechnology

Moscow demonstrates a tendency towards a systemic approach to the development of the African biotech sector and expresses its readiness not only to export ready-made solutions, but also to cooperate in the development of research and human resources potential of the countries of the region²¹. Increasing its presence in the market of solutions for the agro-industrial complex of the SSA countries also looks promising: South Africa, Mali, Zimbabwe, Mozambique, Tanzania, Nigeria, Kenya, Uganda and Ghana are showing interest in purchasing biotechnologies for the needs of the agro-industrial complex²².



Russian Orbital Service Station (ROSS)

Source: www.roscosmos.ru

BATTLE FOR AFRICA: ACTIVITY OF RUSSIA'S KEY COMPETITORS

China

China's policy towards African states has a clear economic basis. Based on the *One Belt, One Road* project, Beijing is increasing its influence on the economies of African countries, and in some cases, indirectly determines the vector of their development.

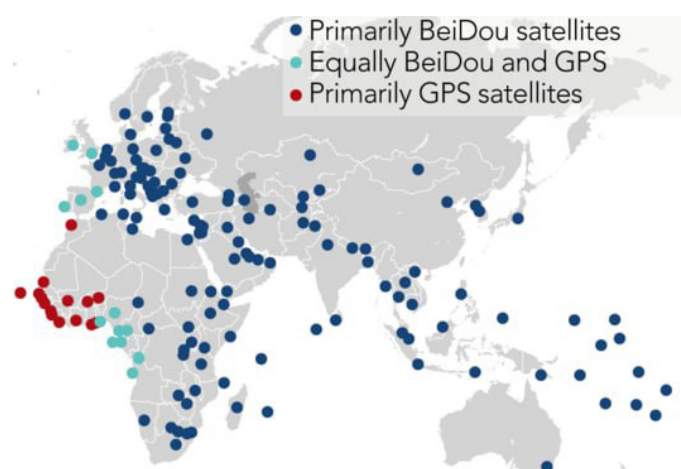
The digital component is one of the leading ones in the China-Africa dialogue. Since it is often about protecting critical infrastructure, Beijing prioritizes enhancing the cyber preparedness of SSA states and jointly implementing digital security initiatives. The general logic of cooperation is built on the provisions of the *International Strategy for Cyber Cooperation (ISCC)*, adopted in China in 2021²³.

Guided by the goals of the ISCC, China is also investing in applied digital industries, promoting the development of a culture of handling digital assets, as well as the development of the FinTech industry in the SAA region. At the same time, from the point of view

²¹ Russia-Africa Partnership Forum Action Plan for 2023-2026 // Kremlin. URL: <http://www.kremlin.ru/supplement/5971> (in Russ.).

²² Russian farmers named technologies they are ready to implement in Africa // Russian Gazette. URL: <https://rg.ru/2023/08/02/rossijskie-agrarii-nazvali-tehnologii-kotorye-gotovy-vnedriat-v-afrike.html> (in Russ.).

²³ International Strategy of Cooperation on Cyberspace. URL: https://www.fmprc.gov.cn/mfa_eng/wjb_663304/665250/2869.html



National capitals, where positioning
satellites can be observed
(BeiDou, GPS)

Source: www.rntfnd.org

of Chinese business activity, Beijing is most interested in Burkina Faso, Kenya, Senegal, Cameroon and Zambia²⁴.

China is also investing in renewable energy development programs in African countries. Beijing not only ensures additional growth in African economies and diversification of national energy baskets, but also strengthens its influence in the technology market of specific countries. The availability of critical minerals (lithium, cobalt, manganese, gallium, indium, graphite, zinc, chromium, etc.), which form the basis of the high-tech energy complex, plays a

major role in the development of China's dialogue with partners. For this reason, Beijing is placing a priority on strengthening its own positions in *critically important* countries – the DRC (cobalt, tantalum), South Africa (chromium, magnesium, platinum), as well as in the *bauxite* (Guinea, Cameroon, Nigeria) and *graphite* (Madagascar, Mozambique, Tanzania) countries²⁵. In this matter, China competes with both the United States and the EU countries.

China has long-term plans for the African continent in the field of space exploration. According to the *White Paper on Space* "China's Aerospace Industry in 2021" (2021), one of Beijing's goals is to work on the international standardization of the BeiDou satellite navigation system, as well as to expand cooperation mechanisms with African Union countries²⁶.

As for the biotech industry, Beijing is betting on the development and localization of pharmaceutical production (including the production of vaccine serums); the main markets for the presence of Chinese biotech business are Chad, Mali, Ethiopia and Côte d'Ivoire²⁷.

The USA

The level of U.S. engagement with Africa has fluctuated several times over the past decade. With the advent of Joe Biden's administration, Washington's engagement with African states (especially in the SSA region) has begun to grow again. The White House has combined public statements with a gradual reset of

²⁴ Why a growing number of Chinese investors are looking to Africa's tech space // SCMP. URL: <https://www.scmp.com/news/china/diplomacy/article/3226727/why-growing-number-chinese-investors-are-looking-africas-tech-space>

²⁵ Kulkov A. Competition between the USA and China for critical minerals in Africa // RIAC. URL: <https://russiancouncil.ru/analytics-and-comments/columns/sandbox/konkurentsia-ssha-i-kr-za-kriticheskie-mineraly-afriki/> (in Russ.).

²⁶ 2021中国的航天》白皮书 (White Paper "China's Aerospace Industry in 2021") // The Paper. URL: https://m.thepaper.cn/baijiahao_16494211 (in Chinese).

²⁷ Chinese Drugmakers March into Africa // Asia Nikkei. URL: <https://asia.nikkei.com/Spotlight/Caixin/Chinese-drugmakers-march-into-Africa>

its approach to the development of the African tech sector. In 2022, the United States presented a new strategy for developing relations with Sub-Saharan Africa, identifying social, energy, and food security as priorities for dialogue²⁸.

The USA is placing a significant bet on the concept of *energy transition*: along with Brussels, Washington is willing to actively participate in the construction of solar and wind energy facilities in Sub-Saharan Africa, as well as to develop the emerging hydrogen energy market²⁹. In addition, the US is actively competing with China for control over the extraction of critical minerals needed for the effective transformation of the energy sphere.

In the space industry, Washington is also focused on increasing political influence – in particular, on involving African states in the *Artemis Accords*, which provide for the establishment of bilateral US relations with partner countries in space exploration³⁰. On the other hand, private business (SpaceX, Dynetics) can give an additional impetus to increasing US involvement in the development of the space sector of SSA states – given the growing popularity of the *NewSpace* concept, it is the private space business that will eventually become one of the indirect conductors of Washington's interests on the continent.

As for the biotechnology industry, it fits quite organically into the complex of Washington's declared efforts to improve food security in Sub-Saharan Africa. The emphasis is on exporting solutions in the field of selection, as well as on training personnel in the field of bioengineering. In addition, since the COVID-19 pandemic, an important area of US-African cooperation has been the joint production of vaccines and serums – the corresponding production sites have been opened in African countries at the initiative of the US government³¹.

On the other hand, despite Washington's increased involvement in the affairs of the African continent, its influence on the situation is noticeably lower than that of its key competitor, China. The main efforts of the American administration are focused on maintaining the status quo and preventing Beijing from expanding its participation in the affairs of African states. At the same time, in terms of the scale of the clash of interests between the two actors, Africa is significantly inferior to the Asia-Pacific region.



A SpaceX Falcon 9 rocket carrying 51 satellites, including the Taifa-1 (Kenya) takes off from Vandenberg Space Force Base in the US, April, 2023

Source: www.spacex.com

²⁸ U.S. Strategy Towards Sub-Saharan Africa // White House. URL: <https://www.whitehouse.gov/wp-content/uploads/2022/08/U.S.-Strategy-Toward-Sub-Saharan-Africa-FINAL.pdf>

²⁹ Green hydrogen for Africa: Opportunities and obstacles in African markets // Atlantic Council. URL: <https://www.atlanticcouncil.org/event/green-hydrogen-for-africa/>

³⁰ Makarov D. "The Artemis Accords": How the US is Forming a New Space Alliance // RIAC. URL: <https://russiancouncil.ru/analytics-and-comments/columns/sandbox/soglasheniya-artemidy-kak-ssha-formiruet-novyy-kosmicheskiy-alyans/> (in Russ.).

³¹ The Russian Foreign Ministry has announced threats from US biolabs in Africa to the continent // TASS. URL: <https://tass.ru/politika/17310787> (in Russ.)



The EU

The African continent occupies a specific position in the foreign policy of European countries. In particular, in this area, EU members often prefer to act outside the framework of the *European family*, building relations with Africa in an individual format. In terms of developing a dialogue with Sub-Saharan Africa, France and Germany are the most active.

France's efforts are focused on developing cooperation in the energy sector, with a focus on renewable energy sources. Paris is investing heavily in the development of solar and wind power systems (*TotalEnergies*), as well as hydrogen energy (*Hydrogene De France*) in the countries of Sub-Saharan Africa. Germany is also actively involved in developing the *green* segment of the energy sector in African countries: since 2015, Berlin has been the largest financial donor to the energy segment of the SSA region, and also ensures the implementation of renewable energy projects in five countries of the region (South Africa, Uganda, Kenya, Côte d'Ivoire, Mozambique)³².

In matters of cybersecurity, both Paris and Berlin are betting on developing bilateral cooperation with African states, with combating organized cybercrime at the forefront. In addition, a certain burden of developing the digital competencies of African allies has been assigned to the NATO special structures.

Cooperation in the field of biotechnology is developing intensively. Leading European research centers are systematically increasing cooperation with African scientific and medical organizations in the field of advanced pharmaceuticals and agrobiotechnology. In addition, within the framework of the *New EU-Africa Innovation Agenda* launched in 2023³³, it is expected to significantly expand cooperation in the biotech industry, as well as promote the development of a system of medical startups in African countries.

As for cooperation in the space sector, the main part of the dialogue on the development of scientific and technological competencies of African countries is conducted with the participation of the African Union; bilateral contacts are episodic.

Maintaining the indicators in the dialogue with Africa is also partly facilitated by the *two-tier* approach to interaction with the region, combining political dialogue with the efforts of big business. In addition, the generally positive reputation of European startups plays into Brussels' hands.

³² Muller F. Energy cooperation between Africa and Germany: development, diplomacy, transformation // Africa Policy Research Institute. URL: <https://afripoli.org/energy-cooperation-between-africa-and-germany-development-diplomacy-transformation>

³³ New EU-Africa Innovation Agenda to enhance cooperation in science, technology and innovation // EU. URL: https://research-and-innovation.ec.europa.eu/news/all-research-and-innovation-news/new-eu-africa-innovation-agenda-enhance-cooperation-science-technology-and-innovation-2023-07-20_en

Arab states

Arab states are also seeking to increase their level of participation in the affairs of Sub-Saharan Africa, which is facilitated by both geographical proximity and joint work within integration platforms, as well as the growing investment activity of individual Arab powers (Gulf monarchies) in the region.

Growing activity of Arab powers is observed in the renewable energy sector, where the efforts of leading exporters of *clean energy* solutions are concentrated. The most comprehensive approach on this track is demonstrated by the UAE, which has expressed its readiness to invest about 4.5 billion dollars in this segment of the African energy basket³⁴. Saudi Arabia is also promoting its projects, having chosen the developing hydrogen energy market as a *starting point*³⁵.

Certain efforts are also being made in the digital sector: in particular, Arab and African countries are working together to develop relevant legislation to combat cybercrime³⁶. On the other hand, due to the general fragmentation of the Arab world, the effectiveness of these efforts is noticeably reduced. There is no progress in the digital asset and financial solutions market either, although attempts to intensify the dialogue have been made repeatedly over the past year.

As for cooperation in space exploration, it is being implemented exclusively in the scientific sphere: Arab powers are focused on their own space projects and at this stage are not demonstrating a willingness to allocate additional funding for similar initiatives in Africa.

India

Delhi's current activities in the region are based on the *Kampala Principles* formulated and announced by Prime Minister Narendra Modi in 2018³⁷. According to them, India will seek to provide comprehensive support to Africa, combining measures to develop innovative technologies and skills, as well as to create and modernize infrastructure, and deepen intergovernmental and public-private partnerships. An interesting feature of India's self-positioning policy in the region is its public rejection of *benefits in return* and its

³⁴ UAE announces \$4.5bn initiative to support deployment of clean energy in Africa // Gulf Business. URL: <https://gulfbusiness.com/uae-to-support-africa-clean-energy-efforts/>

³⁵ Is a green hydrogen boom coming to Africa? // the Arab Weekly. URL: <https://the-arabweekly.com/green-hydrogen-boom-coming-africa>

³⁶ Arab-speaking African countries present joint cybersecurity strategy // Weartetech. URL: <https://www.weartetech.africa/en/fils-uk/news/security/arab-speaking-african-countries-present-joint-cybersecurity-strategy>

³⁷ Prime Minister's address at Parliament of Uganda during his State Visit to Uganda // Ministry of External Affairs. Government of India. URL: <https://www.mea.gov.in/Speeches-Statements.htm?dtl/30152/Prime+Ministers+address+at+Parliament+of+Uganda+during+his+State+Visit+to+Ugand>



PM Narendra Modi declaring “Kampala Principles” in Uganda, ahead of the 10th BRICS Summit

Source: www.livemint.com

opposition to the region’s *selfish donors* (which usually mean China, the United States, and EU countries).

One of India’s *footholds* in the African high-tech market is the digital solutions sector. The country has significantly increased its cybersecurity competencies and is seeking to export its accumulated experience. India offers its partners from the region to adapt successful Indian digital initiatives (*Digital India*, *BharatNet*, *IndiaStack*, etc.) to the needs of the national segment of cyberspace and thereby mitigate some of the problems typical for the region (for example, the *brain drain*)³⁸.

Delhi is seeking to gain a foothold in the hydrogen energy market by offering regional players joint projects in the production of *green hydrogen* and renewable energy generation³⁹.

In the area of space exploration, India is betting on deepening cooperation with individual powers – leaders in the regional space race (Kenya, South Africa)⁴⁰.

India is actively working on exporting successful solutions to the African continent. In addition to the pharmaceutical sector, the focus is on supplying solutions for the agro-industrial complex of the Sub-Saharan countries (Senegal, Kenya, Nigeria, etc.)⁴¹.

In terms of other long-term interests, Delhi is betting on strengthening its role in the *zone of historical control* (Seychelles, Madagascar, Mauritius) and forming a *natural counterweight* to the influence of other interested players (China, Pakistan, Türkiye).

Türkiye

The core of Ankara’s foreign policy in the region is the idea of increasing its own influence through the use of *soft power* and *smart power* tools. And the high-tech sector is one of the areas in which Türkiye can establish mutually beneficial cooperation with the SSA states.

In matters of developing the digital competencies of African partners, Ankara relies on bilateral cooperation. In particular, the Turkish technology business is also increasingly expanding its presence in the domestic markets of East Africa⁴². In addition, Türkiye

³⁸ Mishra A. Elevating the India-Africa partnership to new horizons // ORF. URL: <https://www.orfonline.org/expert-speak/elevating-the-india-africa-partnership-to-new-horizons/>

³⁹ India Energy Firms See Growth Prospect in Africa and Middle East // Bloomberg. URL: <https://www.bloomberg.com/news/articles/2023-02-07/india-energy-firms-see-growth-prospect-in-africa-and-middle-east>

⁴⁰ India ready to partner with South Africa in space exploration, says Consul General Mahesh Kumar // The Print. URL: <https://theprint.in/world/india-ready-to-partner-with-south-africa-in-space-exploration-says-consul-general-mahesh-kumar/1337512/>

⁴¹ L’Afrique ne peut pas se permettre de rater la révolution du gene (Africa cannot afford to miss the gene revolution) // VivAfrik. URL: <https://vivafrik.com/2019/02/05/lafrique-ne-peut-pas-se-permettre-de-rater-la-revolution-du-gene-a24301.html> (in French)

⁴² Fintech investment pours into Africa // KPMG. URL: <https://kpmg.com/xx/en/home/insights/2022/01/pulse-of-fintech-h2-2021-emerging-markets-africa.html>

expects to export its own cybersecurity solutions to Africa in the future – for example, a model of cooperation between the state and non-systemic actors in the digital space.

Since 2021, alternative energy ties have been developing with Angola, Nigeria and Togo, allowing Turkish officials to declare *high involvement* in the transformation of the regional energy sector. However, at this stage, Ankara still does not have sufficient resources to fully compete with larger players in the industry – India, China and the EU countries.

	Leading sphere	Dialogue format (main conductor of interests)	Key benefits	Key obstacles
China	Energy	Mixed cooperation	Integration into megaprojects	Neocolonialism (<i>debt traps</i>)
the USA	Cybersecurity	Government	Extensive political support	Unbalanced and reactive dialogue
India	Energy	Mixed cooperation	Integration into megaprojects	Counteraction from China
the EU	Energy	Mixed cooperation	Extensive experience in implementing spe- cialized projects	Unbalanced and reactive dialogue
Türkiye	Cybersecurity	Government	Flexible approach to interaction	Domestic political situation
Arab states	Energy	Private sector	Willingness to actively invest in the develop- ment of all the spheres	Relatively little practical experience

Table 1. Matrix of interests and capabilities of
Russia's main competitors in the region

Compiled by the author



CONCLUSIONS

The technological dimension of Sub-Saharan Africa is in the process of active transformation. The vast majority of regional states view the high-tech sector as a potential growth area and are willing to invest in its development.

At the same time, it is too early to talk about a full-fledged *high-tech transition*: no more than half of the regional powers can boast of stable positions in high-tech industries, and only a few of them (South Africa, Nigeria, Ghana, Kenya) are able to fully compete in the global market.

There is a clear trend towards the transfer of the *palm* in the competition for influence in the African technological sector to Asian states – and, first of all, to China. On the other hand, the scale of the outflow of forces and funds from Western players (the USA, the EU) should not be overestimated. Western countries still have fairly strong positions in a significant part of *sensitive* areas, including digital technologies and pharmaceuticals.

In addition, against the backdrop of ongoing global transformations, Russia's importance and its involvement in African projects are growing – Moscow has, in general, advantageous positions and, unlike its European competitors, is less susceptible to the influence of the *colonial discourse*. At the same time, Moscow is still in a *catch-up* position in the race for influence in Sub-Saharan Africa, which is due, among other things, to the long period of *absence* of stable conductors of Russian interests in the region. The influence of this factor could be partly mitigated by the intensification of dialogue with the economic community of the region. ■

TECHNOLOGICAL RENAISSANCE IN SUB-SAHARAN AFRICA:
CHALLENGES AND OPPORTUNITIES FOR RUSSIA

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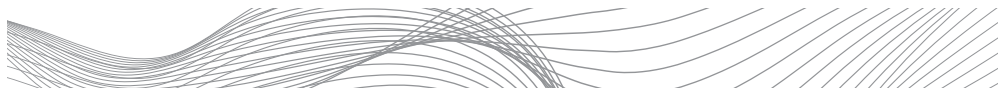
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PROSPECTS FOR COOPERATION BETWEEN RUSSIA AND SUB-SAHARAN AFRICA ON GLOBAL SECURITY AND HIGH TECHNOLOGIES

This occasional paper was made within the framework of the project *Prospects for Cooperation between Russia and Sub-Saharan Africa on Global Security and High Technologies*, which is part of the *Global & Regional Security: New Ideas for Russia* Program.

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