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Research article

CHALLENGES OF INDUSTRIAL GROWTH IN AFRICA: SEARCHING FOR NEW OPPORTUNITIES

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Abstract. Industry is a key factor in the structural shifts in the economy that are necessary for enhancing the economic development in African countries. In the rapidly changing global landscape, industrialization, mainly focused on developing the domestic market, is once again becoming the primary way to overcome the growing lagging behind of African countries. This aligns with the essence of Goal 9 (“Promote inclusive and sustainable industrialization and foster innovation”) of the UN Sustainable Development Goals, as well as the main directions of the industrialization strategy outlined in Goal 4 (“Transforming the economy”) of the “Agenda 2063,” developed by the African Union (AU) in accordance with the contemporary challenges of strengthening the economies of Africa’s countries. The lack of significant results in establishing an industrial base in most of them, after three declared decades of industrial development for Africa by the UN (Industrial Development Decade for Africa: 1980–1990, 1993–2002, 2016–2025), requires a certain revision of commonly accepted models of industrialization, as well as increasing state support for the implementation of the most promising among them. Based on the analysis of classical models of industrialization, as well as programs and actual results of the manufacturing industry development in Africa, the authors of the article propose an assessment of African countries’ industrial potential and the possibilities for them to implement innovative technologies, as well as the creation of production clusters (special economic zones), including through the expansion of cooperation with Russia in the field of modernization of existing and construction of new industrial facilities, primarily in high-tech sectors of the manufacturing industry.

Keywords: Africa, manufacturing industry, models of industrialization, industrial development programs, special economic zones, innovative technologies, Russian-African cooperation

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Amid the reformatting of the global economy in the 2020s, the issue of industrialization in Africa is reaching a new level, exacerbating the continent's need for structural changes in order to sustain economic growth, with industry becoming a key factor in this process. At the same time, the main guideline for the industrialization strategy of African countries remains Goal 9 of the UN's Sustainable Development Goals for 2016–2030[1] (SDGs), which provides for the promotion of inclusive and sustainable industrialization, as well as the creation of appropriate infrastructure and the acceleration of innovation[2].

In this connection, according to the African Development Bank experts, at country level, bold structural reforms are needed to improve the business environment and upgrade labor and entrepreneurship skills as well as production technology[3]"

In these conditions, African countries lacking developed technology face contradictory tasks. For more developed economies such as Egypt, Nigeria, and South Africa, this involves seeking opportunities for the sovereign development of national economies based on the advancement of massive digitalization that accelerates global processes, the introduction of innovations, the restructuring of production management methods, science and professional education, the search for appropriate sources of financing, etc. Less developed African countries, primarily the least developed countries (LDCs), which constitute the majority on the continent, are facing an increasingly urgent need to adapt to the consequences of these processes.

The subject of this study is an analysis of a number of preliminary results of industrialization on the African continent, new challenges in advancing this process, and opportunities for implementing certain models of industrial development in modern Africa.

EVOLUTION OF INDUSTRIAL DEVELOPMENT MODELS IN AFRICA

Following the UN-declared Industrial Development Decades for Africa: IDDA I (1980–1990), IDDA II (1993–2002) and IDDA III (2016–2025), as well as the adoption of the Plan of Action for the Accelerated Industrial Development of Africa (AIDA) by the African Union (AU) in 2008, there is a need to rethink the model of industrialization in Africa, taking into account the multidimensional nature of the structural transformation

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[1] The Sustainable Development Goals Report, 2016. *UN*. https://unstats.un.org/sdgs/report/2016/the%20 sustainable%20 development%20goals%20report%202016.pdf (accessed: 12.06.2025)

[2] Goal 9: Industry, Innovation and Infrastructure. Sustainable Development Goals. *United Nations Development Programme*. https://www.undp.org/sustainable-development-goals/industry-innovation-and-infrastructure (accessed: 04.04.2025)

[3] Why does Africa's Industrialization Matter? Challenges and Opportunities? *African Development Bank*. 20.11.2017. https://am.afdb.org/2018/en/news/why-does-africas-industrialization-matter-challenges-and-opportunities (accessed: 04.04.2025)

process, which is directly linked to the development of energy and transport infrastructure, the availability of human and financial capital, the introduction of technological innovations, the simplification of trade procedures, and a number of other factors [Morozenskaya 2023: 499–500].

In the 1990s, economic liberalization policy, or Structural Adjustment Programs, implemented with the support of the World Bank (WB) and the International Monetary Fund (IMF), which primarily involved reducing the state's role in industrial development, undermined efforts to diversify industry and led to the levelling of the industrial base created in a number of African countries during the period of import substitution industrialization after independence (mid-1960s–1980s). The closure of enterprises was observed in many countries, including Nigeria, Ghana, and Zambia, which were the most advanced in industrial development. The share of manufacturing in the GDP of African countries fell from 15.3% in 1990 to 10.5% in 2008[4]. These processes gave rise to talk of deindustrialization.

In the late 1990s, the *Poverty Reduction Strategy* prioritized the development of agro-industrial sectors, but this was complicated by the financial and economic crisis of 2008–2009. This led to a further decline in the average annual growth rate of industrial production across the continent, from 5.2% in 2000–2006 to 2.6% in 2009[5]. Consequently, in 2008, the heads of government of African states approved the aforementioned *AIDA* action plan.

These processes have been examined in detail in the scientific literature, including in studies by Soviet and Russian Africanists [Aleksandrovskaya 1986; Babintseva 1982; Bragina 1971; Goncharov 1983; Tyulpanov 1969]. Decades later, in the 21st century, the process of deindustrialization on the continent accelerated again, characterized as "premature deindustrialization" [Rodric 2016] (see below for more details), which forces most African governments to choose between restoring/modernizing previously created industrial facilities and organizing new enterprises based on the use of modern technologies. Additional opportunities for both options are opening up in Africa as a result of steadily growing domestic demand, supported by rapid population growth, the expansion of regional markets, primarily within integration associations, and the emergence of new opportunities for including African production in international value chains.

In this regard, it is inevitable that new problems will emerge. These include the lack of a sufficiently developed public policy and regulatory framework in the changing economic conditions of *Industry 4.0*, increasing energy supply needs, as well as rising energy and transportation costs, the need to create digital infrastructure and provide digital services, the transformation of the labor market and the shortage of highly qualified personnel and skills in the management of technological production, the intensified competition in the global market and the modernization of global value chains under the influence of automation and artificial intelligence (AI), the resolution of growing environmental problems, etc. This necessitates the implementation of reforms in state industrial policy, particularly in the investment sphere. Accordingly, when developing national and regional plans for the creation and development of the manufacturing industry, various models of interaction between technological, institutional, economic, and environmental factors can be applied.

[4] Economic Development in Africa Report 2011. Fostering Industrial Development in New Global Environment. *UN*. New York and Geneva. 2011. P. 15
[5] Ibid. P. 4.

These models are generally based on the postulates of classical principles of manufacturing industry development, starting with Rostow's theory of the five stages of economic growth (Africa is characterized by the 3rd and 4th stages, the "take-off" and the "drive to maturity") and Lewis's dual-sector model, which divides the economies of countries with high population density, capital shortages, and limited natural resources (using Egypt and a number of other countries as examples) into two sectors: traditional agriculture and modern industry. While Rostow acknowledged the pivotal role of infrastructure, technology, and human capital development for industrialization [Rostow 1960], Lewis considered the flow of surplus workers from agriculture into industry, as well as the accumulation of capital, to be the driving force behind industrial development [Lewis 1955].

Historically, economies have developed based on the transition of workers from agriculture to export-oriented manufacturing, which also uses low-skilled labor but is more productive. However, this pattern is interrupted as the manufacturing sector becomes sufficiently automated and requires increasingly more skilled workers. This leads to labor flows being redirected back to agriculture or low-productivity service sectors (such "premature deindustrialization" has, for example, hampered productivity growth in some Latin American countries). Furthermore, the associated risks are not purely economic and may contribute to political conflicts within the country[6].

To date, the Global Value Chain (GVC) theory remains the most popular, describing the fragmentation and international distribution of industrial production of goods (assembly, component manufacturing, etc.), allowing developing countries to gradually move from low value-added activities to high value-added activities [Bair 2005; Gereffi, Humphrey, Sturgeon 2005].

Among the models of state-led industrialization is Alexander Gerschenkron's theory of late industrialization, which states that countries that embark on industrialization later than others can "leapfrog" certain stages of development by introducing advanced technologies and institutions with the decisive participation of the state and financial institutions in mobilizing resources for industrialization [Gerschenkron 1962].

Erik Reinert, a modern proponent of the ideas of mercantilists Friedrich List and Joseph Schumpeter, also supports active state intervention in economic life, including industrial development and protectionist policies. In his opinion, the practical significance of an economic theory depends on a country's level of development and its ability to escape poverty through industrialization by diversifying manufacturing, introducing protective tariffs, establishing inter-sectoral links, investing in infrastructure, and forming regional markets. With the successful creation of a sustainably functioning industrial sector, a country has the opportunity to enter the global market and compete for profitable positions [Reinert 2008].

Contemporary concepts of socio-economic development in Africa emphasize either strict state control over the economy (Developmental State, DS) or improving the well-being of the population and increasing its involvement in the reproduction process (Inclusive Development, ID) [Morozenskaya 2018]. In the first case, the basis for growth and subsequent development is considered to be an increase in production efficiency in key sectors (industries), while in the second case, a large-scale increase in employment and

[6] Alqali A. When industrialization became a centrepiece of Africa's agenda. *African NewsPage*. 24.12.2022. https://african-newspage.net/2022/12/when-industrialization-became-a-centre-piece-of-africas-agenda/ (accessed: 15.06.2025)

labor intensity of production in all spheres of the economy. It can be said that the concept of the DS echoes the concept of "Infant Industry" (a newly created industry in need of state support), successfully used in newly industrialized countries, primarily in Southeast Asia [Stiglitz 2002], and the concept of ID echoes the concept of human capital.

When applying the DS concept, it is necessary to revive the export-oriented model but with a focus on industrial modernization. This model was implemented in the newly industrialized countries (NICs) and, to a certain extent, in China, enabling them to occupy an advantageous position in the global economy. Meanwhile, in African countries, this model, although seemingly modernizing, may not achieve this. In essence, it is a modified version of the catch-up development strategy, which was popular in the 1960s and 1970s. However, rather than emulating the economies of industrially developed countries, the model is based on the NICs and China. In fact, the only thing the African economy has in common with the Chinese economy of the 1990s is cheap labor, while the second most important component of the Chinese model—massive state capital investment—is absent. Therefore, while it is apparently possible to modify such a model for Africa, this can only be achieved through the flexible use of foreign investment to establish and develop industrial export production [Morozenskaya 2013].

In the coming years, the enhancement of competitiveness in many African countries could be based on the extractive industries, provided that revenues from expanded raw material exports enable them to expand processing and establish medium- and high-tech manufacturing industries (e.g., electrical and telecommunications equipment, medical and measuring instruments, chemical and automotive assembly industries[7]). At the same time, they may well join the process of transition to low-carbon, resource-efficient "green industrialization" within the framework of regional and international cooperation, for example, by developing nuclear energy with the participation of Russia.

INDUSTRIAL DEVELOPMENT PROGRAMS AND RESULTS

At the 2022 African Union Extraordinary Summit on Industrialization, Economic Diversification and Development of the African Continental Free Trade Area (AfCFTA) in Niamey, Niger, attended by heads of state and government from 20 African countries[8], it was noted that there had been no significant progress in establishing an industrial base on the continent. This is evidenced, first and foremost, by the structure of the economies of African countries, most of which have not yet embarked on active industrialization, which is usually characterized by the growth in the secondary sector of the economy. In 2022, the African continent's share of manufacturing value added (MVA) in the global manufacturing sector amounted to only 2%, and its contribution to Africa's total GDP (10.3%) was lower than that of agriculture and mining, as well as being significantly lower than the service sector's share. In sub-Saharan African countries (SSA), manufacturing's share of total GDP fell by almost 5% between 1990 and 2020, dropping from 16.0% to 11.2%[9].

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[7] Africa's Development Dynamics. *African Union*. 06.11.2019. P. 60. https://au.int/sites/default/files/documents/37662-doc-2019_africa_development_dynamics-en.pdf (accessed: 05.06.2025)

[8] Alqali A. When Industrialization Became a Centrepiece of Africa's Agenda. *African Newspage*. 24.12.2022. https://africannewspage.net/2022/12/when-industrialization-became-a-centre-piece-of-africas-agenda/ (accessed: 22.05.2025)

[9] International Yearbook of Industrial Statistics. *UNIDO*. 2024. https://stat.unido.org/portal/storage/file/publications/yb/ 2024/YB-core-2024-regfacts-afr-pdf.pdf (accessed: 03.05.2025)

Table 1. **Indicators of manufacturing development in African countries*, 2010–2023**

Country	MVA**, $ billion		MVA share in GDP, %		MVA growth rate, %	Share of manufacturing products in commodity exports, %		Share of high-tech products*** in manufacturing exports, 2022	
	2015	2023	2015	2023	2010–2023	2010	2023	$ million	%
Algeria	13.3	18.7	7.1	7.8	5.0	0.8	…	…	…
Angola	8.2	6.8	5.7	8.0	2.8	…	1.0	77	22.1
Benin	1.1	2.0	10.0	10.1	5.0	4.7	4.2	1	4.2
Burkina Faso	1.4	2.1	11.7	10.7	4.1	5.0	5.0	3	1.9
Gabon	2.4	4.4	16.7	21.6	2.8	3.5	17.8	40	1.5
Ghana	5.5	8.6	11.1	11.2	4.1	7.3	6.0	10	1.1
Guinea	1.1	2.7	12.1	11.4	5.6	…	…	…	…
DRC	6.5	12.0	17.1	18.0	4.7	…	…	18	0.7
Egypt	55.0	59.8	16.7	15.1	2.0	41.7	52.2	639	2.8
Zambia	1.6	2.3	7.5	8.3	4.8	8.1	12.8	11	0.9
Zimbabwe	2.4	3.7	11.9	13.8	-2.2	18.8	7.5	8	1.5
Cameroon	4.7	6.4	14.4	13.3	3.8	6.9	…	6	2.2
Kenya	7.0	8.4	10.0	7.8	2.9	33.9	30.7	47	2.3
Côte d’Ivoire	5.2	11.7	11.4	14.9	8.5	16.1	13.6	58	3.6
Lesotho	0.4	0.3	15.1	14.0	0.8	77.5	79.2	1	0.1
Mauritius	1.6	1.6	13.0	11.2	0.4	60.1	47.1	17	2.0
Madagascar	1.0	1.5	8.5	9.5	2.0	53.8	25.7	6	0.6
Morocco	16.4	20.5	14.9	14.5	2.0	63.4	74.7	1268	4.1
Mozambique	1.3	1.8	8.3	8.5	1.5	2.0	7.3	18	3.2
Namibia	1.3	1.4	11.4	11.2	-0.2	43.8	32.6	1	0.1
Nigeria	46.3	55.9	9.4	15.4	3.7	6.7	2.8	76	2.4
Rwanda	0.6	1.4	6.8	9.9	6.1	8.4	…	7	4.8
Senegal	3.0	4.8	17.1	15.4	3.8	37.7	26.4	37	2.3
Tanzania	3.7	6.7	7.9	8.4	6.6	18.1	11.9	17	1.7
Togo	0.9	1.2	14.9	12.7	8.0	64.9	36.0	1	0.3
Tunisia	6.4	7.3	14.0	15.1	0.2	76.0	77.7	1041	7.2
Uganda	5.7	7.7	17.6	15.6	3.7	22.8	19.0	18	2.3
CAR	0.3	0.5	19.7	18.0	0.0	3.1	10.4	16	37.3
Eswatini	1.3	1.3	31.7	27.6	2.4	65.4	59.8	…	…
South Africa	43.3	48.7	12.5	12.9	-0.4	48.7	40.5	2476	5.5

* Countries with MVA share in GDP exceeding 7.5% in 2023

** Manufacturing Value Added

Compiled from: World Development Indicators 2024. *World Bank*. https://wdi.worldbank.org/tables/4.1-4.4, 5.13 (accessed: 20.03.2025)

In African countries, growth in a number of manufacturing industry indicators has been insignificant over the past decade. As shown in Table 1, the share of manufacturing value added between 2015 and 2023 did not exceed 15% in most countries on the continent, and in a number of countries it did not even reach 10%. About 80% of the total MVA is accounted for by the 12 leading countries on the continent. Of these, Algeria, Benin, Côte d'Ivoire, Rwanda, Tanzania, Togo demonstrated the highest growth rates in manufacturing in 2010–2023. At the same time, in South Africa, which has one of the most developed manufacturing sectors on the continent, as well as in the Republic of Congo, Libya, Namibia, and Zimbabwe, the growth rate indicator was negative.

In international trade, exports of African manufacturing products account for only 1.3% of the global total. In the export structure, highly processed products play a significant role in the economies of South Africa, Morocco, Tunisia, and Egypt (see *Table* 1).

Unlike industrialized countries, developing countries in Africa have begun the process of deindustrialization without achieving high per capita income levels, and the flow of labor from the agricultural sector often goes directly to the service sector, bypassing the industrial sector. This process exacerbates the problems of rapid labor market growth and its low skills in Africa, since such service sectors as banking, finance, and insurance require educated and qualified employees. In 2022, the manufacturing industry employed 7.6% of the continent's working-age population, predominantly men (60%). The highest employment rates in the service sector (10% to 15% of total employment) were observed in North African countries: Algeria, Egypt, Morocco, Tunisia, as well as Benin, Burkina Faso, Ghana, Lesotho (22.6%), Mauritius, Nigeria, the Republic of Congo, Senegal, Somalia, Togo, and Eswatini[10].

Table 2. **Top 10 countries by the African Industrialization Index**

Country	2010		2021	
	Position	Index	Position	Index
South Africa	1	0,89	1	0,84
Morocco	3	0,78	2	0,83
Egypt	4	0,76	3	0,78
Tunisia	2	0,80	4	0,77
Mauritius	5	0,68	5	0,68
Eswatini	6	0,64	6	0,64
Senegal	14	0,55	7	0,61
Nigeria	10	0,58	8	0,605
Kenya	11	0,57	9	0,603
Namibia	7	0,61	10	0,601

Compiled from: African Development Bank. Africa Industrialisation Index 2022. *African Development Bank Group*. 24.11.2022. https://www.afdb.org/en/documents/africa-industrialization-index-2022 (accessed: 06.05.2025)

According to the Industrialization Index of 52 African countries prepared by experts from the African Development Bank (AfDB), the AU, and UNIDO based on 19 key indicators, including productivity, capital stock, labor force size, the level of institutional

[10] International Yearbook of Industrial Statistics. *UNIDO*. 2024. https://stat.unido.org/portal/storage/file/publications/ yb/2024/YB-core-2024-regfacts-afr-pdf.pdf (accessed: 03.05.2025)

and business environment development, infrastructure provision, and macroeconomic stability, the highest results (maximum = 1.0) in the period 2010–2021 were recorded in South Africa, Morocco, and Egypt, while Senegal, Nigeria, and Kenya improved their performance (Table 2). Countries such as the Central African Republic, Sierra Leone, Guinea-Bissau, Burundi, and the Gambia are at the bottom of the ranking.

As was the case in the 2010s, low-tech industries predominate in the manufacturing sector: the processing of agricultural products, the production of textiles, clothing, leather goods and footwear, construction materials, and woodworking [Kalinichenko 2013: 85–102]. These are mostly small and medium-sized enterprises (SMEs) with low productivity, which generally belong to the informal sector of the economy. They encounter difficulties in obtaining loans, organizational and operational difficulties due to the imperfections in the legal, primarily tax, system, and their products are mainly oriented towards the domestic market and, much less frequently, the regional market. In West Africa, for example, SMEs generate up to 30–50% of GDP, thereby playing a significant role in job creation and consequently reducing unemployment and mitigating acute social problems [Morozov 2016].

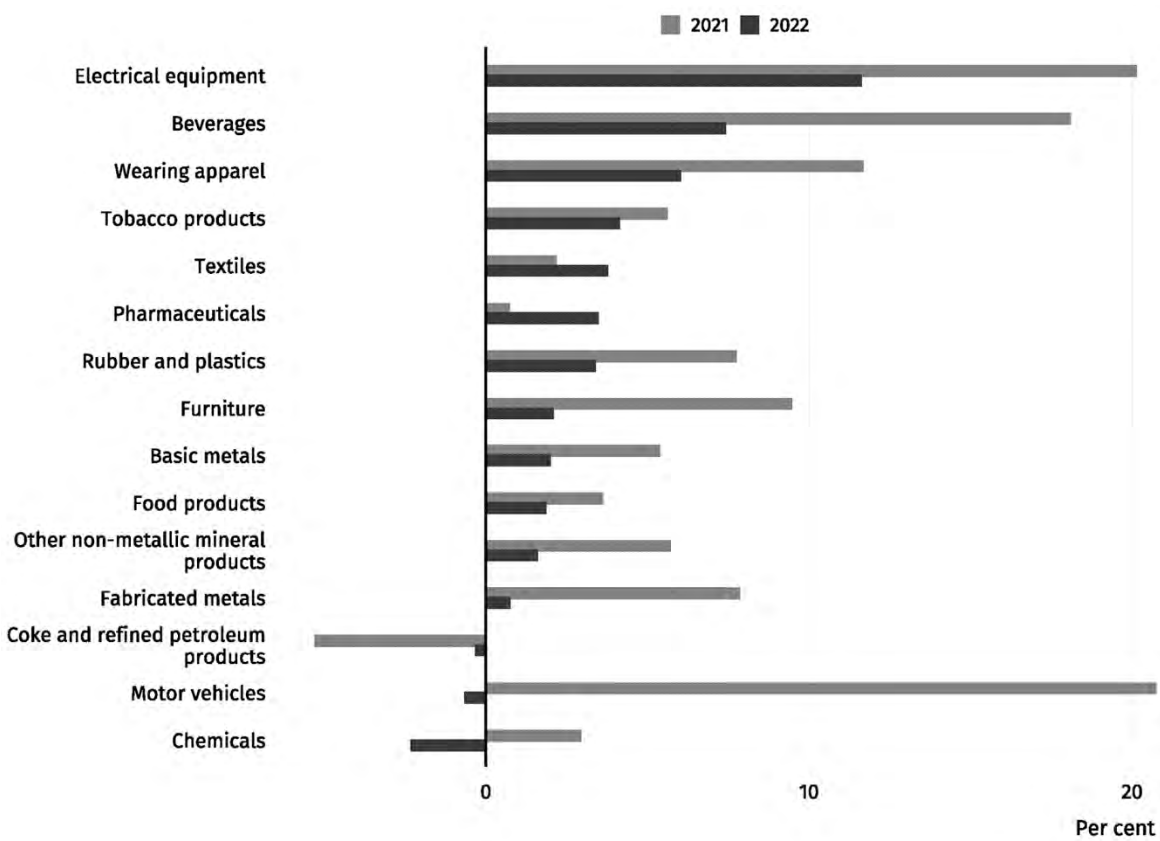

Fig. 1. **Growth rates of value added in Africa’s manufacturing industries, %.**
Source: International Yearbook of Industrial Statistics. *UNIDO*. 2024.
https://stat.unido.org/portal/storage/file/publications/yb/2024/YB-core-2024-regfacts-afr-pdf.pdf
(accessed: 03.05.2025)

At the same time, the majority of private producers in African countries are small and medium-sized enterprises that lack the financial and technical capabilities to implement the technologies of the Fourth Industrial Revolution. In some cases, the state seeks to provide such support. For example, in order to boost the competitiveness of locally manufactured goods, the Kenyan Ministry of Industrialization, Trade, and Entrepreneurship, with the support of the World Bank, is implementing the *Kenya Industry and Entrepreneurship Project* (KIEP) aimed at supporting innovation in small and medium-sized enterprises through financial grants and technical assistance, as well as participation in business diagnostic scanning and coordination of productivity improvement plans[11].

Currently, highly processed products play a significant role in the economies and export structures of a limited number of African countries. This is reflected in their positions in the UNIDO's Competitive Industrial Performance Index (CIP), in which South Africa, Morocco, Egypt and Tunisia in 2022 ranked highest among African countries, at 52nd, 60th, 67th, and 70th, respectively[12].

However, there has been a trend towards expanding the medium- and high-tech segment in a number of other countries on the continent, primarily through establishing enterprises that produce electrical and telecommunications equipment, medical and measuring instruments, and the automotive assembly industry. According to UNIDO, in 2021–2023, it was precisely the production of electrical equipment and pharmaceuticals that were the high-tech industries with the highest growth rates, making them key potential drivers of technological modernization on the continent (Fig. 1). At the same time, by the early 2020s, along with the spread of the concept of a "green economy" on the continent, which emphasizes the creation of "clean production and a modern service sector," alternative models of economic development emerged, focusing on the experience of other developing countries, as well as an "African model" [Degterev 2024].

POSSIBILITIES FOR APPLYING NEW FORMS OF INDUSTRIAL PRODUCTION ORGANIZATION IN AFRICA

Creation of industrial clusters. The theory of creating and developing clusters based on the territorial concentration of interrelated firms, suppliers, and specialized institutions [Porter 1998] states that government support in the areas of infrastructure, education, and socio-political incentives is crucial for industrialization and increasing the competitiveness of industry.

Clusters as territorial-production structures in the form of special economic zones (SEZs), agro-industrial parks, technology parks, etc. have already demonstrated their practical feasibility in Africa for creating manufacturing enterprises and developing regional trade and exports. Once the necessary conditions have been met and various bureaucratic barriers have been overcome, SEZs become conduits for industrial development, attracting investment, creating jobs, promoting innovation, and disseminating knowledge [Kalinichenko, Morozenskaya 2021: 164–175]. However, they have to constantly adapt to the impact of external factors and internal socio-economic shifts, whether it be the COVID-19 crisis, climate change, or the proliferation of digital technologies [Oqubay 2025: 136].

In recent years, many African countries have adopted the policy of establishing SEZs as part of their national economic development strategy. According to UNIDO, there were 237 such zones in Africa in 2020 (compared to 20 in 1990), located in 37 countries,

[11] Industrial Development Report 2024. *UNIDO*. https://unido.org/sites/default/files/unido-publications/2024-06/Industrial%20Development%20Report%202024.pdf (accessed: 11.05.2025)

[12] International Yearbook of Industrial Statistics. *UNIDO*. 2024. https://stat.unido.org/portal/storage/file/publications/yb/2024/YB-core-2024-regfacts-afr-pdf.pdf (accessed: 03.05.2025)

which is only about 4% of the global total. Furthermore, it is estimated that only about half of these are fully functioning. The most active in establishing SEZs are Kenya (61), Nigeria (38), Ethiopia (18), Egypt (10), as well as Ghana, Senegal, and Rwanda[13].

The vast majority of African SEZs (89%) are multi-sectoral and host a variety of industries. For example, all nine operating SEZs in Cameroon fall into this category, with a range of enterprises from agribusiness to steel mills in the Douala-Bonaberi industrial zone or from wood processing to oil refining in the Yaoundé-Sud zone. Examples of narrow-profile zones can be found in Morocco, where Tanger Automotive City specializes in the automotive industry, Casablanca Midparc FZ in aeronautics, and Rabat Technopolis and Oujda Technopolis in the development of start-ups engaged in the research and development of innovative technologies and training in these areas. A significant part of SEZs is associated with labor-intensive industries, such as the agro-industry and textile manufacturing (the enterprises created within them provide more than 500,000 jobs), but in a number of countries they have also emerged in high-tech sectors (for example, in Morocco in the automotive industry and in Nigeria in the oil and gas chemical industry)[14].

The most effective special economic zones, in terms of the number of companies attracted and the number of enterprises and jobs created, operate in countries on the continent with the best investment climate and fiscal and institutional opportunities (Egypt, Morocco, Kenya, Mauritius, South Africa, Rwanda). Many African countries form zones jointly with foreign partners, which allows them to attract their technologies and experience, as well as obtain additional financing opportunities. At the same time, projects to create such zones without appropriate conditions in a number of African countries may pose certain risks to the existing economic structure. Consequently, the most prevalent export-processing zones on the continent are enclave-type zones (31%), which have emerged due to preferences for duty-free access of their products to US markets in accordance with the *African Growth and Opportunity Act* (AGOA), face barriers to growth due to the intensification of regional integration processes in Africa, especially against the backdrop of the creation of the AfCFTA [Rodríguez-Pose et al. 2022].

Equally important is the expansion of infrastructure in agro-industrial zones. In partnership with the African Export-Import Bank (Afreximbank), the Islamic Development Bank, and Arise Integrated Industrial Platforms, the African Development Bank has launched the Special Agro-Industrial Processing Zones (SAPZ) program, which aims to transform underdeveloped rural areas into agro-industrial corridors. In this regard, Africa's rich agricultural resources are being used to boost food production and address the continent's dependence on imports. One of the countries participating in the program is Senegal, where the Ministry of Industrial Development and Small and Medium Industry is implementing a program to create five agricultural processing centers (agropoles)—in the north of the country (Saint-Louis, Matam, and Louga), in the south (Ziguinchor, Kolda, and Sédhiou), in the center (Kaolack, Kaffrine, Fatick, and Diourbel), in the east (Tambacounda, Kédougou), and in the west (Sandiara, Malicounda, and N'Guéniène). These centers are intended to become centers of agro-industrial development and promote cooperation between all stakeholders in the value chain[15].

[13] Handbook of Special Economic Zones in Africa. Towards Economic Diversification across the Continent. *UNCTAD*. 2021. https://unctad.org/system/files/official-document/diaeia2021d3_en.pdf (accessed: 14.05.2025)
[14] Ibid. Pp. 34–50.
[15] Industrial Development Report 2024. *UNIDO*. P. 107. https://www.unido.org/sites/default/files/unido-publications/2024-06/Industrial%20Development%20Report%202024.pdf (accessed: 11.05.2025)

Leaders of AU member states have noted the necessity to increase budgetary investment in the development of industrial projects and the creation of appropriate energy and transport infrastructure in order to achieve the development goals set out in Agenda 2063. The industrialization and structural transformation of African economies still depend on the inflow of foreign investment, which requires reforming the conditions for access of the Organization for Economic Cooperation and Development (OECD) to export credits by easing lending rules, which will increase the volume of financing for development projects, including those based on public-private partnerships[16].

Implementation of innovative technologies. A pressing issue for Africa is the structural transformation of industrial production, which will help contribute to the increase of added value of products through the use of the latest technologies and innovations. It is within the framework of industrialization that African countries will be able to implement digital production and distribution technologies, allowing them to "leapfrog" outdated technologies [Kalinichenko 2019].

However, only nine African economies were among the top 100 in the 2024 Global Innovation Index (GII), ranking in the second half of the list: Mauritius (55th), Morocco (66th), South Africa (69th), Tunisia (81st), Egypt (86th), Botswana (87th), Cape Verde (90th), Senegal (92nd), and Kenya (96th). Egypt, South Africa, Morocco, and Nigeria are leading the continent in creating a network of science and technology clusters engaged in implementing advanced developments[17].

Various innovative industrial production models are being tested in African countries, for example, eco-industrial parks based on clean, closed-loop technology, which have seen some development in Ethiopia, whose government has invested more than $1 billion in their creation. The aim of this project was to demonstrate how industrialization can generate new jobs and improve people's living conditions without causing environmental harm [Hai 2019: 38–41].

African countries are trying to find their niche in innovative manufacturing processes, but the implementation of projects is being delayed for years. For example, the introduction of advanced technologies in Uganda, where the Kiira Vehicle Plant for the production of hybrid electric vehicles was built in the Jinja Industrial Park in Kampala, has been underway since 2016 in collaboration with Kiira Motors Corporation and the state-owned National Enterprise Corporation. The start of production of locally assembled electric buses was officially announced in March 2025, with 65% of parts and components expected to be supplied by domestic companies (Tondeka Metro, RentCo Africa, Golden Dragon) by 2030. The project was developed in collaboration with Makerere University in Uganda with the support of the Ugandan government, but due to funding issues, the launch of the enterprise has been constantly delayed. It is expected that Chinese car brands will also be assembled there, but for now, the country continues to import several thousand cars annually, mostly used ones[18].

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[16] Alqali A. When Industrialization Became a Centrepiece of Africa's Agenda. *African Newspage*. 24.12.2022. https://www.africannewspage.net/2022/12/when-industrialization-became-a-centre-piece-of-africas-agenda/ (accessed: 22.05.2025)

[17] Global Innovation Index 2024 rankings. Unlocking the Promise of Social Entrepreneurship. *WIPO*. P. 18. https://www.wipo.int/web-publications/global-innovation-index-2024/assets/67729/2000%20Global%20Innovation%20Index%202024_WEB3lite.pdf (accessed: 22.05.2025)

[18] See: Mass Bus Production Officially Commences at Kiira Vehicle Plant. *The Insider*. 10.03.2025. https://theinsider.ug/index.php/2025/03/10/mass-bus-production-officially-commences-at-kiira-vehicle-plant/ (accessed: 22.05.2025); Inadequate Funds Delay Completion of Kiira Vehicle Plant. *Nilepost*. 13.10.2022.

Currently, a number of countries on the continent are focusing on the production of medical products among the high-tech industries, as this can act as an industry multiplier and a conduit for technological innovation. In some cases, plans for the development of the sector have been formulated at the subregional level, such as the East African Community (EAC) Second Regional Action Plan for Pharmaceutical Manufacturing for 2017–2027[19].

The pharmaceutical industry in Egypt is a priority sector with special tax incentives. The government has amended the 2017 New Investment Law to provide additional incentives for both foreign and domestic investment. In 2021, the government opened Gypto Pharma City, a state-of-the-art industrial zone 30 km north of Cairo, specifically designed for the pharmaceutical and medical sectors, which has become one of the largest drug manufacturing centers in the Middle East. In May 2023, the Sovereign Fund of Egypt (TSFE) and the private investment company B Investments announced the establishment of EZ International, which will collaborate with local pharmaceutical chain El-Ezaby Pharmacy. According to 2023 results, 170 manufacturing enterprises provided the highest market volume in the Middle East and North Africa region ($56.6 billion)[20].

Despite some positive trends in the creation of a technological ecosystem, entrepreneurs, developers, and investors still face a number of challenges, including power outages, high internet connection costs, limited infrastructure, insufficient private capital funding, a lack of sustainable interaction with scientific and educational institutions, and a shortage of professional developers. In turn, universities and research institutes often have limited funds to improve the quality of education and conduct modern-level research.

Expanding industrial cooperation with Russia. African governments are seeking new ways to attract investors to industrial development by implementing strategies that involve targeted investments in infrastructure, including regional integration projects and the creation of special economic zones for priority sectors. As industrial clustering is an effective spatial model for both Russian and African economies, this path opens up opportunities for cooperation and the exchange of experience. This is already happening with the implementation of the Russian Industrial Zone project in Egypt, led by the Russian Ministry of Industry and Trade in conjunction with the State Development Corporation *VEB.RF*. Following the signing in May 2025 of an agreement on the right to use land for the construction of the Russian Industrial Zone within the Suez Canal economic zone, work has begun on establishing Russian industrial enterprises there. Priority sectors include chemicals, pharmaceuticals, metallurgy, food, and construction materials. In the future, Russian companies plan to enter the markets of Africa and the Middle East[21].

Similar cooperation with other countries on the continent is possible, such as Zimbabwe. During his visit to Moscow in January 2019, the Zimbabwean president,

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https://nilepost.co.ug/business/144946/inadequate-funds-delay-completion-of-kiira-vehicle-plant (accessed: 22.05.2025)

[19] Nazeem M. East African Pharmaceutical Sector: Opportunities and Challenges. *UNIDO*. 2018. https://unido.org/sites/default/files/files/2018-03/Nazeem%20Mohamed_FEAPM_East%20Africa_Inside%20the%20Pharma%20Market_ 01032018%20Bonn.pdf (accessed: 20.04.2025)

[20] Industrial Development Report 2024. *UNIDO*. P. 109. https://www.unido.org/sites/default/files/unido-publications/2024-06/Industrial%20Development%20Report%202024.pdf (accessed: 11.05.2025)

[21] Russian Industrial Zone in Egypt. *Southern Regional Export Support Center*. 30.04.2025. https://exporteram.ru/rossijskaya-promyshlennaya-zona-v-egipte/ (accessed: 25.05.2025)

Emmerson Mnangagwa, offered his country's territory for the implementation of the Russian industrial zone project [Abramova, Fituni 2019]. The stages of development of industrial production and technology transfer, as well as those of supplies of agricultural machinery and equipment and mineral fertilizers, were outlined. At the end of 2024, at the 5th session of the Intergovernmental Commission on Trade, Economic, Scientific, and Technical Cooperation between Russia and Zimbabwe, the expansion of cooperation with the Russian company *PJSC KAMAZ*, in such areas as technology transfer, skills development, and the creation of manufacturing or assembly plants in Zimbabwe, was discussed among other topics. This would contribute to the economic growth and industrialization of the African country[22].

The Nigerian government's decision to resume work on commissioning the full-cycle metallurgical plant of *Ajaokuta Steel Company Limited* in Ajaokuta also provided a positive impetus for cooperation. Built by the Soviet (now Russian) consortium *Tyazhpromexport* (1979–1994), the plant has a design capacity of 5 million tons of steel per year and includes an agglomeration plant, a coke and blast furnace shop, and 16 rolling mills. The plant was planned to operate using the nearby Itakpe ore deposits and Lafia-Obi coking coal deposits. Despite being almost complete and its products being in demand for the industrial development not only in Nigeria but also in the neighboring countries, the plant was not launched due to political instability and delayed financial payments. In order to complete the work by August 2024, Russian specialists have begun auditing the dilapidated complex, according to Nigeria's Minister of Steel Development, Audu Shuaibu. In addition, in accordance with Nigerian President Bola Ahmed Tinubu's The Renewed Hope Agenda, the light rolling mill for producing reinforcement bars for infrastructure projects, including roads and bridges, will be restarted at the Ajaokuta plant in the near future, saving foreign currency that would otherwise be spent on importing these products[23].

Nigeria also has aluminum smelting capacity that has been idle since 2013. At the Second Russia-Africa Summit in St. Petersburg in 2023, a representative of the Nigerian Ministry of Petroleum Resources, Gabriel Aduda, announced that negotiations were underway with the Russian company RUSAL regarding the resumption of operations at ALSCON (Aluminum Smelter Company of Nigeria). RUSAL owns 85% of ALSCON, with the Nigerian government owning the remaining 15%. Located in Ikot-Abasi, the ALSCON complex with a capacity of 193,000 tons of primary aluminum per year includes not only the plant itself and a thermal power station but also a port on the Imo River, through which alumina can be imported from Guinea, where RUSAL owns an alumina plant[24].

Russia's experience, technology, and specialists can assist African partners in both modernizing existing industrial facilities and constructing new ones. Russia and African countries are united by the shared goal of expanding and modernizing the complex of processing industries, including the development of high-tech sectors of the economy. Cooperation in innovative areas, such as the development of biotechnology,

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[22] Zimbabwe and Russia Strengthen Economic Cooperation. *FurtherAfrica*. 06.12.2024. https://furtherafrica.com/2024/12/06/zimbabwe-and-russia-strengthen-economic-cooperation/ (accessed: 23.05.2025)

[23] Ajakuota Steel Plant to Open After All. Russia Set to Modernize and Launch Unfinished Plant in Nigeria. *About Metal*. 21.08.2024. (In Russ.) https://dzen.ru/a/ZsWu0mx0UDKRWB6- (accessed: 16.05.2025)

[24] Aluminum plant in Nigeria may resume operations with support from Rusal. *Neftegaz*. 29.07.2023. (In Russ.). https://neftegaz.ru/news/Oborudovanie/788492-alyuminievyy-zavod-v-nigerii-mozhet-vozobnovit-rabotu-pri-podderzhke-rusala/ (accessed: 05.02.2025)

petrochemicals, robotics and artificial intelligence, the improvement of telemetry and optical systems, the development of devices for space exploration, and the training of highly qualified specialists in these fields, appears to be both possible and important. This is confirmed by the fact that more than 20 Russian companies participated for the first time in the International Exhibition of Information Technologies and Innovations GITEX Africa Morocco 2025 (April 14–16, 2025, Marrakesh), demonstrating advanced developments for smart cities, including modern solutions for transport services, as well as high-tech software and AI solutions in the fields of medicine, cybersecurity, and water supply[25].

* * *

The member states of the African Union continue to view industrialization as one of the key tasks that will ensure structural transformation in Africa's economy in the coming decades. They are striving to implement the main directions of the industrialization strategy outlined in Goal 4 ("Economic Transformation") of the African Union's Agenda 2063 and Goal 9 ("Promoting inclusive and sustainable industrialization and fostering innovation") of the UN SDGs until 2030[26], developed on the basis of previous experience in establishing industrial production and in accordance with current conditions and the tasks of strengthening the economy. National and regional industrial development strategies and plans based on these fundamental documents include the following relevant tasks:

– Transforming the economy by expanding the manufacturing industry (MI) to create added value through processing raw materials. Diversifying the production base and increasing the share of high value-added products in GDP;

– Strengthening the institutional framework for the implementation of industrial policy, unifying industrial standards and regulations in countries in order to effectively support manufacturers;

– Expanding the R&D base, introducing technologies and innovations, including the digitalization of production processes, to promote the modernization and structural transformation of industry;

– Increasing the share of manufacturing exports in total exports of goods and reducing dependence on raw material exports. Expanding intra-regional trade in manufacturing products, simplifying trade procedures, and reducing tariff barriers to strengthen the single market for goods;

– Transforming micro, small, and medium-sized enterprises, which play a key role in job creation, into viable and sustainable business structures capable of contributing significantly to the added value in the manufacturing industry;

– Organizing special economic zones and technology parks to attract investment and stimulate production by simplifying regulatory procedures and providing tax incentives for doing business within them;

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[25] Russian companies to present their IT solutions at GITEX Africa Morocco. *RIA Novosti*. 14.04.2025. (In Russ.). https://ria.ru/20250414/rets-2011214646.html (accessed: 15.05.2025)

[26] Goal 9: Industry, Innovation and Infrastructure. Sustainable Development Goals. *United Nations Development Programme*. https://undp.org/sustainable-development-goals/industry-innovation-and-infrastructure (accessed: 04.04.2025); Assessing Progress after the First Decade (2014–2023) of Agenda 2063. *Mo Ibrahim Foundation*. 26.02.2024. https://mo.ibrahim.foundation/news/2024/assessing-progress-after-first-decade-2014-2023-agenda-2063 (accessed: 07.04.2025)

– Training a skilled workforce through educational programs and professional training, as well as collaborating with universities and research centers to promote innovation;

– Providing manufacturing enterprises with the required level of energy, transportation infrastructure, and logistics.

Consequently, sustainable economic growth in African countries, accompanied by job creation, can be achieved by strengthening their productive capacity, promoting industrialization, and embracing innovations that enable producers to bring new products to market and improve the efficiency of enterprises and product competitiveness.

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Научная статья

ПРОБЛЕМЫ ПРОМЫШЛЕННОГО РОСТА В АФРИКЕ: ПОИСК НОВЫХ ВОЗМОЖНОСТЕЙ

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Аннотация. Промышленность является ключевым фактором структурных изменений в экономике, необходимых для повышения уровня хозяйственного развития стран Африки. В быстро меняющейся картине мира главным способом преодолеть растущее отставание стран Африки вновь становится индустриализация, ориентированная прежде всего на развитие внутреннего рынка. Это соответствует сути Цели 9 («Содействие инклюзивной и устойчивой индустриализации и поощрение инноваций») ЦУР ООН, а также основным направлениям стратегии индустриализации, указанным в Цели 4 («Трансформация экономики») «Повестки дня 2063», разработанной Африканским союзом (АС) в соответствии с современными задачами укрепления экономики стран континента. Отсутствие значимых результатов в создании индустриальной базы в большинстве из них по прошествии трех объявленных ООН десятилетий промышленного развития Африки (*Industrial Development Decade for Africa*: 1980–1990 гг., 1993–2002 гг., 2016–2025 гг.) требует определенного пересмотра общепринятых моделей индустриализации, а также усиления государственной поддержки для реализации наиболее перспективных из них. Основываясь на анализе классических моделей индустриализации, а также программ и фактических итогов развития обрабатывающей промышленности в Африке, показатели вклада которой в экономику являются индикаторами уровня индустриализации, авторы статьи предлагают оценку промышленного потенциала стран континента и возможностей внедрения ими инновационных технологий, а также создания производственных кластеров (особых экономических зон), в том числе на основе расширения сотрудничества с Россией в сфере модернизации действующих и строительстве новых промышленных объектов, прежде всего в высокотехнологичных отраслях обрабатывающей промышленности.

Ключевые слова: Африка, обрабатывающая промышленность, модели индустриализации, программы промышленного развития, особые экономические зоны, инновационные технологии, российско-африканское сотрудничество

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