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Industrial Parks and Industrial Development in Africa

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1. Contextual Background

Literature in the field of economic growth and development indicates that industrialization is indispensable to economic growth and rapid transformation of economies. Industrialization is broadly viewed as an increase in the value added by non-agricultural and non-services sectors to GDP. Industrialization is most often synonymous with the manufacturing sector. Industrialization stimulates learning, innovation, access to capital, increased productivity, and the development of jobs (Opoku and Yan 2019). Industrialization is one of the three interrelated concepts required for both long-term economic growth and improved living standards (Delgado, Caldas, and Varela 2024). The other two are economic development and poverty. It stimulates economic growth by enhancing productivity, generating job prospects, and raising income levels.

Furthermore, industrialization plays a significant role in the advancement of essential infrastructure, including transportation, energy, and telecommunications, which in turn sustains other economic sectors (Djekonbe 2022). Industrialization promotes economic diversification, which decreases dependence on agriculture and raw material exports. In turn, this strengthens the ability of economies to withstand external economic shocks, for example, in the case of East Asian countries such as South Korea and Taiwan (Lin 2011). Industries, particularly manufacturing, facilitate the reallocation of resources from low-productivity sectors such as rural agriculture and informal services to more productive and output-enhancing activities, mostly owing to advancements in the division of labour and technological innovations (Seyoum 2024).

Industrialization can increase an economy's exports, allowing technology to spread. Yet, exports—high-tech exports in particular—are essential for steady, long-term economic growth (Navarro Zapata, Arrazola, and de Hevia 2024; Wabiga and Nakijoba 2018). The foregoing instances serve as testament to the substantial impact that industrialization has on the economic metamorphosis of economies.

In Africa, the essentiality of industrialization in economic growth and development has been recognised since the times of national independence struggles. In 1965, distinguished African nationalist Kwame Nkrumah asserted that industry is the means through which rapid improvement in living standards in Africa can be achieved (Opoku and Yan 2019). According to African Economic Outlook

Morocco Free Trade Zone

Port Elizabeth Warehouse

2017: Entrepreneurship and Industrialisation (AfDB, OECD, and UNDP 2017), industrialization is a prerequisite for Africa's economic transition. The report asserts that only industrialization can start the region's unrestricted convergence with the developed nations. Elsewhere, industrialization is proclaimed by the African Union as the primary tactic for fostering and accomplishing inclusive economic transformation. Africa's development strategies, such as Agenda 2063, the Sustainable Development Goals, and the 2011 Action Plan for the Accelerated Industrial Development of Africa by the African Union, all make it clear that industrial development is a prerequisite for inclusive growth, the generation of good jobs, and many other development objectives. A similar case is made by and permeates most of the strategic visions and development frameworks for the continent's regional economic blocs, including but not limited to EAC (2016), ECOWAS (2022), SADC (2020), and IGAD (2020).

Undoubtedly, African economies, cognizant of the essentiality of the industrial sector, have rekindled programs aimed at achieving fast industrialization. Policy and scholarly evidence now recognise that the time has come for a significant economic advancement centered on industrial expansion and exports, even if the continent has never properly experienced industrialization (Aiginger and Rodrik 2020; Scholz 2018). Whether Africa can become a provider of manufactured goods is now topical, given that manufacturing is essential to the continent's transformation. A major subject in current policy and empirical circles is the need for rapid industrialization in spite of obstacles such as natural resources endowments, political unrest, climate change, and poor governance. Large-scale industrial policies in Africa, and in the developing world, have broadly tended to reflect this need.

A key industrial policy strategy in many African economies is development of industrial parks (IPs) and other related or synonymous economic zones with the aim of accelerating rapid industrial growth. There are active industrial parks in 47 African countries, with the largest percentages in Morocco, Ethiopia, and Uganda (Agility 2021). This strategy has been dubbed a key catalyst for industrialization by the United Nations Industrial Organization (UNIDO 2018). The concept of IPs, for the most part as a policy tool, is not new, although only in recent years has it attracted significant interest to spur industrial growth and development. The concept originated in the early 19th century, during the Industrial Revolution. A pioneering industrial park known as Trafford Park was founded in Manchester, England, in 1896. Initially adopted by Europe and North America, industrial parks quickly began appearing in other regions (Karas 2012). The widespread success of these parks prompted other governments to integrate industrial parks into their economic strategies. Industrial parks have shown considerable efficacy in fostering industrialization and stimulating economic development. China's swift industrialization and economic growth are intricately connected to establishment of special economic zones (SEZs) and industrial parks, which have successfully drawn significant foreign direct investment (FDI), enabled the transfer of technology, and generated millions of employment opportunities, making them critical to China's ascent as a prominent global manufacturing hub (Zeng 2012). Furthermore, in Southeast Asia, nations such as Malaysia and Thailand have effectively employed industrial parks to enhance their industrial sectors, resulting in higher exports and more varied economies (Kumar 2020).

On the African continent, countries such as Egypt, Liberia, Mauritius, and Senegal, to mention but a few, had IPs in the 1970s (Wang 2021). In recent years, these parks have become more popular throughout Africa as a way to spur economic transition and industrialization. In line with the spirit of China's Belt and

Road Initiative, China and Africa began, around 2000, to jointly plan, build, and operate industrial parks, aiming to effectively utilise their respective comparative advantage. Egypt, Ethiopia, Kenya, and Nigeria have made large investments in creating industrial parks in an effort to draw in foreign capital, create jobs, and advance export-oriented manufacturing (AfDB, OECD, and UNDP 2017). Ethiopia, in particular, has seen considerable success (UNIDO 2018) with its Industrial Parks Program, which includes the Hawassa Industrial Park that is intended to strengthen the textile and garment sectors. The parks in the program have already attracted international corporations and produced thousands of jobs, supporting Ethiopia's goal of becoming one of Africa's manufacturing hubs. Kenya's Konza Technopolis, Uganda's Namanve, and Egypt's Suez Canal Economic Zone are notable instances of industrial parks that have been leveraged to promote industrial expansion and facilitate technical progress.

Conceptually, an IP is an area reserved for industrial development, usually near transportation hubs (Vidová 2010). According to the United Nations Industrial Development Organization (UNIDO), an IP is a tract of land developed and subdivided into plots according to a comprehensive plan with the provision of roads, transport, and public utilities, and, sometimes, facilities for use by a group of manufacturers (UNIDO 2021). It is an instrument of industrial policy designed by governments to attract investment so as to achieve economic growth and development (UNIDO 2021). Elsewhere, industrial parks have been viewed as geographically defined regions that are explicitly designated and constructed to facilitate industrial operations. These parks include common infrastructure, services, and facilities that are tailored to meet the requirements of manufacturing and production (African Times 2024). Strategically designed, these parks aim to attract investment, facilitate the creation of industries, and foster economic progress. By consolidating industries in one area, industrial parks facilitate the realization of economies of scale, decrease operational expenses, and promote cooperation among enterprises.

Many countries in Africa have promoted and developed industrial parks. Whether these parks have spurred industrial development is not well documented. Consequently, it remains difficult to identify the most important areas for intervention in the parks' development to maximise the parks' effectiveness. Africa has not done well overall in terms of industrial growth, notwithstanding some exceptions like Angola, Ethiopia, Tanzania, and Nigeria where value added and industrial output have been increasing (African Development Bank Group 2022). Africa has been mainly left out of the growth of global value chains due to subpar manufacturing results, and the continent's industrial value share in the world was estimated by the United Nations Economic Commission for Africa (UNECA) to have decreased from 1.9 percent in 1980 to just 1.5 percent in 2010 (African Development Bank Group 2022). Yet with proper industrial policies and instruments like IPs, Africa could emerge as the next industrial frontier on a global scale. This current study aims to shed light on the role played by IPs as a potential industrial policy instrument in Africa by answering the following questions:

1. Is industrial growth stimulated by the pursuit and eventual establishment of industrial parks?

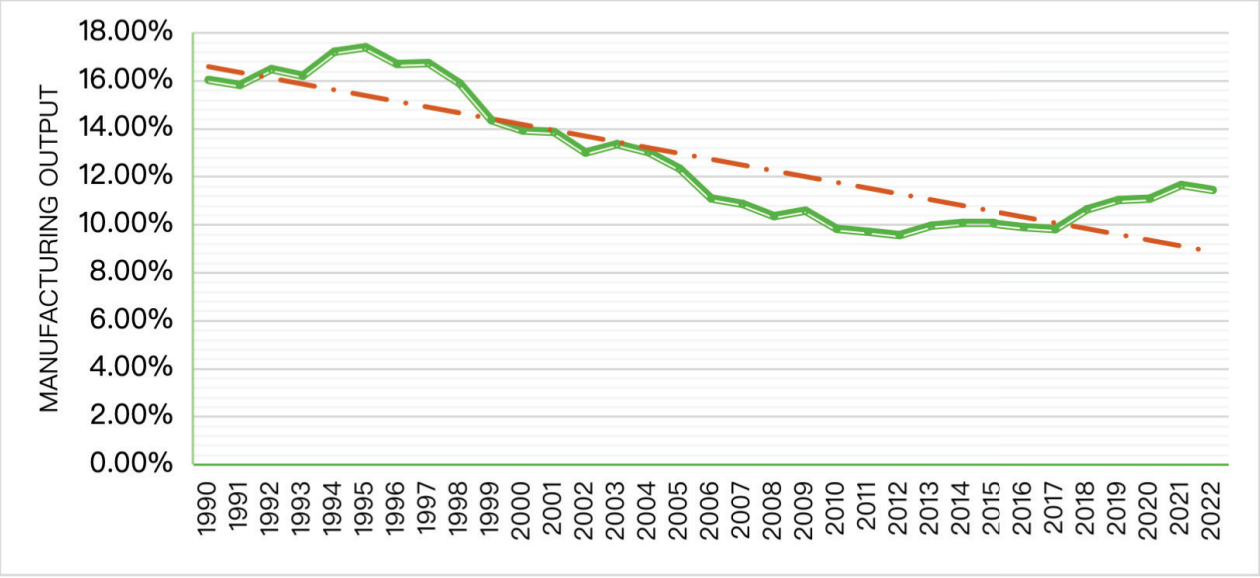
2. If so, what constraints impede the development and functioning of industrial parks in most African countries?

3. What funding and policy measures could speed up industrial expansion on the continent through IPs' development?

2. Status and Performance of the Industrial Sector in Africa

Africa's road toward industrialization has been marked by considerable hurdles but also encouraging advances. Industrialization is recognised as a key driver of economic transformation, fostering diversification, employment, and poverty alleviation. However, the industrial sector in Africa generates a mere 3 percent of the world's gross domestic product (GDP), and it represents only 2 percent of the global manufacturing value added (MVA) and 1 percent of global total manufacturing exports (UNIDO 2023). Industrial manufacturing in sub-Saharan Africa generally declined as a percentage of GDP from 1990 to 2022 (Figure 1).

Figure 1. Trends in sub-Saharan Africa's manufacturing output (percent of GDP), 1990–2022



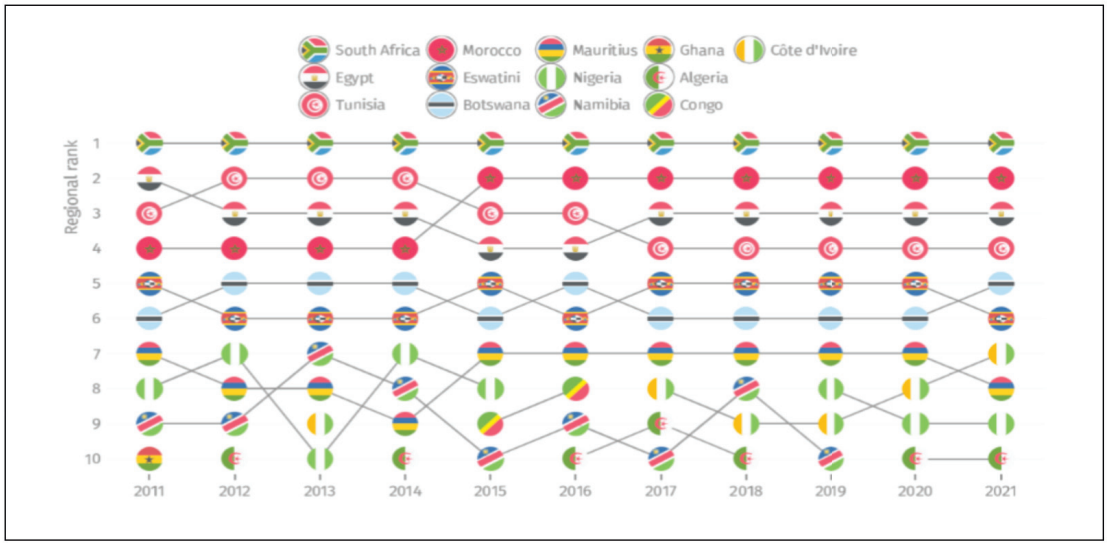
Source: Based on data from Macrotrends' "Sub-Saharan Africa Manufacturing Output 1981–2024," https://www.macrotrends.net/global-metrics/countries/SSF/sub-saharan-africa-/manufacturing-output.
Note: The dashed trend line shows that output has generally been on the decline despite some growth beginning in 2017.

MVA on the continent is 10.4 percent, with an annual growth rate of 3.6 percent. It contributes a manufacturing share of employment of 7.4 percent; this share has consistently increased everywhere on the continent with the exception of southern Africa. Regionally, northern Africa contributes the largest proportion of MVA. MVA has increased in western Africa in the past 10 years. Eastern and Central Africa consistently have the lowest MVA share on the continent.

Equally varied is the competition landscape of the continent. Throughout the last 10 years, South Africa has consistently maintained the highest ranking in the Competitive Industrial Performance Index, followed by Morocco, Egypt, Tunisia, Botswana, and Eswatini (UNIDO 2023). Accordingly, the most competitive economies in terms of industrial performance have been located in northern and southern Africa. Prominent manufacturing industries in Africa have included food items, non-metallic minerals, and beverages, with prospects in automotive and electrical equipment.

Overall, Africa is marked by nascent industrial activity and a substantial growth potential. The growth potential is evident in several nations that exhibit robust industrial growth, as shown by the Africa Industrialization Index (AII), which monitors industrial performance throughout the continent (Figure 2). South Africa, the most industrialized nation on the continent, routinely tops the AII with well-established sectors such as automotive, mining, and chemicals producing some 13 percent of its GDP (African Development Bank Group 2022). Egypt follows South Africa on the AII, with industrial activity accounting for 16 percent of its GDP, mostly driven by the Suez Canal Economic Zone, which fosters investment in electronics, chemicals, and logistics (African Development Bank Group 2022; UNIDO 2023).

Figure 2. Top 10 African economies in the Competitive Industrial Performance Index

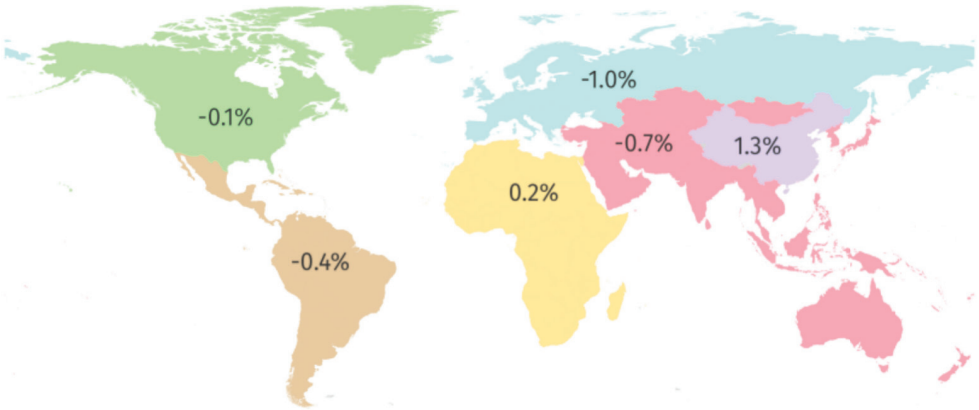


Source: Adapted from UNIDO (2023).

Morocco has established itself as a major global participant in the automotive and aerospace sectors, with industrial exports making a substantial contribution to its 18 percent industrial component of GDP (African Development Bank Group 2022). Tunisia also ranks high due to its focus on high-tech manufacturing, particularly in the electronics and aerospace sectors, which have driven its steady industrial growth.

Another promising signal is provided by UNIDO's quarterly world manufacturing production report for 2024. It shows that Africa is the only continent to exhibit growth (0.2 percent) in manufacturing output; China experienced a quarterly manufacturing expansion of 1.3 percent, reflecting an annual gain of more than 5 percent (Figure 3). Egypt (0.3 percent), Nigeria (0.7 percent), and Rwanda (2.6 percent) saw some of the highest growth rates, while Senegal (-0.6 percent) and South Africa (-0.9 percent) experienced declines in output compared with the previous quarter (Haq, Perveen, and Amin 2024).

Figure 3. Quarter-over-quarter growth rate of manufacturing output, by region



Source: Adapted from UNIDO (2024).

Countries with promising industrialization potential include Ethiopia, Kenya, and Rwanda, which have leveraged IPs to increase industrial growth potential. Ethiopia's Industrial Parks Program has made the country a manufacturing hub in textiles and garments, with the industrial sector growing at rates of 8–10 percent annually (Zhang et al. 2018). Kenya, meanwhile, is leveraging special economic zones to boost its industrial activity in agro-processing and electronics, aiming to increase its industrial contribution to 15 percent of GDP by 2030 (Government of Kenya 2024). Despite these successes, Africa's industrial sector overall remains small, contributing only 11–12 percent of the continent's GDP (African Development Bank Group 2022).

Efforts to industrialise across the continent are gaining momentum. Ghana's One District, One Factory initiative is designed to create jobs and spur industrial growth at the district level. In Rwanda, the expansion of SEZs is boosting industrial output, particularly in agro-processing and construction materials. Uganda's national industrial policy prioritises the establishment of industrial parks and investment in infrastructure to expedite the expansion of industry. Notably, initiatives such as the Kampala Industrial and Business Park are at the forefront of this effort (Albert Musisi 2021). Additionally, the establishment of the African Continental Free Trade Area is expected to dramatically increase intra-African trade and build regional value chains, which will provide new prospects for the expansion of industrial activities across the continent.

3. Industrial Parks and Industrial Growth in Africa

This study used both literature reviews and regression analyses to gain insights into the effects of industrial parks on industrial growth on the continent.

3.1 Insights from Empirical Literature

The existing literature on the impact of industrial parks in stimulating industrial development in Africa is abundant and expanding as the continent strives to narrow the gap with the western world in terms of

global economic advancement. Academic and policy inquiries consistently highlight the predominantly positive impacts of these parks.

El Massah (2018) investigated the impact of eco-industrial parks on industrialization in Egypt. The research evaluated the impact of environmental intervention programs on industrial development by analyzing three specific case studies: Robbiki Eco-Leather Park, El-Safaa Metal Foundries Zone, and Shaq Al-Thu'ban Marble Technology Park. The results suggest that economic investment programs play a vital role in advancing industrialization by improving production efficiency, encouraging innovation, and promoting sustainable industrial practices. As a result, they are indispensable in Egypt's industrial growth plan.

The findings from El Massah align with the Egyptian government's industrial development strategy (Government of Egypt 2012), which affirms that industrial parks in Egypt, including those in Alexandria, Port Said, and the Suez Canal Economic Zone, have been instrumental in promoting industrial development by attracting foreign investment, stimulating economic growth, and generating employment opportunities. These parks play a crucial role in improving Egypt's industrial sector by offering specialized infrastructure and resources that enable large-scale manufacturing and facilitate seamless integration into global supply networks. Their progressive growth has heightened industrial production, enhanced competitiveness, and built a more robust economic base for the nation, helping propel industrialization and promote economic prosperity.

Seyoum (2024), Roberto and Koranchelian (2023), and Jaouhari, Stour, and Ali (2023) assessed the effect of industrial parks on industrialization in Morocco. Available evidence highlights that well-managed industrial parks play a crucial role in strengthening the manufacturing sector and diversifying the economy. Some scholarly investigations highlighted that the investment of $131 million in the development and enhancement of 11 industrial parks was anticipated to attract more than $500 million in private investment and create more than 80,000 jobs. These investigations underscore how these parks drive substantial economic growth by bolstering industrial output, creating employment opportunities, and fostering sustainable development through improved infrastructure and effective governance.

Tesfaw (2023) undertook a comprehensive analysis of the effect of industrial parks on Ethiopia's industrialization, with a specific emphasis on export revenues, job generation, and FDI. Using both statistical and qualitative analytical methods, the study determined that industrial parks had greatly bolstered Ethiopia's economic development. More precisely, the establishment of these parks resulted in considerable growth in export revenues, marked by a statistically significant effect ($p < .001$), and created enormous job prospects. The parks also drew significant FDI, which further bolstered industrial expansion. These empirical findings accentuate the vital role of industrial parks in propelling Ethiopia's industrial sector by enhancing exports, generating employment opportunities, and attracting foreign investment.

Bassi, Manwaring, and Sarasola (2023) discovered that industrial parks in Uganda make a substantial contribution to industrialization by positively impacting domestic sales, purchases, and wages for the companies operating within them. By providing infrastructure and subsidised land, these parks

encourage productive investment, enabling companies to overcome obstacles associated with property rights and high land costs. Collaboration and innovation are fostered by the concentration of enterprises inside these parks, resulting in enhanced productivity and industrial growth. These parks stimulate domestic economic activity, attract investment, and enhance productivity, thereby bolstering the country's industrial sector and establishing a foundation for future competitiveness and export potential.

Ochieng (2020) examined the impact of industrial zones on industrialization in Kenya through a mixed-methods approach that included surveys of 100 workers and interviews with 20 managers conducted between 2018 and 2020. The study found that these zones have played a significant role in creating jobs and boosting exports, contributing to Kenya's industrialization efforts. The zones have become key drivers of industrial growth by facilitating increased production and export activity, thereby strengthening Kenya's position in global trade. Similarly, Waweru (2021) emphasised the role of industrial parks in promoting economic growth through enhanced industrial output, while Kamau (2020) underscored the importance of these parks in attracting foreign investment by offering a conducive environment for industrial activities. Together, these studies highlight the crucial role of industrial parks in advancing Kenya's industrialization by fostering export growth, creating employment opportunities, and attracting investment. However, other scholarly evidence shows that special economic zones have not achieved their objectives (Kyule and Wang 2024).

Ackah, Osei, and Kusi (2024) use variance analysis, treatment estimation, and regression models to examine the impact of SEZ dynamics/features on firm performance in Ghana. The study covers 328 firms from 2018 to 2021 and focuses on key indicators such as total factor productivity, labor productivity, profitability, revenue generation, and value added. The study indicates that companies operating under SEZ dynamics experience different and noteworthy impacts on their performance. Firms registered as SEZ firms and operating within or even outside SEZ enclaves have notably positive performance indicators. Conversely, firms not registered as SEZ firms and operating outside SEZ enclaves do not. Special economic zones have played a pivotal role in advancing industrialization by fostering manufacturing activities and integrating Ghana into global trade networks. These findings corroborate earlier studies on Ghana’s industrial zones, for instance, Ackah, Osei, Owusu, and Acheampong (2023).

Chikhuri (2022) provides evidence of IPs on Mauritius. A more diverse industrial basis is the focus of Chikhuri's investigation into the evolution of Mauritius's strategic change from an economy based on sugar production to one that is more diversified. The report chronicles the path that the country has taken in terms of its industrialization, detailing how Mauritius has used industrial upgrading to transition into industries such as manufacturing, tourism, and services, and, more recently, real estate. One of the most important aspects of this change has been the establishment of important industrial zones, most notably the Export Processing Zone of Mauritius, which was vital in the expansion of the textile sector. In addition, Chikhuri investigates the establishment of key hubs, such as the Ebène Cybercity, which is positioned as a technological and commercial hub, and the JinFei special economic zone, which is aimed at attracting foreign investment and supporting economic growth. These hubs have played a significant role in propelling the island's industrialization and economic progress, attesting to the flexibility of the island country of Mauritius to adjust to different economic trends around the world.

Chauke (2022) conducted a comprehensive evaluation of the function of industrial zones in South Africa's economic development, with a specific emphasis on their influence on the generation of employment and FDI. The report emphasises that implementation of industrial zones has served as a strategic policy instrument to stimulate industrial and infrastructure growth in certain geographical regions. Since embracing democracy in 1994, industrial zones have made a major contribution to South Africa's economic development by attracting considerable FDI, promoting industrial growth, and generating millions of employment opportunities. These zones have been crucial in broadening the economy, decreasing dependence on a limited variety of exports and primary production, and improving employment rates, thereby playing a vital part in the country's industrialization and general economic progress. These findings are corroborated by Chauke, Mamokere, and Mmabeba (2023).

In summary, the available literature generally reveals that industrial parks in Africa have had a positive effect on industrial performance, and thus reaffirms the relevance of industrial policy as a tool for improving the industrial prospects of countries not only worldwide but also in Africa, specifically.

3.2 Findings from Regression Analyses

This analysis starts with a descriptive statistical analysis using means and standard deviations for centrality and dispersion, respectively. Table 1 summarises the results for the sampled SSA countries, both countries with industrial parks (WIPs) and those without industrial parks (NIPs). Columns 2 and 3 present the overall group means, and columns 4 and 5 present the overall group standard deviations.

Table 1. Descriptive statistics for variables in WIPs and NIPs countries

	Overall Means		Overall Std. Deviations		
Variable	WIPs	NIPs	WIPs	NIPs	*P>|t|*
industrial_gdp	26.937	25.983	11.976	12.450	0.670
regulatory_quality	–0.459	–0.656	0.624	0.499	0.197
gdp_growth	3.605	3.647	4.825	5.685	0.926
fdi	3.546	2.595	5.522	4.156	0.142
gfcf	23.333	18.455	9.670	8.102	0.006
trade_openness	77.150	59.726	39.543	27.443	0.045
inflation	14.138	101.08	46.85	1175.7	0.224

Source: Afrexim Bank's computations based on data.
WIPs = with industrial parks; NIPs = without industrial parks

In the last column are p-values, which are associated with the "raw" differences between the group means of the WIPs and NIPs countries in the sample.[7] These values were generated using the stata command "reg outcomevar Industrial_parks, vce (cluster country)" to sidestep hitches in conducting T tests on group means in panel data.]7 With one exception, the overall unadjusted means for WIPs and NIPs countries are not significantly different with respect to industrial contribution to gross domestic product (industrial_gdp), industrial growth (gdp_growth), and the other variables. The difference between the overall unadjusted means for WIPs countries and those for NIPs countries with respect to trade openness suggests that industrial growth can stimulate exports, as manifested in the manufacturing subsector's increased contribution to GDP. The insignificance of group means for GDP (p-value is 0.165) is a probable pointer to the relative strengths of sectoral contribution to GDP among economies on the continent. Mauritius's service sector, especially finance and banking, has been pivotal in the Mauritian economy, much like industrial manufacturing in Egypt and South Africa. The lack of significant differences between the WIPs and the NIPs masks much-needed insights into the hypothesised effect of industrial parks on industrialization of economies.

The previous descriptive statistics are inadequate to answer this study's first research question. Regression techniques shed more light on the effect of industrial parks on industrial growth or contribution to gdp. For this endeavor, this study models industrial growth as a function of "pursuit of industrial park policies" and then controls for other variables thought to stimulate industrial development among sampled countries in sub-Saharan Africa. These control variables include rate of growth in gross domestic product (gdp), which is used as a proxy for domestic market strength to support industrial growth; foreign direct investment (fdi), which is thought to spur industrialization in terms of furtherance of investment and closing capital gaps; gross fixed capital formation (gfcf), which is equivalent to investment when viewed through the lens of change in capital stock over time; trade openness (trade_openness); and inflation as a proxy for macroeconomic stability, which is taken as an indicator of institutional quality and political stability. Data for all these variables was obtained from the World Bank's World Development Indicators (WDI) database and Worldwide Governance Indicators (WGI) database.[5] These variables were measured as shown in Table 2.

Table 2. Selected variables, their source, and how they were measured

Variable	Measurement	Source
Industrial growth	Annual growth rate for industrial (including construction) value added based on constant local currency. Aggregates are based on constant 2015 prices, expressed in U.S. dollars. Industry corresponds to International Standard Industrial Classification (ISIC) divisions 05–43 and includes manufacturing (ISIC divisions 10–33). It comprises value added in mining, manufacturing (also reported as a separate subgroup), construction, electricity, water, and gas. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the ISIC, revision 4.	World Development Indicators (WDI)
Industrial parks	A binary variable reflecting the date that a sampled country set up its first industrial park or zone.	Websites
GDP	Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2015 prices, expressed in U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.	WDI
FDI	Foreign direct investment reflects the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, and it is divided by GDP. It also is expressed as a percentage of GDP.	WDI
Inflation	Inflation was measured by the annual growth rate of the GDP implicit deflator, which shows the rate of price change in the economy as a whole. The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency. It was also measured as a percentage.	WDI
Gross fixed capital formation	Measured as percent of gdp. It involves building roads, railroads, and similar infrastructure, such as schools, offices, hospitals, private residences, and commercial and industrial structures. It includes purchasing plant, machinery, and equipment. It also includes land improvements (fences, ditches, drains, and the like).	WDI
Political stability	The Worldwide Governance Indicators (WGI) are a research dataset summarising governance quality views captured in surveys of enterprises, citizens, and experts in industrialised and developing countries. The data are gathered from survey institutes, think tanks, nongovernmental organizations, international organizations, and private sector firms. The WGI do not reflect the official views of the Natural Resource Governance Institute, the Brookings Institution, the World Bank, its executive directors, or the countries they represent. The World Bank Group does not use the WGI to allocate resources.	Worldwide Governance Indicators (WGI)
Corruption	See description of WGI above.	WGI
Regulatory quality	See description of WGI above.	WGI

Using the variables in Table 2, this study specifies and estimates a panel model based on equation 1.0

$$y_{it} = a + \beta y_{it-1} + \lambda_0 IP_{it} + \lambda_1 gdp_{it} + \lambda_2 fdi_{it} + \lambda_3 gfcf_{it} + \zeta_i + \eta_t$$
$$\lambda_4 \inf_{it} + \lambda_5 corruption_{it} + \lambda_6 pol\_stab_{it} + \lambda_7 regulatory + \varepsilon_{it}$$

(1.0)

In (1.0), y_{it} is the dependent variable, that is, industrial growth, and y_{it-1} is its lag. λ_0 is the parameter of interest, and IP_{it} denotes the dichotomous variable of industrial parks. The rest of the variables are, in order, gross domestic product (*gdp*), foreign direct investment (*fdi*), gross fixed capital formation (*gfcf*), inflation, corruption, political stability, and regulatory quality, respectively. a_i , β , λ_0 ..... λ_7 are the intercept and the coefficients to be estimated, respectively. ε_{it} is the idiosyncratic error term, ζ_i captures the country-level fixed effects or it is the group-specific heterogeneity, and η_t captures the time effects.

3.2.1 The Industrial Park Variable

To derive the variable that captures industrial parks as a policy instrument, the study used information culled from the websites of sampled countries from 1990 to 2022. For the years leading up to the launch of a country's first industrial park or zone, the value of the variable was 0. The value of the variable was 1 for the years that a country had at least a single industrial park in place. Consequently, this dichotomous variable was 0 throughout the period for countries like Malawi and Burundi, which launched their first industrial parks or zones in 2024, but 1 throughout the period for countries like Mauritius, which had industrial parks in the 1970s.

3.2.2 The Sample

We used a sample of 39 countries in sub-Saharan Africa (SSA). Accordingly, manufacturing giants like Egypt and Morocco were eliminated from the sample. Six countries in SSA were dropped from the sample because the launch date of their first industrial park or zone could not be established. These countries are Burkina Faso, São Tomé and Principe, Madagascar, Guinea, Guinea Bissau, and Comoros. Other countries, including South Sudan and Eritrea, were eliminated from the final sample because data on key variables were unavailable.

3.2.3 Estimation Method

The study employs the fixed effects (FE) estimator to estimate equation (1.0) with all the necessary pre- and post-estimation tests, the results of which are available on request. Table 3 presents the regression results for the estimation. Column 2 contains the results based on a pooled OLS estimation, column 3 contains fixed effects results, and the last column contains the dynamic FE results with robust standard errors in parenthesis.

Table 3: Effect of industrial parks on industrial growth in Africa

Full sample:	Estimated Coefficients		
Variable	Pooled	Fixed Effects (FE)	Dynamic FE
Industrial_VA_ percent gdp			
lag_industrial_VA_ percentgdp	---	---	0.788*** (0.039)
industrial_park	7.209** (3.404)	1.571* (0.827)	0.607 (0.459)
lag_industrial_park	–4.566 (3.385)	–2.981** (1.459)	–1.136* (0.554)
gdp_growth	–0.0065 (0.117)	0.192** (0.084)	0.218*** (0.042)
lag_gdp_growth	–0.097 (0.112)	0.104** (0.042)	–0.042 (0.027)
fdi	0.009 (0.103)	0.130* (0.081)	0.022 (0.051)
lag_fdi	0.053 (0.102)	---- ----	0.017 (0.043)
gfcf_growth	0.0004 (0.005)	0.006*** (0.001)	0.002*** (0.0006)
lag_gfcf	–0.006 (0.019)	–0.017 (.012)	–0.002 (0.004)
regulatory_quality	–4.622 (1.417)	0.865 (3.119)	0.891 (0.859)
inflation	–0.001 (0.004)	–0.002 (0. 003)	0.003* (0.002)

corruption	−4.678***	−0.439	−0.395
	(1.317)	(2.819)	(0.671)
political_stability	0.257***	----	----
	(0.039)	----	----
constant	14.735***	26.889***	5.437***
	(1.850)	(1.038)	(1.151)
№ of observations	657	660	656
R-squared	0.096	0.07	0.929
F-test and Prob>F	5.70 (0.000)	138.61 (0.000)	786.52 (0.000)

*** p<.01, ** p<.05, * p<.1

Source: Afrexim Bank's computations based on the World Bank's World Development Indicators data for 2022.

Table 3 reveals that industrial parks have a positive and significant effect on industrial growth in SSA. In the pooled and fixed effects estimations, the coefficient on the industrial park variable is positive at 5 percent and statistically significant at 1 percent. This result tends to imply that the use of industrial parks as an industrial policy instrument comes with positive effects and tends to spur industrial growth and development. The effect remains positive, although not significant, even in the dynamic estimation. The coefficient on this lagged variable is actually negative in pooled and FE estimations. This negative effect is likely reflective of the huge costs to set up industrial parks—costs that may require countries to reallocate resources from other key projects. More than 56 million euros were invested in the establishment of special economic zones in Lithuania; some of that money came from Lithuania's national budget and some from the European Union (Vabuolytė and Burinskiene 2020).

The study controlled for GDP growth due to its hypothesised effect on industrial growth via domestic market strengthening. The resilience of domestically oriented FDI and indigenous investment relies on robust domestic aggregate demand, which ensures a continuous need for products and services. This need is quite significant in promoting industrial investment. Notably, export markets, particularly regional economic blocs such as the Economic Community of West African States and the Common Market for Eastern and Southern Africa, can also drive industrial growth.

GDP reveals positive effects on industrial growth with a statistically significant coefficient of 0.192 for the FE and 0.218 for the dynamic FE. FDI posts positive and statistically significant results for the FE estimation in model 2 (FE), the result being significant at 10 percent. This result lends credence to the long-held belief that FDI is linked to the transfer of technology and the impacts of spillover, both of which stimulate the growth and development of the industrial sector. The finding is in line with available empirical evidence. For instance, Etukafia, Enang, and Ele (2024) find a positive association between FDI and industrial growth in Nigeria.

The study also controlled for the rate of further investment in the sample of countries by using the growth rate in gross fixed capital formation. Notably, the change in capital formation over time is equivalent to investment. Although the coefficient is small, it is statistically significant at 1 percent in both the fixed and dynamic fixed estimations. This result is in line with findings by Kesar et al. (2023) indicating the vitality of gross fixed capital formation in enhancing industrial growth and development.

The study controlled for trade openness (estimation results available on request). It found the coefficient on trade openness is negative, although insignificant, in FE and the dynamic FE. This result is likely indicative of the high and continued exportation of raw materials rather than of exportation of processed or value-added products that typifies African economies. Exportation of raw products stifles industrial development. Yet industrial giants like England are known to have restricted such exportation in a monopolistic and monopsonistic manner, making industrial processing inevitable (Adam and Ahamat 2023). By restricting raw material exports, domestic and foreign capitalists are encouraged to invest in country-of-origin processing because it becomes more competitive when compared with raw exportation and foreign processing (Schulz 2020).

As expected, inflation posts a negative coefficient, indicating that high inflation levels affect industrial growth, although the negative effect is insignificant. This result is likely indicative of the role of mild inflation in incentivising investment, especially from the private sector. But in the dynamic model, the effect is positive and statistically significant, indicating that mild increases in the general price level are an incentive for investment, including investment in industrial sectors. And descriptive statistics revealed lower inflation in WIPs countries than in NIPs countries. As expected, corruption negatively affects investment, including investment that would go to industrial development in parks. This study uses corruption as a measure of institutional quality. This study finds the effect to be insignificant though, and empirical evidence shows that it may differ in the short run than in the long run (Bekoe, Jalloh, and Rahaman 2022).

The study also controlled for political stability. To guarantee the stability of FDI, which is crucial for the industrial sector, African economies must be free from violence and conflict and enjoy both strong governance and pricing stability (African Development Bank Group 2024). Political stability positively affects industrial growth and development because no economic activity can flourish amid chaos. Mogadishu Industrial Park in Somalia is struggling, in part, due to more than 20 years of insecurity. The Sudan conflict has brought most economic activities to a standstill. The industrial park constructed by Henan Guoji Construction Group in 2002 in Sierra Leone successfully enticed numerous Chinese companies and converted a deserted railway station into a highly efficient location for production, therefore reinforcing the emerging pattern of Chinese investment in Africa. Nevertheless, the park failed to endure the civil war that ravaged the nation. In the results for the pooled model, its coefficient (0.257) is positive and statistically significant. Furthermore, political instability is detrimental to innovation, one of the central aims of IPs' development, due its negative effect on patenting economic activity (Okrah and Hajduk-Stelmachowicz 2020).

4. Constraints to Industrial Parks' Development and Functionality

Intriguingly, Africa's share of industrial production globally remains dismal. As highlighted earlier, Africa's manufacturing output has fallen to less than 2 percent of the world's total in recent decades, and a large number of the continent's economies still rely heavily on unimproved commodities, making them susceptible to changes in demand throughout the world (African Development Bank Group 2022). For this reason, this study set out to examine some of the underlying constraints to industrial growth, especially those that tend to hamstring accelerated development and the contribution of industrial parks on the continent. For this endeavor, the study used critical literature review methods.

One of the most prominent challenges facing industrial parks across the continent is infrastructural deficiencies. While significant progress has been made in developing physical infrastructure, challenges remain. Inadequate infrastructure, such as unreliable electricity supply, poor transportation networks, and insufficient water and sanitation facilities, still pose significant barriers to the efficient operation of industrial parks. These infrastructural deficiencies can disrupt manufacturing activities, increase transportation costs, and delay the movement of goods, ultimately affecting the competitiveness and growth potential of businesses within these parks. In Nigeria, the Calabar Free Trade Zone suffers from frequent power outages, which significantly disrupt manufacturing activities (Nwakaego et al. 2022). Similarly, in Kenya, the Athi River Export Processing Zone is hampered by poor road conditions that increase transportation costs and delay the movement of goods (Ouma 2020). Ethiopia's Bole Lemi Industrial Park grapples with insufficient water supply, which affects operations, particularly in the textile and garment industries (Gebreeyesus 2019).

Most of the industrial parks in SSA have been designed to house foreign investors, giving little room to indigenous industrialists. While foreign companies might serve as a springboard for the development of competitive domestic industries, they can also impede progress by neglecting to pass technology to domestic businesses and to establish reciprocal relationships within the national economy (Whitfield, Staritz, and Morris 2020). This problem is worsened when IPs are designed in a manner that further reduces the proximity between foreign-owned firms and indigenously owned firms, as it was in Ethiopia, for example. Evidence has shown that IPs continue to be stuck in enclave operations with little to no connections to the overall economy (Tesfachew 2021). Denying potential agglomeration advantages to indigenously owned industrial firms reduces the possibility of forward and backward linkages and, above all, the associated technology spillovers that are central to the growth of these firms. Ultimately, reducing the proximity of these firms to foreign-owned firms undermines what makes industrial parks unique: their goal to promote innovation or production in specific areas by giving their tenant companies the best possible conditions to innovate, grow, and share their knowledge. This goal is what makes IPs instruments for stimulating economic transformation rather than mere containers of economic activity.

Policy designs to support IP development have tended to ignore long-term gains. The short-term gains of IP development include employment creation, stimulation of exports, and foreign exchange earnings. Long-term gains include the effects on the country's economic transformation in terms of technology transfers, forward and backward linkages, demonstration effects, and other spillovers (Tesfachew 2021). Less emphasis on long-term gains by IP policies in SSA and the continent at large has perpetuated the

operation of IPs as little more than production enclaves, with insignificant impacts on industrialization agendas. Unsurprisingly, the continent's share of global industrial manufacturing output is dismally low at less than 5 percent. In Uganda, the IP development strategy is largely hinged on broadening employment creation, stimulating exportation, and attracting foreign investment (Uganda National Planning Authority 2020). In Namibia, the main goals of special economic zones are to boost exports, draw in both domestic and foreign investment, create jobs, and serve as a catalyst for industrialization and structural change (Government of Namibia 2021). In Ghana, the core objectives of IP and SEZ development are to (1) encourage the geographical dispersion of industrial development to reduce poverty and economic inequality and create jobs; (2) expand economic activity throughout the nation and enhance access to utility services, free land, and litigation; (3) support growth and economic activity by offering an institutional framework, cutting-edge services, and physical infrastructure that may not be found elsewhere in the nation; and (4) promote the establishment of industrial clusters for networking and cascading effects (GIPC 2022). In all these examples, short-term gains are prioritised.

Regulations and policies are inconsistent. In Tanzania, for instance, inconsistent policies regarding tax incentives have deterred investors from fully committing to the country's industrial parks. In Ghana, bureaucratic red tape and delays in the issuance of permits have been identified as major challenges within the Tema Industrial City (Oppong 2020). Similar problems have been reported in Morocco's Tangier Free Zone, where overlapping regulations have caused confusion and delays (El Haddadi, Mourabit, and El Haddadi 2021). The absence of stringent rules suggests inadequate governance and inconsistent implementation of laws, resulting in higher company expenses, corruption, and an uncertain investment environment. Inadequate regulation in this environment discourages high-quality corporations and foreign direct investment, diminishes the competitiveness of enterprises within industrial parks, and leads to environmental and social problems. Furthermore, it weakens the efficacy of industrial parks in promoting sustainable industrialization.

Acquisition of land for industrial parks frequently results in disputes and postponements. The Kampala Industrial and Business Park in Uganda has encountered considerable setbacks stemming from conflicts regarding land compensation and the displacement of local communities (Nakiyaga 2022). In Rwanda, the Kigali Industrial Zone encountered opposition from local communities that received insufficient compensation for their land (Bizimana and Twesigye 2021). The challenges are especially pronounced in regions with high population density and little land availability, as exemplified by Egypt's Suez Canal Economic Zone (Soliman and Soliman 2022).

As industrial parks increase, environmental sustainability becomes a pressing issue. The Coega Industrial Development Zone in South Africa has been criticised for its role in environmental deterioration. Local communities have expressed apprehensions over pollution and its effects on public health (Africa 2010). The Gabès Industrial Zone in Tunisia has been accused of contaminating adjacent water bodies, therefore endangering local agricultural and fisheries (Chatti 2019). These environmental concerns are especially urgent in countries with inadequate regulatory enforcement.

Skilled workforces are lacking. The Gaborone Industrial Park in Botswana faces a scarcity of technically proficient personnel, impeding productivity and constraining the operational efficiency of enterprises. An inadequate supply of highly trained workers has required the Lusaka South Multi-Facility Economic

Zone in Zambia to seek foreign workers (Mwale 2023). Despite the effectiveness of industrial parks in attracting investment in Ethiopia, a notable skills gap hampers the capacity of local workers to fulfill the requirements of foreign corporations (Workenh Eshatuu, Eshetu, and Shemilis 2022). Lack of skilled workforces inhibits firms' expected contribution to industrial output and the country's export capacity.

Securing financial resources for industrial parks is expensive and difficult. Elevated interest rates, intricate financing processes, currency volatility, and the absence of specialised financial institutions make securing financial resources for IPs expensive and difficult (African Development Bank Group 2024). Egypt and Nigeria have experienced interest rates exceeding 15 percent, resulting in elevated borrowing costs for investors (Nairametrics 2024). In Uganda and Malawi, interest rates can go as high as 18 percent and 25 percent, respectively (Wang 2021). The fluctuation of currency presents another challenge. The depreciation of the South African Rand, for instance, resulted in heightened costs for companies dependent on imported materials, thereby impacting their profitability (UNIDO 2020). Moreover, the limited presence of specialised financial institutions in numerous countries constrains access to financial resources. Industrial parks with limited alternatives turn to informal lenders who impose exorbitant interest rates (Independent Evaluation Group 2019). Access to credit is crucial for both major corporations and micro, small, and medium enterprises (MSMEs) to fund necessary capital acquisitions or research and development activities. In the case of MSMEs, the domestic financial sector typically serves as the sole provider of credit (African Development Bank Group 2022). In Zimbabwe, protracted approval processes and burdensome documentation prerequisites dissuade potential investment (African Development Bank Group 2018).

In a related vein, the low credit rating of the majority of African economies has been blamed for the poor performance of businesses in industrial parks. Due to that rating, investors in parks are significantly hindered in their ability to use African assets as mortgages in foreign finance. In the second half of 2021, for example, only nine countries had a positive sovereign credit rating (UNECA and African Union Commission 2021). Low ratings maintained over time not only prevent the private sector from receiving support to get access to the global financial market, but also impede the efforts of nations to attract FDI and develop robust local capital markets. According to a United Nations Development Programme report presented at the World Bank Group-International Monetary Fund Spring Meeting in Washington, DC, in April 2023, the estimated financial consequences of prejudiced credit ratings on African nations amounted to USD74.5 billion. Furthermore, during times of economic turbulence, African nations may implement foreign exchange control measures that have the potential to hinder the movement of capital to businesses.

5. Policy Options for Improving IPs' Performance in Africa

The literature and other data analyses presented in the preceding sections brought to light the fact that the continent's industrial performance on a worldwide scale, particularly in the manufacturing sector, is far lower than 5 percent. The influence of industrial parks is not as significant as policymakers and other stakeholders on the continent would like it to be. The likely reason: intrinsic elements that tend to impede industrial parks from fostering industrial expansion. This study proposes several policy options to make these parks more efficient instruments for expanding industrial activity on the continent.

Strengthen public-private partnerships (PPPs) in IP development and use. Through cooperative investments and subsidies, PPPs can lessen financial barriers that tend to hamstring IPs on the continent. Parties are more inclined to contribute to sustainable projects as a result, leading to growth and development of eco-friendly IPs. Sharing of risks by public and private entities eases financial strain and encourages funding for environmentally friendly initiatives (Dierink 2024). Such initiatives are currently favored in most industrialising countries globally.

Stimulate export-led industrialization following the "flying geese" pattern. The experiences of Brazil, China (Shenzhen), the Dominican Republic, and Mauritius are a testament to the efficacy of this strategy, which is less embraced in IP planning frameworks in some African countries. For instance, the strategic objectives of Ghana's framework are largely domestic (GIPC 2022). Export-oriented IPs are likely to attract foreign industrial investors, even when the domestic market is small, as it is in most low-income economies of Africa. African countries could emulate the model of some Asian tigers' model of gradually moving from technologically simple, labor-intensive goods to high-tech export goods. For instance, in South Korea, iron ore accounted for 13 percent of all exports in 1961, textiles and clothing for 29 percent of total exports in 1980, and electronics for 29 percent of total exports in 1989 (Azmach 2019). As of 2022, this Asian nation was the ninth largest exporter globally (SEPO 2024). As export-led industrialization strategy would entail intentional policy choices about who gets access to IPs in African economies, as opposed to haphazard selection of investors who meet the financial requirements. Moreover, two of the four appropriate categories of industrial parks for Africa are market-oriented industrial parks catering to textiles, food, electronics, and other consumer goods and export-oriented industrial parks, which are facilitated by tariff relief and tax deductions policies (Wang 2021).

***Accelerate technology adoption to increase efficiency, streamline logistics, upgrade infrastructure, and leverage trade agreements on the continent*,** including the Africa Continental Free Trade Area. Findings from the reviewed literature indicated that infrastructural constraints inhibit IPs' functionality and help account for the apparent lack of tenant firms in Kenya, Namibia, Uganda, and other African countries. Businesses are deterred from sourcing products from African countries due to delays caused by the continent's inadequate investments in ports, highways, and rail infrastructure.

Link IP design to policy reforms that not only incorporate local content but also feed into more comprehensive development plans for African economies. Most IPs are established in anticipation of attracting foreign investment in the industrial sector. Such investment spurs industrial growth through technology transfer and other spillover effects that stimulate native industrial development. But from 1990 to 2022, net inflows of foreign investment did not significantly stimulate industrial growth on the continent. For that reason, legislation aimed at conditioning foreign firms' access to IPs to pegged levels of local content is imperative (UNCTAD 2023). Such legislation will stimulate forward and backward linkages between foreign firms and indigenously owned firms and will encourage knowledge diffusion and local firms' growth, likely encouraging local acquisition of space in IPs to eliminate the problem of dormancy, which is exemplified by the Namibia Industrial Development Agency's 30 industrial parks ("30 NIDA Industrial Parks Dormant," 2023).

International experience reveals that IP development should be part of a country's broader economic development strategies. In China, industrial parks acted as a platform for drawing foreign direct

investment, sped the growth of China's export-oriented manufacturing sector, and spurred broad economic changes that were eventually implemented across the entire economy (Azmach 2019). In Africa, IPs have long been a key policy tool in the economies of Egypt and Mauritius, enabling a highly successful process of industrialization and economic diversification. If these economies' models are replicated elsewhere in Africa, the positive effect of industrial parks is likely to be amplified.

Promulgate policy to promote business-to-business linkages in African IPs. Available statistics show that most of the private sector enterprises in Africa are MSMEs. It is generally agreed that micro, small, and medium-sized businesses are the most essential engine of innovation, growth, job creation, and social cohesion in the majority of rising economies. MSMEs are responsible for more than 50 percent of employment and 40 percent of GDP in these countries, and they make a significant contribution to poverty alleviation (Ssettimba, Kamarun, and Azman 2020). Available empirical evidence identifies linkages with large firms—particularly foreign-owned private firms—as an enabler of MSMEs' development and competitiveness (Kweka and Fadhili 2020). Accordingly, to enhance the contribution of IP tenant firms to industrial growth, countries should nurture partnerships with large firms, especially foreign-owned firms, by pursuing three strategies:

- ***Encourage export-oriented foreign investments while enthusiastically promoting domestic investors.*** Developing local enterprises that can compete both at home and abroad while meeting employment goals will foster business linkages. Deliberate sector prioritization (in this case, industry) should permeate this effort because, for example, MSMEs in the manufacturing sector are 2.7 percent more likely to participate in forward linkages than MSMEs in the mining sector, while SMEs in the electricity sector are 24 percent less likely to participate in technology linkages than SMEs in the mining sector (Kweka and Fadhili 2020; Ssettimba, Kamarun, and Azman 2020).

- ***Implement governmental frameworks that agglomerate the production of MSMEs with major corporations, particularly those owned by foreign entities.*** A portion of the land in African countries' IPs can be designated for the exclusive use of MSMEs. The closer MSMEs are to large firms, the greater the probability of business links between the two.

- ***Target incentives to input-supply-oriented MSMEs to increase and strengthen local and foreign business linkages.*** In conjunction with this effort, countries should attempt to lower costs, enhance quality, and ensure a reliable supply of commodities in the local market by local businesses. The dynamics of global production favor the establishment of commercial connections between foreign direct investments and the suppliers of those investments. Foreign direct investments are focusing on their core activities while outsourcing other tasks. They consider cost, quality, reliability, and flexibility before making the decision to source locally or abroad. For this reason, national governments ought to promote and facilitate efforts to ensure that local sourcing reduces costs, enables tighter monitoring, and provides better flexibility in terms of modifying requirements and producing new inputs.

6. Emerging Issues and Conclusions

The impact of industrial parks on the industrial expansion and development of the continent is significant. Nevertheless, this contribution remains insignificant, as evidenced by the small proportion of the continent's industrial production on a global scale. Current research indicates that the continent's industrial production has not yet become integrated into global value chains. Although industrial parks have long been acknowledged as a strategic instrument for industrial strategy, they have only recently gained significant traction in Africa. They now exist in at least 47 countries throughout the continent.

Some of the most significant obstacles to development of industrial parks and their contribution to accelerated industrial development are deficiencies in infrastructure, inconsistencies in regulatory and policy frameworks, conflicts and delays in land acquisitions, concerns regarding environmental sustainability, and the expense of acquiring financing.

To unlock industrial parks' full potential, countries should strive to develop vital infrastructure, reduce the cost of financing, consolidate MSMEs and major corporations, and design industrial parks based on benchmarks from developed countries.

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