THE ROLE OF ARTIFICIAL INTELLIGENCE IN PRODUCTIVE TRANSFORMATION AND ECONOMIC DIVERSIFICATION: ANGOLA AND BRAZIL

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ABSTRACT

This study analyzes the growing presence of Artificial Intelligence in productive structures and how it has altered the course of economic development, especially in emerging countries. The article investigates the strategic role of AI in the productive transformation and economic diversification of Angola and Brazil, highlighting how these technologies can increase productivity, stimulate innovation, and strengthen industrial resilience. Using a comparative approach, we examine public policies, technological infrastructures, investments, and human capabilities related to the adoption of AI, which emerges as an opportunity, offering new, more efficient and inclusive forms of production. In Angola, the use of AI still faces structural challenges, such as a lack of data and adequate digital infrastructure. In Brazil, although there are notable advances in areas such as agriculture and health, there are difficulties in the full integration of AI with existing industrial policies. This study focused on a theoretical analysis of economic diversification and productive transformation, with a focus on the contexts of Angola and Brazil. It is a descriptive, theoretical study based on a literature review, with a qualitative approach. The results indicate that AI can be an important driver of economic transformation, provided it is accompanied by investments in technological education, public policies that encourage innovation, and international collaborations. It concludes that institutional strengthening and digital governance are fundamental for Angola and Brazil to fully benefit from these advancements.
Keywords: Artificial intelligence, Productive transformation, Economic diversification, Emerging economies.

RESUMO

O papel da inteligência artificial na transformação produtiva e diversificação econômica: Angola e Brasil
Este estudo analisa a crescente presença da Inteligência Artificial nas estruturas produtivas e como ela tem alterado os rumos do desenvolvimento econômico, especialmente em países emergentes. O artigo investiga o papel estratégico da IA na transformação produtiva e diversificação econômica de Angola e Brasil, destacando como essas tecnologias podem aumentar a produtividade, estimular a inovação e fortalecer a resiliência industrial. A partir de uma abordagem comparativa, examinamos as políticas públicas, infraestruturas tecnológicas, investimentos e capacidades humanas relacionadas à adoção da IA, logo surge como uma oportunidade, oferecendo novas formas de produção mais eficientes e inclusivas. Em Angola, o uso da IA ainda enfrenta desafios estruturais, como a falta de dados e infraestrutura digital adequada. No Brasil, embora haja avanços notáveis em áreas como agricultura, saúde, há dificuldades na integração plena da IA com as políticas industriais existentes. O estudo se concentrou em uma análise teórica sobre a diversificação econômica e a transformação produtiva, tendo como foco os contextos de Angola e Brasil. Trata-se de uma pesquisa descritiva, de caráter teórico e baseada em revisão bibliográfica, com abordagem qualitativa. Os resultados indicam que a IA pode ser um importante motor de transformação econômica, desde que acompanhada por investimentos em educação tecnológica, políticas públicas que incentivem a inovação e colaborações internacionais. Conclui-se que o fortalecimento institucional e a governança digital são fundamentais para que Angola e Brasil aproveitem ao máximo os benefícios.

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El papel de la inteligencia artificial en la transformación productiva y la diversificación económica: Angola y Brasil
RESUMEN
Este estudio analiza la creciente presencia de la Inteligencia Artificial (IA) en las estructuras productivas y cómo ha modificado los rumbos del desarrollo económico, especialmente en los países emergentes. El artículo investiga el papel estratégico de la IA en la transformación productiva y la diversificación económica de Angola y Brasil, destacando cómo estas tecnologías pueden aumentar la productividad, estimular la innovación y fortalecer la resiliencia industrial. Desde un enfoque comparativo, se examinan las políticas públicas, las infraestructuras tecnológicas, las inversiones y las capacidades humanas relacionadas con la adopción de la IA, la cual surge como una oportunidad al ofrecer nuevas formas de producción más eficientes e inclusivas. En Angola, el uso de la IA aún enfrenta desafíos estructurales, como la falta de datos y de infraestructura digital adecuada. En Brasil, aunque existen avances notables en áreas como la agricultura y la salud, persisten dificultades en la integración plena de la IA con las políticas industriales existentes. El estudio se centró en un análisis teórico de la diversificación económica y la transformación productiva, con énfasis en los contextos de Angola y Brasil. Se trata de una investigación descriptiva, de carácter teórico y basada en una revisión bibliográfica, con enfoque cualitativo. Los resultados indican que la IA puede constituirse en un importante motor de transformación económica, siempre que esté acompañada de inversiones en educación tecnológica, políticas públicas que incentiven la innovación y colaboraciones internacionales. Se concluye que el fortalecimiento institucional y la gobernanza digital son fundamentales para que Angola y Brasil aprovechen al máximo los beneficios de la IA.
Palabras clave: Inteligencia artificial; transformación productiva; diversificación económica; países emergentes.

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Introduction

It cannot be denied that Artificial Intelligence optimizes the processes and has the potential to drive the creation of new industries, adding value to production chains and contributing to large-scale production. Furthermore, it improves automation, ensuring higher quality in the control of products and services, which translates into greater satisfaction for the population and a reduction in waste. In this way, AI can act effectively in economic diversification, stimulating the emergence of new sectors and business models, as well as fostering direct investments in innovation, research and development.

This movement also strengthens investment in human capital development, focusing on the development of technical skills. Thus, by investing in AI, investment in education and training is boosted, promoting a more qualified and diverse workforce, which contributes to reducing dependence on commodities and stimulating the growth of other promising sectors. Therefore, according to the OECD (2019), investments in AI can increase workforce qualification, stimulating economic diversification and reducing dependence on sectors such as commodities, while developing new skills in digital technologies. Thus, the adoption of AI in emerging countries, especially Angola and Brazil, can expand their insertion in the global scenario, increase their international competitiveness, attract more investment, and favor the export of products and services with higher added value.

In recent decades, the digital revolution has brought about profound changes in productive, social, and economic structures around the world. Among the emerging technologies that have most impacted global economic development, Artificial Intelligence (AI) stands out as a set of computational techniques capable of simulating human cognitive abilities, such as learning, reasoning, and decision-making. In an increasingly data-driven, algorithm-driven, and automated environment, AI emerges as a strategic tool to drive productive transformation and economic diversification, especially in emerging countries, which still face limitations due to their dependence on traditional and vulnerable sectors.

According to Brynjolfsson and McAfee (2014), AI represents the core of a new era of innovation, with the potential to significantly increase productivity, create new economic sectors, and transform production systems. However, its impacts are not equally distributed: while developed countries reap broad benefits from their digital infrastructure and technological capacity, developing countries face structural obstacles such as a shortage of skilled professionals, a lack of effective public policies, and technological limitations. For thinkers like Rodrik (2018), AI can open a window of opportunity to break with patterns of premature deindustrialization and establish a new innovation-based development model. For example, Ben-Ishai et al. (2024) highlight that, although AI can expand productivity and encourage innovation; its economic benefits depend on a combination of coherent policies in education, infrastructure, workforce training, and digital infrastructure to prevent the technology from amplifying existing inequalities or becoming a disjointed force in emerging economies.

This article aims to comparatively analyze the role of Artificial Intelligence (AI) in the processes of productive transformation and economic diversification in Angola and Brazil. Despite having distinct trajectories, productive structures, and challenges, both countries share the urgent need to modernize their economies and reduce their dependence on primary resources. The research seeks to understand to what extent AI is being integrated into national development strategies, identify the obstacles that hinder its dissemination, and extract lessons that can amplify the benefits of this technology in low- and middle-income contexts.

To this end, the study adopts a qualitative and comparative approach, using secondary data, institutional reports, and references from the scientific literature. It starts from the premise that, although Angola and Brazil face similar difficulties, factors such as the degree of institutionalization of innovation, investment in human capital, and the existence of effective digital governance are decisive for the success of AI as a tool for economic transformation.

Theoretical Framework

The theoretical basis of this study is structured around four central pillars: (1) the concept and function of Artificial Intelligence (AI) in the current economic scenario, (2) the processes of productive transformation and economic diversification in emerging countries, (3) the role of technological innovation as an engine of development, (4) effects on the labor market.

Artificial Intelligence and Economic Development

Artificial intelligence is an area of the computer science focused on developing systems that can perform tasks that would normally require human intelligence, such as recognizing patterns, reasoning logically, and learning automatically (Russell & Norvig, 2016). In the context of the Fourth Industrial Revolution (Schwab, 2016), it has been seen as an engine for transforming productive structures, reshaping business models and global value chains (Brynjolfsson & McAfee, 2014).

AI allows for the automation of repetitive tasks, the analysis of large amounts of data in record time, and the making of decisions based on patterns that often escape from human perception. This potential directly impacts increased productivity, especially in sectors such as agriculture, industry, finance, and health. Even though it can replace certain traditional jobs, it also creates new opportunities. The retraining of the workforce, therefore, becomes essential to keep up with the demands of this new digital landscape. However, as Ndemo (2020) points out, the adoption of disruptive technologies in developing countries requires attention to aspects such as ethical regulation, institutional capacity building, and digital inclusion. Otherwise, there is a risk of increasing inequalities instead of reducing them.

From the point of view of economic inclusion, AI can be an important ally in developing countries, democratizing the access to services such as credit, education, and health. Credit algorithms, for example, can allow small farmers or informal workers to obtain financing based on mobile or consumer data. For AI to contribute positively to economic development, it is essential to ensure ethical regulation, data protection, and transparency in algorithms. African countries, for example, face the challenge of implementing AI without compromising human rights.

Productive Transformation and Economic Diversification

Productive transformation refers to the evolution of an economy that depends on sectors with low productivity towards a more sophisticated and efficient structure, based on innovation, added value, and market diversification (Syrquin, 1988; UNCTAD, 2021a). In emerging countries, this process is essential to reduce exposure to commodity price fluctuations and boost more advanced industrial sectors.

According to Mkandawire (2001), overcoming the so-called primary dependency trap requires the implementation of active industrial policies, sound public management, and strengthened institutions. In the case of countries like Angola, whose economy is heavily dependent on oil, diversification will only be possible with the incorporation of technologies such as Artificial Intelligence in strategic sectors, such as agriculture, energy, health, and mining, supported by well-targeted public policies.

When a nation depends on only one economic sector, it becomes more vulnerable to shocks and crises. Therefore, economic diversification seeks to create multiple sources of revenue through the development of sectors such as modern agriculture, tourism, industry, technology, and digital services.

Innovation, Technological Capabilities, and Emerging Countries
Following Schumpeter (1934), he was one of the first thinkers to recognize innovation as an essential driver of economic development, introducing the concept of 'creative destruction'. Decades later, authors such as Freeman (1987) and Lundvall (1992) developed the notion of national innovation systems (NIS), emphasizing the role of institutions, public policies, and collaboration between companies, universities, and government in technological advancement. In the African context, Juma (2011) argues that the success of technological innovation on the continent depends on the creation of solutions adapted to its social, economic, and institutional reality. For him, innovation must be internal, inclusive, and focused on solving local problems. Muchie reinforces this vision by proposing the formation of African National Innovation Systems that unite the efforts of the State, the private sector, universities, and civil society.

The so called technological capabilities encompass the set of knowledge, skills, practices, and infrastructure that enable a country not only to import but also to adapt and develop its own technologies (Lall, 1992). For emerging countries, this requires investment in education, research, entrepreneurship, and an institutional environment that fosters innovation.

According to Oyebode (2022), African values, such as the Ubuntu principle, should guide the ethical design of Artificial Intelligence. This implies promoting technologies geared towards the common good, social justice, and inclusion, especially in historically marginalized contexts. Therefore, the adoption of AI in African countries should not simply replicate external models. It needs to be integrated into national sustainable development strategies, where technological innovation is a central axis of economic diversification and not just an imported or imposed solution.

Effects on the Labor Market
The widespread adoption of AI has raised concerns about its impact on the labor market, as it has the potential to dramatically change the entire economy. On the one hand, the potential for greater productivity growth is welcome, given the slowdown in productivity growth that has lasted for decades in much of the advanced economy. On the other hand, the potential for AI-induced labor unrest could potentially exacerbate existing problems in the workforce, including the decades-long decline in the male labor force participation rate. (Furman & Seamans, 2019).

The same authors, Furman & Seamans (2019), further consolidate that AI-driven automation can replace certain job functions; it can also create new opportunities for "human workers." Jobs involving routine tasks are more susceptible to displacement, while functions requiring complex problem-solving and creativity are less likely to be affected. The displacement of workers can lead to short-term unemployment and require the (re)skilling of the workforce to meet the demand of an AI-driven economy. Consequently, policies and programs to facilitate job transitions and the development of new skills are crucial.

What can be undertaken is that it is necessary not to view (AI) as the enemy of man, but it is necessary to see that it can generate new challenges for countries that implement it in the labor market, due to the fact that (AI) performs certain tasks and cannot perform all tasks, and it needs the technological skills of man for its functionality.

Therefore, the authors Tschang & Almirall (2021) argue that under certain conditions, cognitive human work can be preserved; these conditions, where the richness of the knowledge context and complex human interactions remain important for companies, will have a limit until critical technological advances are achieved. However, according to Brynjolfsson and McAfee (2014), "digital technologies are transforming the nature of work, increasing productivity but also threatening traditional jobs." Although several studies have explored the ways in which AI can alter the nature of jobs, significant gaps remain in the literature, especially regarding the mechanisms that influence career paths and employment patterns in different sectors and regions.

Methodology
This study follows a qualitative and comparative approach, focusing on the analysis of public policies, technological capabilities, and national strategies aimed at integrating Artificial Intelligence (AI) into productive transformation processes and economic diversification. With an exploratory character, the research seeks to understand how Angola and Brazil have treated AI as a strategic element for economic development, considering both its possibilities and the challenges faced.

The research was constructed from secondary sources, including:
- Official documents and national strategies on science, technology, and innovation (such as the EBIA in Brazil);

- International reports from organizations such as UNCTAD, OECD, World Bank, and World Economic Forum;
- Scientific articles and books by recognized authors in the areas of innovation, AI, and development.
- Science, Technology and Innovation Strategy (ENCTI);

However, the research was built on secondary sources, such as official documents, international reports, and specialized scientific literature. In the case of Brazil, explicit national strategies for Artificial Intelligence and innovation were analyzed, such as the Brazilian Artificial Intelligence Strategy (EBIA), which reflect a high degree of institutionalization of technological policies.

In the case of Angola, the analysis was based on broader strategic documents, such as national development plans, science, technology and innovation policies, and digital transformation guidelines, in which Artificial Intelligence appears in an incipient or indirect way. However, this documentary asymmetry does not constitute a limitation of the study, but rather a central analytical element, allowing us to highlight differences in the level of institutional maturity, digital governance, and prioritization of technological innovation between the two countries.

The comparative analysis was carried out based on defined analytical criteria, such as:
- Digital infrastructure and connectivity;
- Human capital and technical training;
- Public policies and regulatory frameworks in AI;
- Adoption of AI in strategic sectors (such as health, agriculture and industry);
- Integrating AI with economic diversification strategies.

Results and Discussion
Comparative Analysis: **Angola and Brazil**
The comparison between Angola and Brazil reveals striking contrasts, but also points of convergence regarding the role of Artificial Intelligence in economic transformation.

Digital Infrastructure
Brazil: The country has a more developed digital infrastructure, with broad internet coverage and strong articulation between universities, research centers, and the productive sector. As we can see in Figure 1 which illustrates the places with access to subscription television service in rural and urban areas.

The results show that Brazil has a relatively consolidated innovation ecosystem, supported by public policies and a continuously expanding digital infrastructure. According to InvestSP (n.d.), the São Paulo System of Technological Parks (SPTec) is one of the main initiatives aimed at bringing universities, research centers and the productive sector closer together, creating favorable conditions for the transformation of scientific knowledge into technological solutions and market products.

This strategy is aligned with the guidelines of the Brazilian Artificial Intelligence Strategy (EBIA), which highlights the importance of collaborative innovation environments and technology transfer as pillars for the development of AI in the country (Ministry of Science, Technology and Innovation [MCTI], 2021). Regarding connectivity, data from Anatel (2022) indicate that more than 83% of the Brazilian population has access to the internet, reflecting consistent investments in advanced digital technologies, such as 5G, the Internet of Things and solutions for smart cities.

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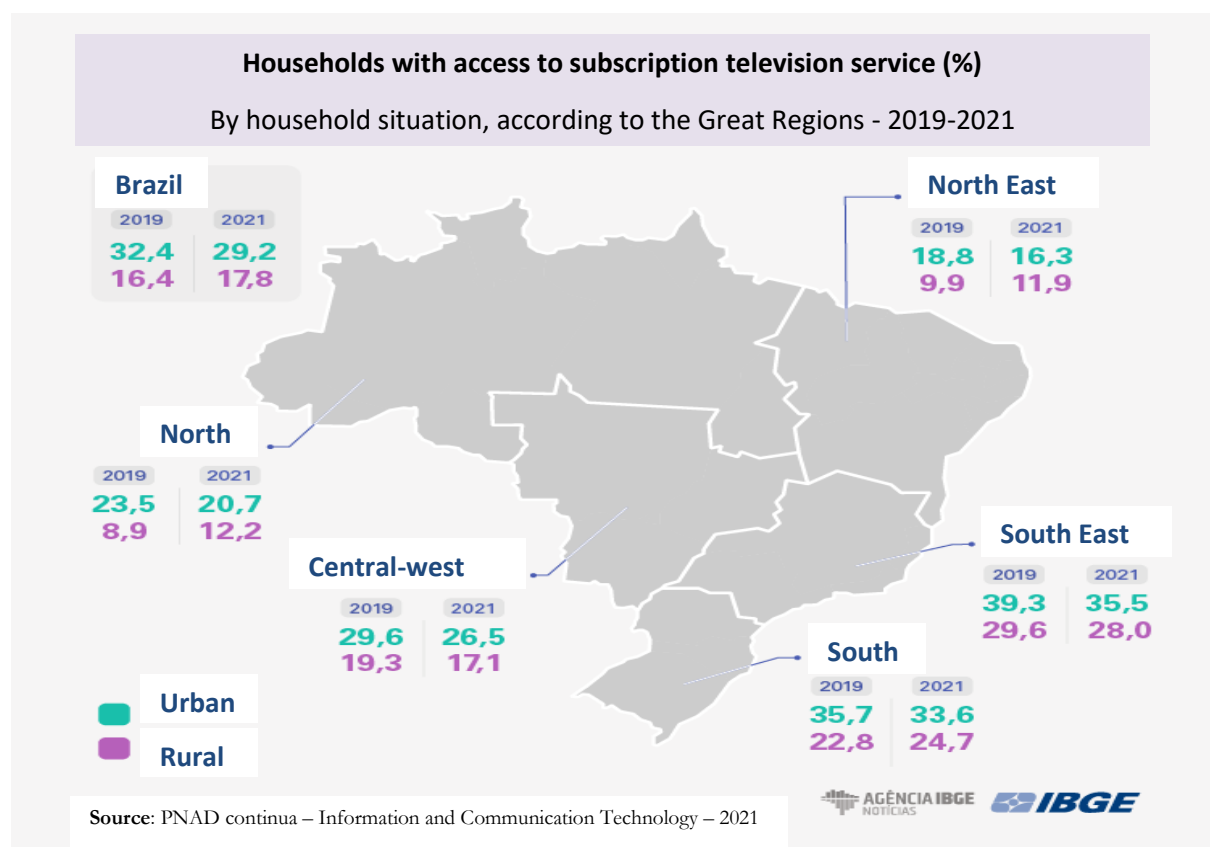
Figure 1. Households with access to subscription TV services (%)
Source: PNAD continua – Information and Communication Technology – 2021

This scenario converges with the recommendations of the World Bank (2022) and the OECD (2019), which point to digital infrastructure as an essential factor for the dissemination of Artificial Intelligence and for increasing productivity in emerging economies**.**

Angola: In contrast, the results show that Angola still faces significant limitations in the field of digital infrastructure. Despite advances associated with the expansion of the fiber optic network and the launch of the Angosat-2 satellite, internet access remains restricted, especially in rural areas. According to the National Institute of Statistics (INE, 2023), only about 36% of the Angolan population has internet access, showing profound territorial asymmetries.

This chart is consistent with analyses by UNCTAD (2021b), which identify insufficient digital infrastructure as one of the main obstacles to the adoption of emerging technologies, including Artificial Intelligence, in African countries. Although the National Development Plan (PDN) recognizes the strategic relevance of digitizing the economy, the document does not present concrete measures specifically aimed at integrating AI into productive sectors (Government of Angola, 2020).

Human Capital and Technological Education
Brazil: In the field of human capital, Brazil demonstrates a more advanced level of technical and scientific training in areas associated with Artificial Intelligence. According to the Ministry of Education (MEC, 2023), there are more than 200 undergraduate and graduate courses focused on data science, AI, and related areas, reflecting an institutional effort to meet the new demands of the digital economy.

The EBIA reinforces this orientation by identifying the training of qualified human resources as one of its structuring axes, promoting the articulation between universities, research centers, and the labor market (MCTI, 2021). This approach is in line with the OECD recommendations (2021), which emphasize the importance of continuous investment in digital skills to support technological innovation processes.

Angola: In Angola, the results indicate that human capital constitutes one of the main challenges to the adoption and diffusion of Artificial Intelligence. Although there are some efforts to introduce technological

content into higher education and vocational training, the number of programs specifically dedicated to AI remains small.

The National Science, Technology and Innovation Strategy (ENCTI) recognizes the need to strengthen scientific and technological education, however, its implementation is still limited with regard to Artificial Intelligence (Government of Angola, 2021). This scenario confirms the conclusions of UNESCO (2021) and the UN (2020), according to which most African countries face structural difficulties in training advanced skills in emerging technologies.

Public Policies and Regulatory Frameworks

Brazil: The results demonstrate that Brazil has a more structured institutional framework for Artificial Intelligence. The Brazilian Artificial Intelligence Strategy (EBIA), launched in 2021, establishes ethical, scientific, economic, and social principles that guide the development and application of AI in the country (MCTI, 2021). In addition, the regulatory environment and public financing mechanisms, such as those operated by Finep and BNDES, contribute to the promotion of technological innovation, in line with international best practices advocated by the World Economic Forum (2023) and the World Bank (2022).

Angola: It does not yet have a specific national strategy for AI. Although there are initiatives aimed at digitizing the economy, as part of the National Development Plan (PDN) and the National Science, Technology and Innovation Strategy, the absence of a dedicated regulatory framework hinders the direction of the private sector and the attraction of international investments. The National Development Plan (PDN) mentions digitalization, but without concrete measures focused exclusively on AI. Programs such as the National Broadband Plan and Angola Digital exist, but are still poorly connected to the country's productive sectors. "Although the National Development Plan mentions the digitalization of the economy, it does not contain specific measures aimed at Artificial Intelligence and its integration with the productive sector" (Government of Angola, 2020). Even so, in Angola, there is an absence of a specific national strategy dedicated to Artificial Intelligence. Although the PDN and the National Strategy for Science, Technology and Innovation (ENCTI) address digitalization as a strategic objective, the documents lack clear guidelines and operational instruments aimed at the implementation of AI (Government of Angola, 2020; 2021).

According to UNCTAD (2021b), the lack of specific regulatory frameworks for emerging technologies reduces the ability of developing countries to attract foreign investment and integrate AI into their production processes.

Strategic Sectors

Brazil: Artificial Intelligence has been successfully used in several areas, such as:
- Precision agriculture, through the use of drones, sensors, and algorithms;
- Public health, with applications in telemedicine and epidemic forecasting;
- Financial services, especially in fintechs and digital banks.

In agriculture, companies like Agrosmart and Solinftec apply AI to predict the weather and optimize the use of inputs. In the health sector, the startup Laura uses AI to identify sepsis risks in hospitalized patients. In the financial sector, digital banks like Nubank and PicPay use algorithms for credit analysis.

Angola: AI initiatives are still sporadic, with emphasis on the health sector, where private clinics have begun using the technology to support diagnoses. There are also pilot projects in the energy and banking sectors. Although adoption is still in its initial stages, there is potential for accelerated expansion, provided there is institutional support and international partnerships. In healthcare, AI has begun to be used to assist in diagnoses in private clinics. In the energy sector, the company ENDE has been exploring digital tools to predict failures, although it is not yet using AI in an advanced way. In the mining and agriculture sectors, there are no concrete records of structured applications of the technology. However, it is worth noting that the Angolan government (2024) requested the permanent presence of an Embrapa unit in Angola in the short term, in order to support efforts to boost agricultural activity in the country. This indicates that the government is showing some concern for implementation through cooperation with Brazil to boost its agricultural activity, which is a step the country is taking to maximize its activity, food security, and social inclusion, given that many families operate or work in the agricultural sector.

Integration with Economic Diversification Strategies

Brazil has sought to integrate its Artificial Intelligence (AI) agenda with industrial and innovation policies, as exemplified by the National Internet of Things Plan. Angola, on the other hand, still faces challenges in incorporating AI into economic diversification efforts, especially beyond the oil sector. However, there are promising opportunities in the agricultural, mineral, and energy sectors, which could benefit from the use of AI to increase productivity and reduce losses. In short, Brazil is at a more advanced stage in the institutionalization and application of AI, although it still faces regional inequalities and regulatory obstacles. The Brazilian Artificial Intelligence Strategy (EBIA) points out that, although Brazil has made important progress in implementing policies for Artificial Intelligence (AI), it still faces challenges such as regional inequalities and the lack of clear regulation, which prevents a more equitable and effective application of the technology throughout the country (Ministry of Science, Technology and Innovation, 2021). Furthermore, we can point out that, according to SEBRAE (2021), the lack of a robust regulatory framework and regional disparities are barriers to the expansion of AI in Brazil. Therefore, for Brazil, the results indicate that Brazil has sought to integrate Artificial Intelligence into its industrial and innovation policies, in line with the guidelines of the World Bank (2022) and the OECD (2021). Even so, EBIA itself recognizes the persistence of challenges, namely regional inequalities and the need for a more robust regulatory framework (MCTI, 2021).

Angola, on the other hand, is in the initial phase, but has the chance to learn from Brazilian experiences, adapting them to its reality. To this end, it is essential that the country prioritizes investments in technological education, expansion of digital infrastructure and formulation of specific public policies that place AI as a central pillar of structural transformation. "Most African countries, including Angola, face significant challenges in accessing advanced technological education and integrating emerging technologies such as Artificial Intelligence into the school curriculum" (UNESCO, 2021). But still from the UN's point of view, "Angola has made significant progress in terms of digital infrastructure, but still needs to prioritize investments in training its workforce and promoting specific public policies to ensure that Artificial Intelligence is an integral part of its economic and social transformation" (UN, 2020).

Therefore, Angola is at an early stage of this process, but it has significant potential in the agricultural, energy and mineral sectors. According to the World Economic Forum (2023), economies based on natural resources can use Artificial Intelligence as an instrument for economic diversification, provided that adequate institutional conditions are created and consistent investments are made in human capital and digital infrastructure.

Comparative Chart 1. Angola vs. Brazil in AI Adoption

Criterion	Brazil	Angola
Digital Infrastructure	High internet coverage (>80%), 5G networks, innovation hubs	Limited access, mainly rural; growing urban coverage.
Human Capital	High number of AI courses, centers of excellence (USP, UFPE, UFMG)	Isolated initiatives; lack of skilled AI professionals.
IA Policies	National AI Strategy (EBIA), funded by BNDES and FINEP.	Lack of a specific strategy; PDN and Angola Digital are generic.
Sectorial Adoption of AI	Established application in agriculture, health, finance and industry.	Early use in private healthcare, energy, and services, through pilot projects.
Observed Results	Increased productivity, the emergence of startups, and the export of solutions.	Impact still limited; initiatives disconnected and poorly systematized.
Main Challenges	Regional inequality and digital exclusion in precarious areas	Poor infrastructure, lack of a national strategy, and a talent shortage.

Source: Own elaboration based on data from UNESCO (2021), OECD (2023), and ITU (2022).

Conclusions

This study demonstrated that Artificial Intelligence (AI), in addition to representing a technological opportunity, constitutes a strategic necessity for emerging countries such as Angola and Brazil in the process of productive transformation and economic diversification. The comparative analysis revealed that,

although both face structural challenges typical of developing economies, their institutional and political responses to the digital revolution differ significantly.

Brazil, for example, already has the Brazilian Artificial Intelligence Strategy (EBIA), possesses a robust digital infrastructure (with more than 80% of the population connected), and invests heavily in human capital and innovation. Practical cases, such as the use of AI in precision agriculture (Agrosmart), in health (startup Laura), and in financial services (such as Nubank), show how the technology has been integrated into value chains, promoting gains in productivity, innovation, and global competitiveness. The country also demonstrates effective coordination between science, the private sector, and public policies, even while facing regional inequalities and regulatory challenges. On the other hand, Angola is still in the initial stages of digital and technological development. Despite significant advancements, such as the expansion of fiber optics, the launch of the Angosat-2 satellite, and some AI experiments in private healthcare, the lack of a specific national strategy, the low connectivity rates in rural areas (with only about 36% of the population having internet access), and the scarcity of specialized professionals hinder the construction of a sustainable innovation ecosystem. While there is an intention to increase AI in the agricultural sector, it is still very timid. Thus, the United Nations Development Programme (UNDP, 2019) discussed the application of artificial intelligence in Angola to address challenges such as drought, health, agriculture, and urbanization. However, the country has the advantage of being able to learn from the mistakes of other nations and adopt successful models, such as the Brazilian one, to its own socioeconomic and institutional reality, and detach itself from the use of (AI) focused only on the Dutch disease, which represents oil. And adoption is also necessary for institutional readjustment in the case of Angola.

A critical analysis shows that AI can only play its transformative role if it is accompanied by solid investments in technological education, resilient digital infrastructure, ethical governance of innovation, and articulation between government, the private sector, universities, and civil society. The true power of AI lies in each country's ability to integrate it into its development goals and ensure that its application promotes inclusion, equity, and sustainable progress, as the United Nations Development Programme (UNDP, 2019) states that the country has the opportunity to invest and bet more on digital tools to face major challenges plaguing the nation. Not all, but some. In this way, according to the National Strategy for Science, Technology and Innovation, "it is essential to promote human and technological capabilities to sustain scientific and technological innovation in the country" (Angola, 2011, p. 12).

So far, Marques (2023) also argues that artificial intelligence can be a catalyst for economic diversification and sustainable development in Angola. Later, the same author adds that AI can revolutionize the agricultural sector in our country, optimizing practices, improving crop yields, and helping to mitigate the effects of climate change. Through the integration of AI-based systems, farmers can access real-time data on soil conditions, weather patterns, and pest infestations, allowing them to make informed decisions and optimize resource allocation. AI-powered drones and satellites can also monitor vast agricultural landscapes, providing valuable information on crop health, water management, and land use optimization. In fact, the author solidifies his approach very well; there are opportunities that Angola could take advantage of, just as Brazil could, to catalyze its economic diversification and development, which would optimize its operations and increase efficiencies in various sectors, as is the case in Brazil.

Furthermore, the author Colaço (2024) argues that Angola faces a myriad of challenges, ranging from infrastructure deficiencies and skills gaps in human capital to bureaucratic inefficiencies and the imperatives of economic diversification and consequent job creation. Traditional development approaches involve lengthy processes and substantial investments that hinder the acceleration of progress in these areas. AI emerges as a disruptive solution, offering innovative strategies to address these challenges quickly and cost-effectively. According to a specialized technology newspaper (2025), Angola is laying the groundwork for a robust digital economy, with policies and investments that strengthen connectivity, digital infrastructure, and technical skills. As we can see from the National Development Plan, "the diversification of the economy and the strengthening of technological infrastructure are strategic priorities for the five-year period 2023-2027" (Republic of Angola, 2023, p. 45). However, it is not enough to simply want to adopt AI, but it is necessary to actually create the foundations to mitigate the difficulties that may prevent its effective implementation.

It can be concluded, therefore, that Brazil and Angola are at different stages in the adoption of AI. Brazil is more advanced, but still faces quality challenges. Angola, although at the beginning of this journey, has the chance to build its own inclusive model aligned with its needs. Actions such as the development of specific public policies, the creation of centers of excellence in AI, the encouragement of applied research, the training of technicians and data engineers, and the promotion of South-South strategic partnerships

with countries that already have contextualized experiences, such as Brazil, are recommended. Finally, including African values and perspectives such as the Ubuntu principle in the debate can help ensure that the adoption of AI in Angola does not merely replicate foreign models, but contributes to the emergence of a truly African paradigm of digital innovation, based on human dignity, the common good and sustainable development with less dependence on the West. We suggest the following: □

- ❖ Establish a National Artificial Intelligence Strategy, aligned with the objectives of economic diversification;
- ❖ Invest in the training of specialized technical personnel in AI and data science, and if there are very few, generate human capital through continuous training and attractive proposals;
- ❖ Promote partnerships between the State, universities, and the private sector for the development of local AI-based solutions;
- ❖ Seek South-South collaboration with countries like Brazil, aiming at the transfer of knowledge, best practices, and successful experiences.

Study Limitations and Implications for Future Research

This study, while contributing to the understanding of the role of Artificial Intelligence in the productive transformation and economic diversification of emerging countries, presents limitations that must be explicitly acknowledged in order to contextualize the results and guide subsequent research.

Firstly, the research is based exclusively on secondary sources, including institutional documents, reports from international organizations, and specialized scientific literature. Meanwhile, the absence of primary data, such as interviews with policymakers, managers in the productive sector, or academic researchers, limits the ability to capture contextual nuances and subjective perceptions about the implementation of AI initiatives in Angola and Brazil. Secondly, the institutional asymmetry between the countries studied constitutes a relevant methodological constraint. Thus, we can understand that Brazil has a structured national strategy for AI, while Angola is still in a preliminary phase of technological institutionalization. Although this difference is explored analytically as a result of the study, it restricts the possibility of direct comparisons and requires caution in extrapolating conclusions about policy effectiveness and sectorial impact.

Additionally, the temporal and methodological heterogeneity of the sources used represents another limitation. Some strategic reports and documents reflect outdated or aggregated data, lacking recent updates, which may not fully capture the rapid dynamics of technological evolution. Furthermore, the scarcity of disaggregated information on Angola also restricts more robust quantitative analyses and accurate comparisons between economic sectors.

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