BENIN

Anticipating the impacts of artificial intelligence on West Africa's aspiring digital services hub

Ministry of Digital Economy and Communications

Key Takeaways:

- Digital infrastructures and platforms have been put in place since 2016 as part of the Beninese vision as the hub for digital services of West Africa. Institutes in the country have initiated AI training and education programs for the young generation.
- Challenges around data collection, preparation, access, storage and governance need to be addressed for proper operation of AI systems. Data protection and fundamental rights as well as data governance also raise legal, regulatory and ethical challenges

The Government of Benin, with its vision to 'transform Benin into the digital services hub of West Africa for accelerating growth and social inclusion' (MDEC, 2016) has implemented several structural reforms and deployment projects of digital infrastructure and platforms since 2016. This vision has been articulated in the government's action programs, which focus on flagship projects, priority projects, and projects with rapid impacts for structural, economic, political and social transformation of the country.

The operationalization of its vision has enabled Benin to establish a digital code, a national data centre, a national portal for public services, a public key infrastructure, a national administration network integrating over 187 sites, and a network of over 2,500 kilometres of fibre-optic cables deployed throughout the national territory, among other projects. The use of Benin's new infrastructure and platforms will generate massive amounts of data that must be managed and valorised through the use of AI tools and technologies so that their value creation potential does not escape the Beninese economy.

National Artificial Intelligence and Big Data Strategy

It is within this framework that the Government of Benin adopted, in January 2023, a National Artificial Intelligence and Big Data Strategy (SNIAM 2023–2027). This strategy outlines a structured action plan around four programs, including one related to 'Support for training, research, innovation, the private sector, and cooperation' (MDEC, 2023). Through this program, Benin aims to support training and research by equipping universities and promoting partnerships in AI. It also aims to develop financing mechanisms by strengthening institutional support to the structures that are responsible for entrepreneurship and innovation as they mobilize and sustain resources allocated to startups. Lastly, it aims to strengthen sub-regional and international cooperation in this area.

The development of SNIAM 2023–2027 was carried out in two phases: a preliminary stage followed by the development of the document itself. It was during the preliminary stage that the government prepared by providing Benin with its digital code, connectivity infrastructure, data storage and platforms conducive to strengthening digital trust. However, many challenges remain to be addressed. There are data challenges concerning the collection, preparation, access, storage and governance of the data necessary for the operation of AI systems. There are also notable legal and regulatory challenges related to AI governance and regulation, and ethical challenges concerning data protection and fundamental rights.

At the same time, the opportunities for Benin are manifold and relate to supporting the development of priority sectors such as education, vocational training, health, the living environment and transportation.

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Financing and institutional arrangements

With an estimated cost equivalent to USD 7.7 million over a period of five years, the main actions of SNIAM 2023–2027 will be implemented through a public–private partnership, at the national level, targeting specific areas of development. Various sources of financing are proposed to mobilize the resources needed to implement the actions outlined in the strategy. These include calls for national funding from both the government and the private sector; appeals for bilateral and multilateral foreign aid; and appeals for foreign private capital within the framework of the public–private partnership.

The integration of AI in Benin will require the participation of all public bodies, the public sector and the population to achieve the desired effects. The effects in question include improving productivity and the quality of products and services in priority sectors and those presenting real opportunities for AI; a dynamic AI ecosystem driven by Beninese companies; technology and knowledge transfers between research laboratories and the private sector; and recognition of Benin in the field of AI.

Stakeholders shaping readiness in research

On one hand, AI readiness in research involves public innovation bodies, and on the other hand, it involves civil society organizations, academics, startups and the private sector in general. Several targeted skill development programs have been identified to help workers prepare for AI transitions. These programs are either directly envisaged by the government or in collaboration with partners. Thus, the Ministry of Digital Economy and Communications, as part of the operationalization of the AI strategy action plan, is collaborating with various digital ecosystem partners in Benin to implement awareness raising, networking, training activities, and more.

Basic AI awareness actions are also planned during the development of digital literacy modules. The Smart Africa Alliance has developed a capacity building reference document that has led to the implementation of several projects and initiatives, including the Smart Africa Digital Academy (SADA) project, which supports existing processes in various countries (SADA, no date). In Benin, a convention for the implementation of SADA was signed in 2022, and in 2023, actions began to support the Lever of Learning for Retraining in the Digital Sector (LeARN), focusing on three modules: training of 25 Data Steward experts, training of 25 Data Developers, and AI training (Government of Benin, 2021).

Furthermore, there are initiatives by some non-governmental actors in the Beninese digital and AI ecosystem that are worth highlighting. The Odon Vallet Foundation has held a Summer School on Artificial Intelligence since 2021, where around a hundred young people receive pragmatic and high-quality training on basic AI concepts such as programming, machine learning and embedded electronics (including robotics and home automation). Since 2020, the Francophone Agency for Artificial Intelligence has been organizing awareness conferences for young Beninese people, including women, on the challenges of AI, as well as online master's-level training in AI and big data in partnership with Francophone universities (AFRIA, 2020).

National scientific and research community

SNIAM 2023–2027 is the result of a synergy of actions stemming from both government sectoral departments and the private sector, as well as associations or academic organizations.

In its development process, the national strategy's aim was to have a consensus document that takes into account vital domains such as research, developments and innovations, applications, market placement and intersectoral dissemination, support, and guidance for deployment.

In terms of local research institutions, Benin has a training and research centre, the Institute of Mathematics and Physical Sciences (IMSP), established in 1988. With its specialized resources in AI, the IMSP constitutes a centre of competence at the national level in mathematics and AI computer science (at the PhD level), and it has a supercomputer with rare power for an institute in West Africa. The challenge for the IMSP today is to maintain computing power and strengthen the means to take advantage of this infrastructure. The Institute of Training and Research in Computer Science, the Abomey-Calavi Polytechnic School and its Doctoral School of Engineering Sciences, and the Laboratory of Biomathematics and Forest Estimations at the University of Abomey-Calavi are also working on several projects implementing AI technology as well as blockchain.

Furthermore, several capacity-building actions have been initiated and are ongoing to prepare human resources for the labour market transformations induced by AI and emerging technologies in general. In addition to teaching computer science (networking and engineering), the IMSP has been offering a data science master's program since 2020, having already trained about twenty graduates, with around forty students currently undergoing training in this field. About ten theses in AI or related fields have already been defended at the IMSP. Additionally, at the Institute of Training and Research in Computer

Science there is a bachelor's program in AI. Efforts are under way to create a master's program here to allow students to continue their studies in AI. The AI training provided in this field will address the various challenges in AI skills. Several universities and schools are also initiating training programs in AI within the private sector. For example, the Sèmè City Development Agency, in partnership with Sorbonne University, launched in 2022 a cohort of professionals who benefited from highly certified continuing education in AI.

Operational steps for the strategy

SNIAM 2023–2027 aims to make AI and big data a lever for Benin's development by 2027, with increased support for strategic sectors such as education, health, agriculture, the living environment and tourism in an opportunistic approach. Ongoing actions are distributed within the programs, and their implementation will be based on prioritization considering three factors. The first factor is business impact: the extent to which the proposed solution will benefit the primary beneficiary or address the original problem. The second factor is given complexity: the extent to which the data are available and exploitable right now. The third is technological complexity: the effort it will take to create, deploy or adapt an AI solution.

In operationalizing the strategy, initiatives are under way to identify and execute associated action plans. These include feasibility studies and project definition to operationalize SNIAM 2023–2027. They also extend to the development of application platforms for AI use cases. As part of this latter action, the Government of Benin has implemented GPT.BJ, an initiative to promote access to legal information in citizens' lives (Le Matinal, 2023). GPT.BJ is a chatbot developed by the Benin Agency for Information Systems and Digital and is designed to answer questions related to the general tax code, digital code, labour code and penal code of Benin. It was launched in 2023 during the second Digital Entrepreneurship and Artificial Intelligence Fair.

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