NATIONAL ARTIFICIAL INTELLIGENCE AND BIG DATA STRATEGY

2023 – 2027

The process of developing Benin's National Artificial Intelligence and Big Data Strategy (SNIAM) was headed up by the Ministry of Digital Affairs and Digitalization, in an approach involving all the stakeholders and following a holistic approach focused on technological solutions suited specifically to our country's needs, particularly in the fields of education, healthcare, agriculture, living conditions, tourism, and on the understanding of the use cases applicable to the Beninese context. The SNIAM was adopted by the Ministerial Council in its session of January 18, 2023.

Guided by the vision of establishing a 2027 target for making Benin a country that can boast, amongst other things, the use of its big data by means of artificial intelligence systems and technologies and the development of the associated skills, it comprises four programs that can be rolled out in three phases spread over five years, with a portfolio containing one hundred and twenty-three (123) actions impacting both the public and the private sectors.

The adoption of this strategy positions Benin as a country capable of seizing current and future opportunities related to artificial intelligence and the processing of big data, making it even more attractive for all types of investments, especially from the private sector and development partners.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS AND ABBREVIATIONS

ACE	Africa Coast to Europe
ADN	Agence du Développement du Numérique
AFNOR	L'Association Française de Normalisation
AIDP	Analyse d'impact relative à la protection des Data
ANIP	Agence Nationale d'Identification des Personnes
ANSI	American National Standards Institute
ANSSI	Agence Nationale de la Sécurité des Systèmes d'Information
APDP	Autorité de Protection des Data à caractère Personnel
ASSI	Agence des Services et Systèmes d'Information
ASIN	Agence des Systèmes d'Information et du Numérique
BAD	Banque Africaine de Développement
BCEAO	Banque Centrale des États de l'Afrique de l'Ouest
CEDEAO	Communauté Economique des Etats de l'Afrique de l'Ouest
CNSR	Caisse Nationale de Sécurité Sociale
CNUCED	Conférence des Nations Unies sur le Commerce et le Développement
CTA	Centre Technique de Coopération Agricole et Rurale
DCN	Data Center National
DGI	Direction Générale des Impôts
DHIS	District Health Information Software
DMIA	Délégation Interministérielle de l'Intelligence Artificielle
AIPD	Analyse d'Impact pour la Protection des Data
FAEN	Fonds d'Appui à l'Entrepreneuriat Numérique
FAI	Fournisseur d'Accès Internet
FAO	Organisation pour l'Alimentation et l'Agriculture
FMI	Fonds Monétaire International
GIZ	Gesellschaft für Internationale Zusammenarbeit
GPAI	Global Partnership on Artificial Intelligence
IA	Intelligence Artificielle
IDI	Indice de Développement des TIC
IFRI	Institut de Formation et de Recherche en Informatique

IFU	Identifiant Fiscal Unique
IMSP	Institut Supérieur de Mathématiques et de Sciences Physiques
INRAB	Institut de Recherche d'Agronomie Béninoise
INSAE	Institut National de la Statistique et de l'Analyse Économique
IP	Internet Protocol
LEARN	Levier d'Apprentissage pour la Reconversion dans le Numérique
LOLF	Loi Organique relative à la Loi de Finances
MCC	Millennium Challenge Corporation
MEF	Ministère de l'Economie et des Finances
MIT	Massachusetts Institute of Technology
NIP	Numéro d'Identification Personnel
NRI	Network Readiness Index
OCDE	Organisation de coopération et de développement économique
OCP	Office Chérifien des Phosphates
OCRC	Office Central de Répression de la Cybercriminalité
ODD	Objectifs De Développement Durable
PAC	Port Autonome de Cotonou
PAG	Programme d'Actions du Gouvernement
PDI2T	Projet de Développement des Infrastructures de Télécommunications et des TIC
PIB	Produit Intérieur Brut
PKI	Public Key Infrastructure
PME	Petites et Moyennes Entreprises
PND	Plan National de Développement
PNDS	Plan National de Développement Sanitaire
PNPE	Plateforme Nationale De Paiement Électronique
PPD	Principes de Protection des Data
PRSCG	Programme de Renforcement des Structures Centrales de Gouvernance
QW	QuickWin

RAVIP	Recensement Administratif à Vocation d'Identification de la Population
RBER	Réseau Béninois d'Education et de Recherche
RNA	Réseau National de l'Administration
R&D	Recherche et Développement
SAT3	South Africa Transit 3
SBEE	Société Béninoise d'Energie Electrique
SBIN	Société Béninoise d'Infrastructures Numériques
SIGFIP	Système Intégré de Gestion des Finances Publiques
SIGTAS	Système Intégré de Gestion des Taxes et Assimilés
SIRB	Société des Infrastructures Routières du Bénin
SNAN	Stratégie Nationale d'Agriculture Numérique du Bénin
SNIAM	Stratégie Nationale d'Intelligence Artificielle et des MégaData
SOC	Security Operation Center
SONEB	Société Nationale des Eaux du Bénin
TVM	Taxe sur Véhicule à Moteur
UE	Union Européenne
UEMOA	Union Economique et Monétaire Ouest Africaine
WACREN	West and Central African Research and Education Network
XML	Extensible Markup Language

INTRODUCTION

OVERVIEW

Artificial Intelligence (AI) has become a field of strategic importance that can represent a major driver of economic development, as well as a lever for strategic positioning, both regional and international, with multiple sector-specific opportunities.

As such, AI is an issue of key importance for national development policies in terms of its implications for regulation, the digital economy, human capital, training, research, cooperation and innovation.

RATIONALE AND AMBITIONS

In order to make the most of its potential and bolster the various initiatives in this field that are already in the making, Benin needs to, first of all, establish its strengths in this area, and second of all, define its objectives with a view to the effective use of Artificial Intelligence for the benefit of its population. To this end, it is also necessary to establish the resources that the country will have to procure if it is to facilitate the implementation of an AI ecosystem, and in so doing, cement itself as the leader in certain strategic areas for the West African subregion.

Benin has a suitable institutional and legal framework (the Code of Digital Affairs, adopted on June 13, 2017, as amended by Law No. 2020-35 of January 6, 2021) as well as a dynamic digital ecosystem which, combined, constitute an essential foundation for the development of a solid Artificial Intelligence strategy capable of offering concrete solutions to development problems in a multitude of areas (agriculture, healthcare, tourism, education, transportation, security, e-governance, e-business, etc.).

In short, a well thought-out national strategy for the development of Artificial Intelligence will contribute to the efforts made by the digital economy sector to meet the objectives of the sector-specific policy, namely to make Benin the leading platform for digital services in West Africa.

In order to most effectively exploit the benefits that AI can offer in the target areas for development, and to position the country as a major player in AI in West Africa, the Ministry of Digital Affairs and Digitalization has developed this National Artificial Intelligence and Big Data Strategy.

1

1. FORMULATION OF THE STRATEGIC FRAMEWORK

1.1. FOUNDATION AND PRINCIPLES

1.1.1. FOUNDATION

NATIONAL DEVELOPMENT PLAN 2018-2025

Benin's National Artificial Intelligence and Big Data Strategy is rooted in the National Development Plan 2018-2025 (NDP).

The NDP shows that the strategic sectors with the highest potential are agribusiness and services, which include Information and Communication Technologies (ICT). According to the results of the strategic analysis carried out in the context of the NDP : **Information and Communication Technologies (ICT): insufficiently developed and with poor availability.**

What's more, the strategic option adopted under the NDP is to : **make agribusiness, services and tourism the drivers for strong, inclusive and sustainable economic growth within the framework of more effective national and local governance, achievable by focusing on the development of human capital and infrastructure.**

The development of digital technology in general and, more specifically, artificial intelligence forms part of a three-step (3) implementation plan under the NDP:

- First step: the diversification of agricultural production, as supported by the development of **services.**
- Second step: the transformation of agribusiness and the increased development of **services.**
- Third step: the exportation of knowledge through **innovation** and **biotechnology.**

GOVERNMENT ACTION PROGRAM (GAP) 2021-2026

Much like the NDP, the second pillar of the **GAP** identifies **digital technology** as a **lever** for accelerating the **structural transformation of Benin's economy.**

NATIONAL SECTORAL STRATEGIES

The Sectoral Policy Declaration for the digital economy sector expressed Benin's ambitions as follows: For Benin to become the leader in the ICT sector in West Africa and to be ranked in the top 100 of the Network Readiness Index (NRI), with this to be achieved by transforming Benin into West Africa's go-to

digital services platform for accelerated growth and social inclusion.
The blossoming of the ecosystem resulting from the implementation of this strategy should boost Benin's positioning as a digital services platform.

Benin's National Digital Agriculture Strategy (SNAN-Benin 2021-2025) established the following vision: A better-performing agricultural sector by 2025, made possible through the use of **digital solutions,** with the following strategic guidelines :

- ☑ Improving the productivity of agricultural sectors.
- ☑ Improving the reliability of the information system in the sector.
- ☑ Improving the governance and management mechanisms for the sector.
- ☑ Developing the capacities of all the actors in the management of the agricultural sector.

Artificial intelligence is a major lever in the implementation of this strategy, above all for the areas relating to smart agriculture.

The National e-Health Strategy 2018-2022 has adopted the following vision: **by 2022, Benin's healthcare system will offer better healthcare to all its citizens by removing all barriers of quality, fairness, equality, accessibility, availability and speed by means of the contribution of e-health,** with the mission of using ICT at all levels of the healthcare system to make reliable health and medical information available, improve the quality of care, and make the management of resources in the country's healthcare facilities more efficient.

In terms of security, one project established under the GAP 2021-2026 concerns developing video surveillance, which can draw heavily on the capabilities of AI.

1.1.2. PRINCIPLES

The construction and implementation of the strategy is guided by a number of key principles which are universally recognized as contributors to the success of development strategies. These are:

Iterative and incremental implementation : this principle allows for rapid operationalization, at the outset, for identified use cases and high-impact initiatives. At a later stage, depending on the results of this initial rollout, it will then be possible to proceed to an increased production of services within an updated regulatory framework.

Resource pooling : for all sectors and as far as possible, the beneficiaries should have access to the entire institutional and organizational system and technical solutions resulting from the strategy.

Accountability : this principle goes hand in hand with the principle of the effective participation of the various stakeholders in the actions that make up the strategy. In order to achieve this, all stakeholders - namely the government,

the private sector, and the end users - will need to be involved in the design, implementation, and ongoing monitoring and evaluation of the strategy. This principle includes mutual accountability between duty bearers (State, Local Government, Private Sector Leaders, Civil Society Leaders) and rights holders (the general public and other specific beneficiaries).

Results-based management : this has become a crucial managerial approach in guiding planning, implementation, reporting and evaluation in all organizations. It focuses on achievements rather than activities, and as such requires clear objectives, indicators and targets to be established. This principle will be systematized at all stages of the strategy's planning, implementation, and ongoing monitoring and evaluation process.

1.2. VISION

The vision was formulated by taking into account the strategic analysis carried out, along with the challenges, issues and problems at hand. It is worded as follows:

By 2027, Benin should enjoy a high profile thanks to artificial intelligence, which is a lever for the growth of strategic sectors, as applied in an opportunistic approach.

This strategy should help to make this vision a reality over the next five (5) years.

1.3. THEORY OF CHANGE

SHORT-TERM CHANGE

The short-term change will consist of the effects of the transformations resulting from guideline 1 (step 1). The changes to be expected in the short term are:

- ☑ Rollout of the identified use cases and gradual resolution of the associated issues;
- ☑ The human capabilities of the actors as regards AI and big data management being strengthened.

MEDIUM-TERM CHANGE

The medium-term change will consist of the effects of the transformations resulting from guideline 2 (step 2). The changes to be expected in the medium term are:

- ☑ The identified issues being entirely resolved;
- ☑ Big data being effectively managed;
- ☑ The rollout taking place in a controlled environment, pending the implementation of the relevant regulatory framework;

- ☑ Ethical and liability issues related to AI being under control;
- ☑ Actors such as the IMSP, the IFRI, Sèmè City, startups and certain bodies being supported with regard to their AI needs;
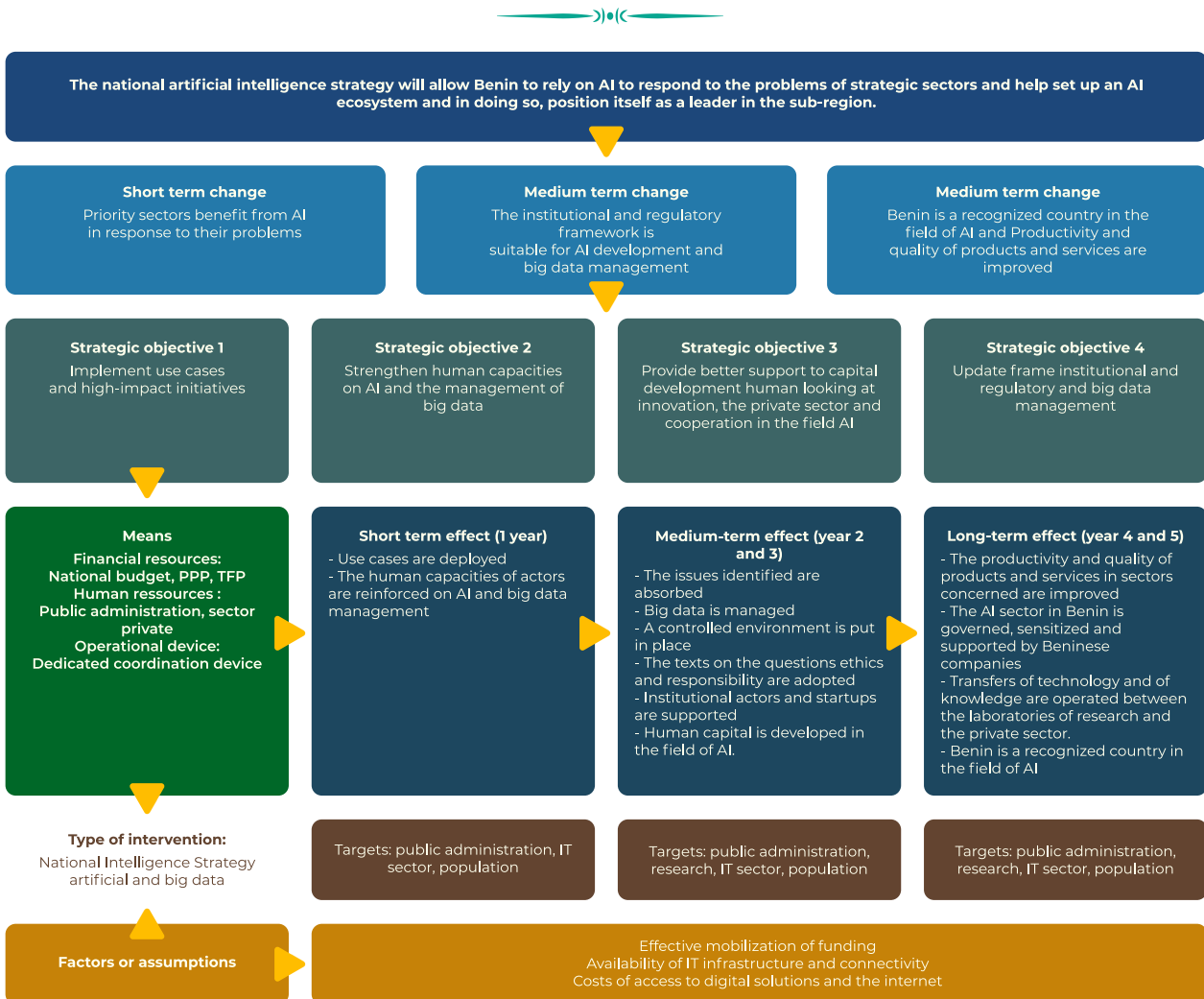- ☑ Human capital being developed in the field of AI.

LONG-TERM CHANGE

The long-term change will consist of the effects of the transformations resulting from guideline 3 (step 3). The changes to be expected in the long term are:

- ☑ The AI sector in Benin being governed, educated and led by Beninese companies;
- ☑ Productivity and the quality of products and services in the business sectors being improved;
- ☑ Technology and knowledge transfer taking place between research laboratories and the private sector;

Benin becoming a well-known country in the field of AI and its leadership within the subregion being cemented.

FIGURE 5: THEORY OF CHANGE

The national artificial intelligence strategy will allow Benin to rely on AI to respond to the problems of strategic sectors and help set up an AI ecosystem and in doing so, position itself as a leader in the sub-region.

Short term change
Priority sectors benefit from AI in response to their problems

Medium term change
The institutional and regulatory framework is suitable for AI development and big data management

Medium term change
Benin is a recognized country in the field of AI and Productivity and quality of products and services are improved

Strategic objective 1
Implement use cases and high-impact initiatives

Strategic objective 2
Strengthen human capacities on AI and the management of big data

Strategic objective 3
Provide better support to capital development human looking at innovation, the private sector and cooperation in the field AI

Strategic objective 4
Update frame institutional and regulatory and big data management

Means
Financial resources:
National budget, PPP, TFP
Human ressources :
Public administration, sector private
Operational device:
Dedicated coordination device

Short term effect (1 year)
- Use cases are deployed
- The human capacities of actors are reinforced on AI and big data management

Medium-term effect (year 2 and 3)
- The issues identified are absorbed
- Big data is managed
- A controlled environment is put in place
- The texts on the questions ethics and responsibility are adopted
- Institutional actors and startups are supported
- Human capital is developed in the field of AI.

Long-term effect (year 4 and 5)
- The productivity and quality of products and services in sectors concerned are improved
- The AI sector in Benin is governed, sensitized and supported by Beninese companies
- Transfers of technology and of knowledge are operated between the laboratories of research and the private sector.
- Benin is a recognized country in the field of AI

Type of intervention:
National Intelligence Strategy artificial and big data

Targets: public administration, IT sector, population

Targets: public administration, research, IT sector, population

Targets: public administration, research, IT sector, population

Factors or assumptions

Effective mobilization of funding
Availability of IT infrastructure and connectivity
Costs of access to digital solutions and the internet

1.4. STRATEGIC GUIDELINES, STRATEGIC OBJECTIVES AND PROGRAMS

1.4.1. STRATEGIC GUIDELINES

The vision put forward will be implemented progressively and incrementally through the following strategic guidelines:

☑ **Strategic Guideline 1:** Organization and consolidation of the existing fledgling ecosystem and exploitation of its results;

☑ **Strategic Guideline 2:** Further development and support of the AI ecosystem;

☑ **Strategic Guideline 3:** Increased value of Benin's ecosystem, knowledge and expertise.

STRATEGIC GUIDELINE 1 : Organization and consolidation of the existing fledgling ecosystem and exploitation of its results

In the field of research, AI innovation and cooperation, there is strong momentum despite the insufficient support being provided.
The first stage of implementing the strategy will involve organizing and consolidating these assets, specifically by applying (testing out/experimenting with) the following ad-hoc or planned (large-scale) actions :

☑ Implement the previously-identified initiatives and use cases;

☑ Establish a controlled environment by applying the articles of the Code of Digital Affairs (406, 407, 408) which would allow for the rigor of preliminary formalities to be eased;

☑ Establish and roll out a training and awareness program for all stakeholders.

This first step requires connectivity, storage and data processing infrastructure to be available for us (computing power, supercomputers, etc.). Failing this, the cloud can be used within the limits allowed by the regulations.

STRATEGIC GUIDELINE 2 : Further development and support of the AI ecosystem

In parallel with the consolidation and improvement of the existing setup, the strategy will involve building a solid and sustainable ecosystem with an agile approach (by adjusting the relevant actions and measures) based on the lessons learned during the previous step.

In order to achieve this, transformation projects will be undertaken along the following lines:

- ☑ Provide support to institutional actors such as the IMSP, the IFRI and Sèmè City, as well as private sector actors and startups, in rolling out value-added solutions;
- ☑ Develop human capital;
- ☑ Carry out technology and knowledge transfer to ensure a strong link between research laboratories and the private sector;
- ☑ Adapt the legal and regulatory framework to suit the new demands of AI (Liability, Ethics, etc.)

STRATEGIC GUIDELINE 3 : Increased value of Benin's ecosystem, knowledge and expertise

Successful completion of the first two steps should help to establish Benin's renown and attractiveness in the field of AI, allowing for its results and expertise in AI to be leveraged and exported.

1.4.2. STRATEGIC OBJECTIVES

TABLE 9 : TABLE SHOWING COHERENCE BETWEEN STRATEGIC GUIDELINES AND OBJECTIVES

Strategic Guidelines	Strategic Objectives	Line of Action	Proposed Programs
Strategic Guideline 1 : Organization and consolidation of the existing fledgling ecosystem and exploitation of its results	**Strategic Objective 1 :** Implement high-impact initiatives and use cases	Service and data infrastructure	**Program 1 :** Development and implementation of high-impact AI solutions
Strategic Guideline 2 : Further development and support of the AI ecosystem	**Strategic Objective 2 :** Strengthen human capabilities in terms of AI and big data management	Human capital	**Program 3 :** Strengthen human capabilities of actors in AI professions and positions
Strategic Guideline 3 : Increased value of Benin's ecosystem, knowledge and expertise	**Strategic Objective 3 :** Provide better support for research, innovation, the private sector and cooperation in the field of AI	Research, innovation and partnership	**Program 3 :** Support for training, research, innovation, the private sector and cooperation
Strategic Guideline 2 : Further development and support of the AI ecosystem	**Strategic Objective 4 :** Update the institutional and regulatory framework for AI and big data management	Governance	**Program 4 :** Implementation of governance framework for AI and big data management

STRATEGIC OBJECTIVE 1: Implement high-impact initiatives and use cases

The assessment of the current situation showed that there are multiple AI initiatives and that AI can offer solutions to a great many issues faced by the priority sectors covered by the research.

The first stage of the iterative (and incremental) approach to rolling out this strategy consists of the actual implementation of AI initiatives and solutions. To this end, the top priority should be to scale up the existing initiatives.

This objective should allow for the high-impact AI initiatives to succeed, all whilst proving the National Data Center's ability to support the development of AI solutions.

Specific objectives

In order to achieve this strategic objective, the following specific objectives have been established :

- Implement components in the data center such as Data-Lake-as-a-Service, ML-as-a-Service, etc.;
- Rollout (Definition and planning, drawing up specifications, selecting service providers, execution, change management and deployment) of AI solutions.

Expected effects

The expected effects of this strategic objective is to resolve the identified issues through the implementation of AI solutions.

STRATEGIC OBJECTIVE 2: Renforcer les capacités humaines sur l'IA et la gestion des mégaData

The inadequacy of human capital is the main factor holding back the emergence of an AI ecosystem in Benin. Addressing this will require not only training and having access to the necessary skills, but also educating all actors (public, private, civil society and end users) in the ecosystem about digital tools and AI.

Specific objectives

In order to achieve this strategic objective, the following specific objectives have been established :

- Training in the field of AI and Data Science;
- Strengthen human capabilities in terms of AI;
- Strengthen human capabilities in terms of big data management.

Expected effects

The expected effects of this strategic objective are:

- Basic training, specific programming training, and ongoing training courses being provided in institutions;

- ☑ Actors (both public and private) as well as end users being educated and trained in AI;
- ☑ Actors (both public and private) as well as end users being educated and trained in big data management.

STRATEGIC OBJECTIVE 3 : Provide better support for the development of human capital, research, innovation, the private sector and cooperation in the field of AI

Research, innovation and the private sector are important components for any AI ecosystem to flourish.
Providing answers to bolster the support provided to this sector is essential to the success of AI in Benin.

Specific objectives
In order to achieve this strategic objective, the following specific objectives have been established:

- ☑ Support training and research;
- ☑ Develop sustainable funding mechanisms for research and innovation;
- ☑ Bolster subregional and international cooperation.

Expected effects
The expected effects of this strategic objective are :

- ☑ Research centers becoming productive and attractive at both subregion and international levels;
- ☑ The transfer of research results between research laboratories and the private sector being ensured;
- ☑ The productivity and quality of products (or new products) in strategic, high-potential sectors being improved;
- ☑ Benin becoming a well-known actor in the field of AI and its leadership within the subregion being cemented.

STRATEGIC OBJECTIVE 4 : Update the institutional and regulatory framework for AI and big data management

The assessment of the current situation highlighted a lack of oversight for AI solutions and the need to address the ethical and liability issues related to using AI.
It also brought up the need for the proper management of big data, which is the raw material used for AI solutions.
This strategic objective should allow for:

- ☑ Legislation regulating the relevant ethical and liability issues to be adopted;
- ☑ A big data management system to be implemented.

Specific objectives

In order to achieve this strategic objective, the following specific objectives have been established :

- ☑ Adopt legislation regulating AI in Benin;
- ☑ Establish a controlled environment for the development of AI initiatives;
- ☑ Define and roll out a big data management model.

Expected effects

The expected effects of this strategic objective are:

- ☑ Ethical and liability issues being under control;
- ☑ Activities in the field of AI being implemented in a coordinated fashion by the actors involved;
- ☑ High-quality data becoming available in large quantities.

TABLE SHOWING COHERENCE BETWEEN MAJOR ISSUES AND STRATEGIC OBJECTIVES

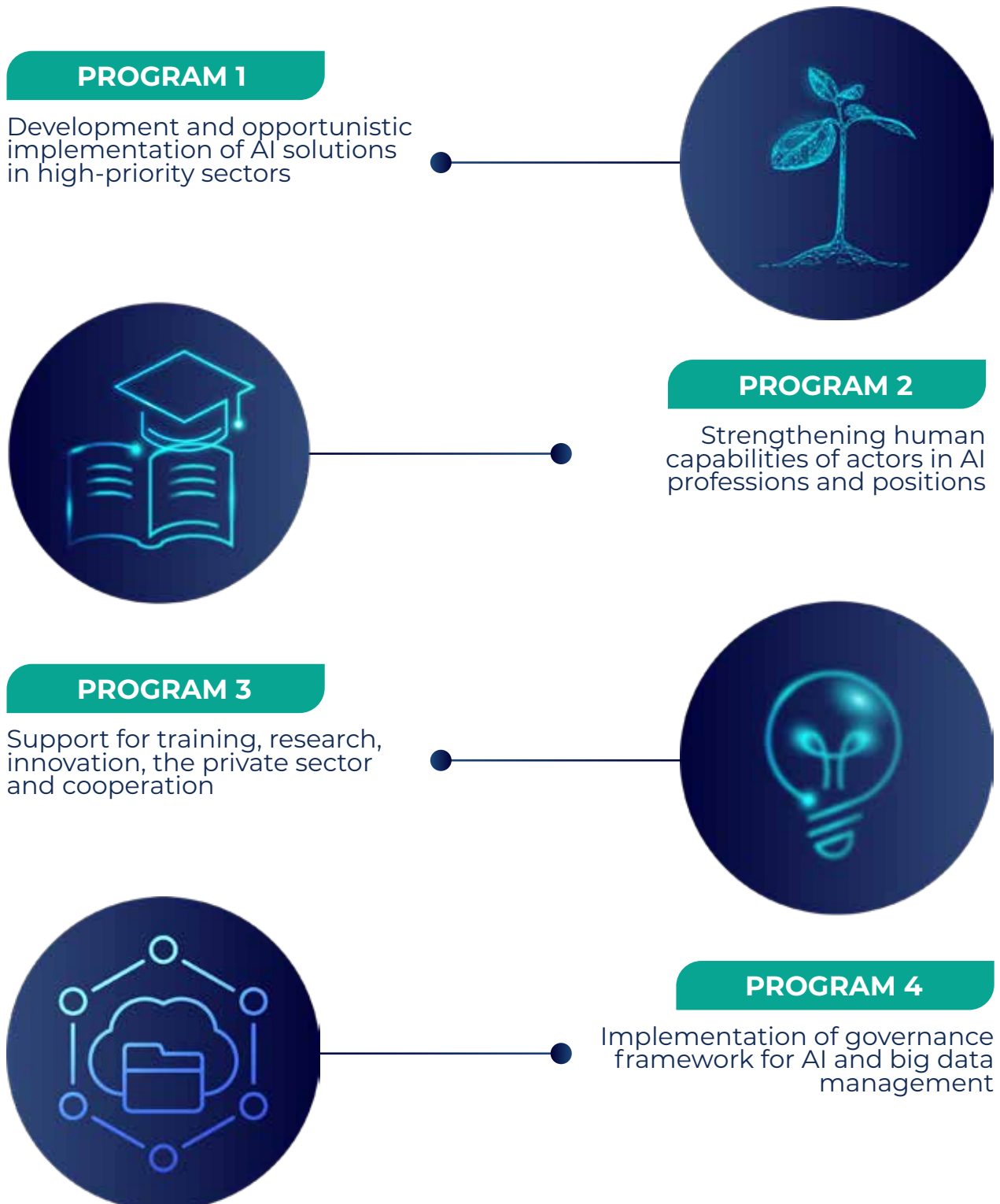| Problèmes majeurs	Objectifs stratégiques
The ecosystem is not aware of the benefits of AI	**Strategic Objective 1:** Implement high-impact initiatives and use cases **Objectif stratégique 2 :** Strengthen human capabilities in terms of AI and big data management
Institutional support is not sufficient for AI research and startups	**Strategic Objective 3 :** Provide better support for research, innovation, the private sector and cooperation in the field of AI
Insufficient sectoral funding for AI research and startups	
Insufficient resources trained in the field of AI	**Strategic Objective 2 :** Strengthen capabilities and educate people on AI and big data management
Ethical and liability issues related to AI not being addressed by the legal framework	**Strategic Objective 4 :** Update the institutional and regulatory framework for AI and big data management
Lack of a framework for big data management	

2

PROGRAMMATIC FRAMEWORK

2.1. TABLE SHOWING COHERENCE BETWEEN THE STRATEGIC FRAMEWORK AND THE PROGRAMMATIC FRAMEWORK

In total, four (4) programs have been drawn up for the implementation of the strategic objectives of the National Artificial Intelligence and Big Data Strategy:

PROGRAM 1

Development and opportunistic implementation of AI solutions in high-priority sectors

PROGRAM 2

Strengthening human capabilities of actors in AI professions and positions

PROGRAM 3

Support for training, research, innovation, the private sector and cooperation

PROGRAM 4

Implementation of governance framework for AI and big data management

TABLE 10: PROGRAMMATIC FRAMEWORK

Programs	Overall Objectives of the Programs	Specific objectives
Program 1 : Development and implementation of high-impact AI solutions	Implement high-impact initiatives and use cases and scale up the associated prototypes	- Implement components in the data center such as Data-Lake-as-a-Service, ML-as-a-Service, etc.; - Roll out (Definition and planning, drawing up specifications, selecting service providers, execution, change management and deployment) AI solutions.
Program 2 : Strengthening human capabilities of actors in AI professions and positions	Strengthen human capabilities in terms of AI and big data management	- Strengthen human capabilities in terms of AI and big data management.
Program 3 : Support for training, research, innovation, the private sector and cooperation	Provide better support for research, innovation, the private sector and cooperation in the field of AI	- Support training and research; - Develop sustainable funding mechanisms for research and innovation; - Bolster subregional and international cooperation. - Establish 'local champions' of AI
Program 4 : Implementation of governance framework for AI and big data management	Update the legal and regulatory framework for AI and big data management	- Adopt legislation regulating AI in Benin; - Establish a controlled environment for the development of AI initiatives; - Define and roll out a big data management model (processes, organization, governance and tools).

2.2. PLAN OF ACTION

Specific objectives	Actions	Year 1	Year 2	Year 3	Year 4	Year 5
Program 1: Development and opportunistic implementation of AI solutions in high-priority sectors						
Carry out preliminary actions	Setting up the implementation mechanism	x				
	Conducting preparatory studies for specifications and economic and financial studies	x				
Implementing AI solutions	Equipping the existing National Data Center with AI services	x	x			
	Implementing AI solutions	x	x	x	x	x
Program 2: Strengthening human capabilities of actors in AI professions and positions						
Training in the field of AI and Data Science	Integration of basic training, specific programming training, and ongoing training courses into the educational system	x	x	x	x	
Strengthening human capabilities in terms of AI	Implementation and rollout of a capacity development program for AI aimed at public and private actors, as well as end users	x	x	x	x	
Strengthening human capabilities in terms of big data management	Implementation and rollout of a capacity development program for big data management aimed at providers and consumers of data, as well as end users		x	x	x	x

Objectifs spécifiques	Actions	An 1	An 2	An 3	An 4	An 5
Program 3: Support for training, research, innovation, the private sector and cooperation						
Support training and research	Equipping universities and promoting partnerships in AI		X	X	X	X
Develop sustainable funding mechanisms for research and innovation	Bolstering institutional support to facilities in charge of entrepreneurship and innovation in terms of engagement and sustainable provision of resources allocated to startups.		X	X	X	X
Bolster subregional and international cooperation.	Bolstering institutional cooperation and collaboration	X	X	X	X	X
	Organizing major events focused on AI	X	X	X	X	X
Program 4: Implementation of governance framework for AI and big data management						
Adopt legislation regulating AI in Benin	Adopting legislation regulating the relevant ethical and liability issues			X	X	
Establish a controlled environment for the development of AI initiatives	Creating a controlled environment for the development of AI initiatives based on articles 406, 407 and 408 of the Code of Digital Affairs			X		
Define and roll out a big data management model.	Definition and introduction of procedures for the data collection and provision chain			X	X	X

The catalytic actions in the implementation of the strategy, allowing for the objectives to be achieved, are :

- ☑ **Action 1.2.** Implementing AI solutions
- ☑ **Action 2.2.** Implementation and rollout of a capacity development program for AI aimed at public and private actors, as well as end users
- ☑ **Action 2.3.** Implementation and rollout of a capacity development program for big data management aimed at providers and consumers of data, as well as end users
- ☑ **Action 4.2.** Creating a controlled environment for the development of AI initiatives based on articles 406, 407 and 408 of the Code of Digital Affairs
- ☑ **Action 4.3.** Definition and introduction of procedures for the data collection and provision chain

ACTION 0.1. Setting up the implementation mechanism

This involves setting up the mechanism for implementing the strategy described in Chapter 4.

Pre-requisites	Performance indicators	Duration
The strategy being validated	▶ The mechanism for implementing the strategy being set up	1 month

ACTION 0.1. Conducting preparatory studies for specifications and economic and financial studies

This involves carrying out technical and economic feasibility studies, ultimately producing :

- ☑ Specifications for the implementation of the actions;
- ☑ An economic and financial model for the strategy.

Pre-requisites	Performance indicators	Duration
The framework for implementing the strategy being set up	▶ The specifications being drawn up ▶ The economic and financial model being drawn up	4 months

ACTION 1.1. Equipping the existing Data Center with AI services

This involves equipping the existing data center with a layer of technical services which allow for the development, execution and use of AI solutions.
Access to this layer must be shared, allowing the data center to operate in 'Artificial Intelligence as a Service' mode (see Annex 3) for all the solutions and initiatives to be implemented.
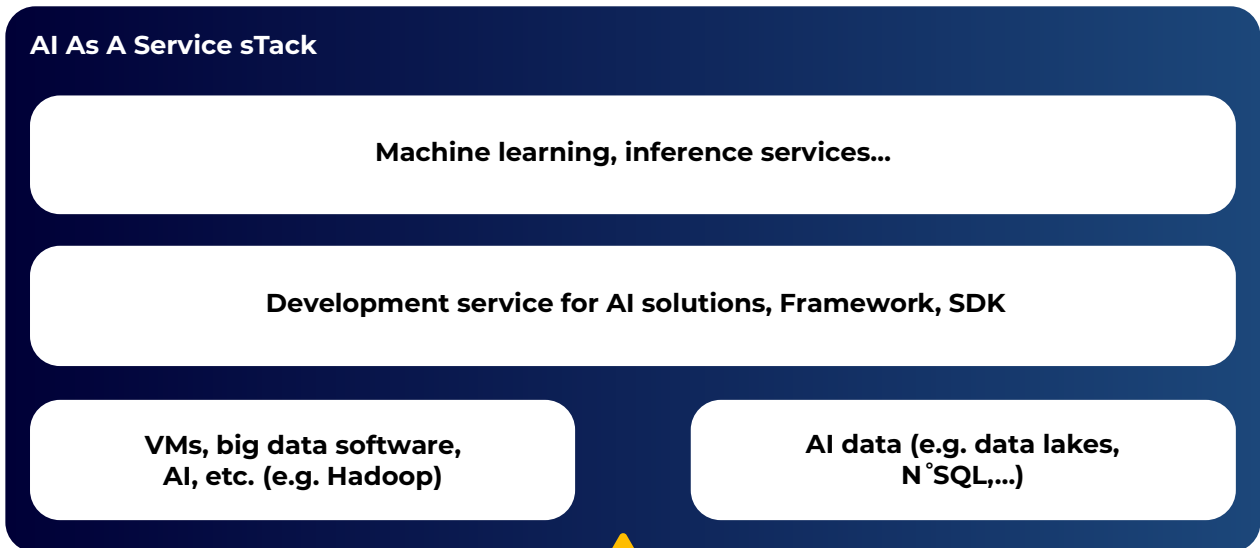
AI As A Service sTack

Machine learning, inference services...

Development service for AI solutions, Framework, SDK

VMs, big data software, AI, etc. (e.g. Hadoop)

AI data (e.g. data lakes, N˚SQL,...)

Existing Infrastructure Services

Pre-requisites	Performance indicators	Duration
-The framework for implementing the strategy being set up -Availability of the data center	▶The AI service layer being set up	9 months

ACTION 1.2. Implementing AI solutions

Description and objectives

This action covers the development cycle for AI solutions, including:

- ☑ Managing the portfolio of identified use cases;
- ☑ Definition and planning;
- ☑ Drawing up the specifications and selecting the service providers for execution;
- ☑ Production and rollout of AI solutions;
- ☑ Implementation of change management and buy-in actions.

When producing AI solutions, the top priority should be to scale up the existing solutions.

With a view to establishing and strengthening local expertise and developing national champions, priority should be given to local companies or groups involving local companies.

Furthermore, to speed up the production of (essential) PoCs in AI projects, African **(e.g. https://zindi.africa/)** and global platforms can be leveraged (with local actors serving as intermediaries).

The assessment of the current situation brought up the following use cases:

☑ Technological complication: lack of existing AI models (algorithms) for the use case or the need to overhaul an existing model;

☑ Data-related complication: lack of high-quantity, high-quality data and the degree of pre-processing required to use the data;

☑ Business impact: business gain achieved or scale of business issue resolved.

SECTOR	Use Case / Issue / Initiative	Complication		Business Impact (High, Medium, Low)
		Technological	Data-related	
Public Administration	Predictions regarding job applications	Medium	High	Low
	Automatic detection of administrative documents	Medium	High	Low
	Help with automatic document classification	Low	Medium	High
	Automatic reading	Low	Low	High
	Customer service	High	N/A	N/A
Agriculture	Predictions regarding resource availability (water, soil, feedstock, etc.) and production planning based on market prospects	Medium	High	Medium
	Detection of various diseases affecting production	Low	High	High
	Prediction of sorghum yield using drones and machine learning	High	N/A	High
	Rice disease detector	High	N/A	High
	Environmental monitoring	High	High	High
	Food quality evaluation	Low	Medium	Low
Living conditions	Management of the land registry map	Medium	N/A	N/A
	Monitoring of town planning and illegal construction	Medium	N/A	N/A
Education	Suggested postings based on skills and preferences	Medium	Medium	Medium

Category	Use Case			
Education	Prediction of academic performance			High
	Personalized academic paths	High	High	Medium
	Prediction of student behavior	High	High	Medium
	Natural language processing (e.g. translation from local languages into French), speech recognition	Medium	High	High
Environment	Smart waste sorting	High	High	Medium
	Climate prediction	Medium	High	Medium
	Combating coastal erosion	High	N/A	N/A
Finance & Economy	Smart tax audits	Medium	Medium	High
	Prioritization of services based on user journey and privileges	High	High	Medium
	Processing of tender documents	High	High	Low
	Streamlining of public expenditure	High	High	High
	Identification of potential sources of tax revenue through analysis of port entries and exits, logging, or truck traffic on national highways	High	N/A	N/A
	Management of innovation patents	N/A	N/A	High
Infrastructure & Transportation	Traffic jam prediction	High	Low	Low
	Optimization of logistics flows	High	High	Medium
	Predictive management of incidents and maintenance of water, electricity and fiber optic networks,	Elevé	Faible	Faible
Justice	Automatic data extraction	Medium	Medium	High
	Prediction of civil protection measures	Medium	Medium	Low

Justice	Legal assistance applications	High	High	Medium
Media	Assistance with the use of media archives	High	N/A	High
	Application d'assistanat juridique	Elevé	Elevé	Moyen
Médias	Aide pour l'exploitation des archives médias	Elevé	N/A	Elevé
Port	Optimizing the unloading process and reducing dwell time of critical cargo containers	High	N/A	High
	Hazard detection (rainfall for unloading cargo, temperature for storing hydrocarbons, etc.)	High	N/A	High
	Prediction of import and export flows of cargo	High	N/A	High
	Optimization of the flow of trucks	N/A	N/A	High
Healthcare	Assistance with diagnosis and treatment	Medium	Medium	High
	Production of disease prediction models	High	High	Medium
	Sector governance assistance tool (Data Visualization)	Medium	High	Low
	Management of mass health campaigns (vaccination, raising awareness, infectious diseases, etc.)	Medium	Medium	Medium
	Voice system in national language for pre-diagnosis of certain diseases	High	N/A	High
	Virtual reality surgical procedures	High	N/A	High
	Cancer detection via medical image processing (e.g. liver cancer)	High	Low	High
	Drug monitoring prediction, detection of high-risk patients, detection of infections	High	High	High

Healthcare	Support for healthcare worker decision-making	High	N/A	High
Security & Defense	Prediction of emergency vehicle response	Low	High	Low
	Prediction of number of emergency calls	Low	High	Low
	Prediction of offenses	High	High	Low
	Video filtering: Detection and removal of pornographic scenes	High	High	Medium
	Analysis of video streams from city CCTV sources	High	N/A	N/A
	Combating poaching in nature reserves	High	N/A	High
	Prevention of security risks (BARSA with DMIA France)	High	N/A	High
	Management of the movement of people in the event of an epidemic situation	High	N/A	High
	Surveillance of borders and maritime coasts	High	N/A	High
Cybersecurity	Automatic data analysis for the detection of suspicious behavior, prevention and detection of cyberattacks	Medium	High	Medium
Tourism	Augmented reality for tourism to Benin	High	N/A	High

Pre-requisites	Performance indicators	Duration
Availability of the AI service layer in the national data center or, if not possible, consider a cloud-based solution in the interim.	▶ Number of operational AI solutions ▶ Number of sectors covered	5 years (prioritizing projects with prototypes ready and the potential for high impact)

ACTION 2.1. Integration of basic training, specific programming training, and ongoing training courses into the educational system

Description and objectives

This will involve establishing an educational system offering real career opportunities in AI and big data management, but also providing every student in the educational system with basic knowledge about the workings of AI and big data management.

In order to strengthen these capacities, these activities should :

- ☑ Update some existing curricula (from basic education to ongoing training) in order to include subjects relating to AI and big data management.
- ☑ Create and popularize specific degree courses in AI and big data management

Pre-requisites	Performance indicators	Duration
None	▶ Number of people trained in AI and big data	4 years

ACTION 2.2. Implementation and rollout of a capacity development program for AI aimed at public and private actors, as well as end users

Description and objectives

This will involve organizing capacity development activities for AI aimed at public and private actors, as well as end users.

In order to strengthen these capacities, these activities should cover, amongst other things :

- ☑ The benefits (impact on products and services, businesses, etc.) of AI for the entire ecosystem, most notably for sectors such as agriculture (MAEP, SNA, INRAB, etc.), healthcare, finance, security, education, transportation, digital issues, and e-governance;
- ☑ The advantages for end users, particularly in terms of employability;
- ☑ The institutional framework for the implementation of AI, in order to reassure stakeholders;
- ☑ The practical details of implementing AI solutions and each person's role in this ecosystem.

Pre-requisites	Performance indicators	Duration
None	▶ Number of people whose capacities have been strengthened for each category	4 years

ACTION 2.3. Implementation and rollout of a capacity development program for big data management aimed at providers and consumers of data, as well as end users

Description and objectives

This will involve organizing capacity development activities aimed at data providers, as well as for end users, with a view to encouraging them to share their data.

Part of the implementation of this action can be pooled with the implementation of Action 3.1 on AI capacity development.

In order to strengthen these capacities, these activities should cover, amongst other things :

- ☑ The benefits (impact on products and services, businesses, etc.) of big data management for providers and consumers;
- ☑ The advantages for end users;
- ☑ The institutional framework for big data management, in order to reassure stakeholders;
- ☑ The practical details of the big data management cycle;
- ☑ The support measures that data providers can rely upon.

Pre-requisites	Performance indicators	Duration
None	▶ Number of capacity development activities carried out on big data management	4 years

ACTION 3.1. Equipping training facilities (universities, institutes, training and research centers) to work on AI and big data, and promoting partnerships in AI

Description and objectives

The development of AI solutions by the IMSP and the IFRI is very promising. The IMSP's supercomputer is an essential asset in developing these solutions and in establishing Benin's positioning within the subregion in terms of AI.

During the initial stages, this action will provide the IMSP with the necessary equipment to exploit the full potential of its supercomputer. This will involve, at a minimum :

- ☑ Fitting out new work rooms (there is currently only one);
- ☑ Setting up FabLabs;
- ☑ Forging partnerships with the private sector with a view to developing and scaling up AI solutions;
- ☑ Developing academic research partnerships on AI issues.

At later stages, this action will allow for the IFRI to be equipped in a complementary way.

Pre-requisites	Performance indicators	Duration
None	▶ The IMSP and the IFRI being fully equipped ▶ Number of partnerships established with universities and the private sector in AI.	4 years

ACTION 3.2. Bolstering institutional support to facilities in charge of entrepreneurship and innovation in terms of engagement and sustainable provision of resources allocated to startups

Description and objectives

This will involve, in particular, providing assistance for facilities in charge of entrepreneurship (e.g.: single point of contact for promoting SMEs) and innovation (e.g.: Sèmè City) in their respective roles of supporting entrepreneurship and innovation in AI.

Indeed, Sèmè City's activities in terms of training and launching AI initiatives are promising, and some projects require assistance in order to be scaled up effectively.

Pre-requisites	Performance indicators	Duration
None	▶ Number of initiatives and innovations financially supported ▶ Number of SAEIs (Innovative Entrepreneurship Support Facilities) improved ▶ Number of AI companies financially supported	4 years

ACTION 3.3. Bolstering institutional cooperation and collaboration

Description and objectives

Benin collaborates with many organizations in the field of AI. Numerous institutions are stepping up their focus on the subject.

However, there is an absence of African actors on the issues of regulation and standardization.

In particular, this will involve :

☑ Strengthening institutional collaborations (win-win) with institutions (AFRIA, ECOWAS, SMART AFRICA, UNESCO, etc.);

☑ Strengthening bilateral and multilateral cooperation agreements for technology exchange and transfer, such as with the DMIA;

☑ Establishing collaborations on AI with organizations such as ISO, Global AI Index, etc.;

Pre-requisites	Performance indicators	Duration
None	▶ Number of collaborations established ▶ Number of South-South, UEMOA, AU, Smart Africa collaborations per high-priority sector ▶ Number of partnerships established by universities ▶ Rate of achievement of partnership targets	5 years

ACTION 3.4. Organizing major events focused on AI

Description and objectives

This will involve organizing events geared towards innovation and raising awareness, along with events that can contribute to raising Benin's profile :

- ☑ Supporting existing major events. For example, the MAIC international AI competition, the Benin Workshop on Artificial Intelligence, and the Summer School on Artificial Intelligence (EEIA);
- ☑ Organizing hackathons and competitions for SMEs and young entrepreneurs with the goal of developing innovative solutions in the field of AI;
- ☑ Organizing national and international AI trade fairs and conferences.

This action was implemented through the first edition of the **Digital Entrepreneurship and Artificial Intelligence Exhibition (SENIA), which took place July 7-9, 2022** at the Palais des Congrès in Cotonou, featuring :

- ☑ Seven (7) panels;
- ☑ Eight (8) presentations / Keynote speeches;
- ☑ Ten (10) demonstrations;
- ☑ Thirty (30) stands;
- ☑ Over 2500 visitors.

Pre-requisites	Performance indicators	Duration
None	▶ Number of hackathons ▶ Number of trade fairs and conferences ▶ Number of innovative solutions (for each sector) resulting from the hackathons ▶ Number of trade fairs and major international events participated in ▶ Number of trade fairs held	5 years

ACTION 4.1. Adopting legislation regulating the relevant ethical and liability issues

Description and objectives

Along with the foundation of the Code of Digital Affairs, this action is one of the major pillars designed to ensure the proper governance of AI in Benin. It consists

of making provisions in the Code of Digital Affairs and the Criminal Code for the ethical and liability issues related to AI, in the same way that Book V of the Code of Digital Affairs exhaustively covers issues related to personal data.

Indeed, the provisions of Book V of the Code of Digital Affairs primarily cover the liability issues (e.g. article 387) related to the protection of personal data.

This legislation should, for example, formalize and institute impact analyses and monitoring of AI solutions throughout their lifecycle, much in the same way it does for personal data (through articles 428 and 429 of the Code of Digital Affairs).

Any such monitoring must be instituted to ensure that AI systems are designed and implemented with due consideration for key concepts such as people, the planet, prosperity, peace, transparency, justice and fairness, accountability, non-maleficence, privacy, benevolence, freedom and autonomy, sustainability, dignity and solidarity.

The organization in charge of this monitoring and the enforcement of the legislation should be identified.

Pre-requisites	Performance indicators	Duration
None	▶ Adoption of legislation	12 months

ACTION 4.2. Creating a controlled environment for the development of AI initiatives based on articles 406, 407 and 408 of the Code of Digital Affairs

Description and objectives

Pending the establishment of a regulatory body for AI, and in order to initiate the implementation of AI solutions within the framework of the SNIAM in the meantime, it is necessary for this to be done within a suitable framework.

To this end, articles 406, 407 and 408 of the Code of Digital Affairs allow for the establishment of a controlled environment for the development of AI initiatives, through the publication of simplification and processing standards or exemption measures.

It will therefore be necessary to set up this controlled environment based on these provisions of the Code of Digital Affairs.

Pre-requisites	Performance indicators	Duration
None	▶ Controlled environment being established and operational.	6 months

ACTION 4.3. Definition and introduction of procedures for the data collection and provision chain

Description and objectives

The implementation of this action will allow for high-quality, high-quantity data to be input into AI solutions. This data can be structured or unstructured, personal or non-personal data, open, etc.

This action will help the interoperability framework to evolve by complementing:

- The procedures for data collection and management of the relationship between data providers, data aggregators, data collectors, the data processor and data consumers;
- The actors (providers, collectors and processor) in charge of and involved in the system;
- Technical interoperability with the recommended network, transport, transfer and service protocols (e.g. HTTP(S), FTP(S), SAML, OAuth);
- Syntactic interoperability with, amongst others, JSON (to take APIs into account), XSD, etc.;
- Semantic interoperability to ensure that once shared, data can be understood by other systems;
- Data governance with the recommended types of data repository architectures and associated rules, data dictionary, metadata, in a big data management context: requirements for data aggregators, data collectors, etc.;
- Appointment of Chief Data Officers (CDOs) in administrations. They oversee the collection, management and storage of data in a given administration. They ensure the availability of high-quality, high-quantity data;
- The technical processing chain of the data, up to the point where it is made available in the system. The data that collected and processed can be structured and/or unstructured. The diagram below lays out the principle of the collection and processing chain.

FIGURE 6 : PRINCIPLE OF THE COLLECTION AND PROCESSING CHAIN

Acquisition	Storage	Processing	Provision	Consumption
Acquisition of internal data (references)	**Storage of raw data** (unstructured data, photos, videos, social networks)	**Mass processing** (batch processing, advanced analytics)	**Provision of refined data** (DWH, DM)	**Visualisation dashboard**
				Reporting
Acquisition of external data	**Storage of structured data**	**AI models** (Deep learning, Machine learning)	**Exposure of internal and external data services** (API, open data)	**Exploration** (data mining)
				AI analysis
		Real-time processing (continuous data, real-time data)		**Call of exposed services**
				Management of events (e.g. alerting)

This collection and processing chain will use, in particular :
. The National Interoperability Platform (NIP);
. ETL/ELT processes, including upstream data cleansing;
. Migration and transformation databases (both relational and non-relational);
. MDM (Master Data Management as a Service);
. National Digitalization Centre (NDC);
. The existing PKI to ensure that transactions are secure.

This action must be carried out in phases, as detailed below :
Phase 1 :
• Updating the interoperability framework;
• Implementing the processing chain;
Phase 2 : Finalizing the implementation of the processing chain;
Phase 3 : Improving the collection and processing chain.

FIGURE 7 : BLOCK DIAGRAM OF THE BIG DATA MANAGEMENT SYSTEM
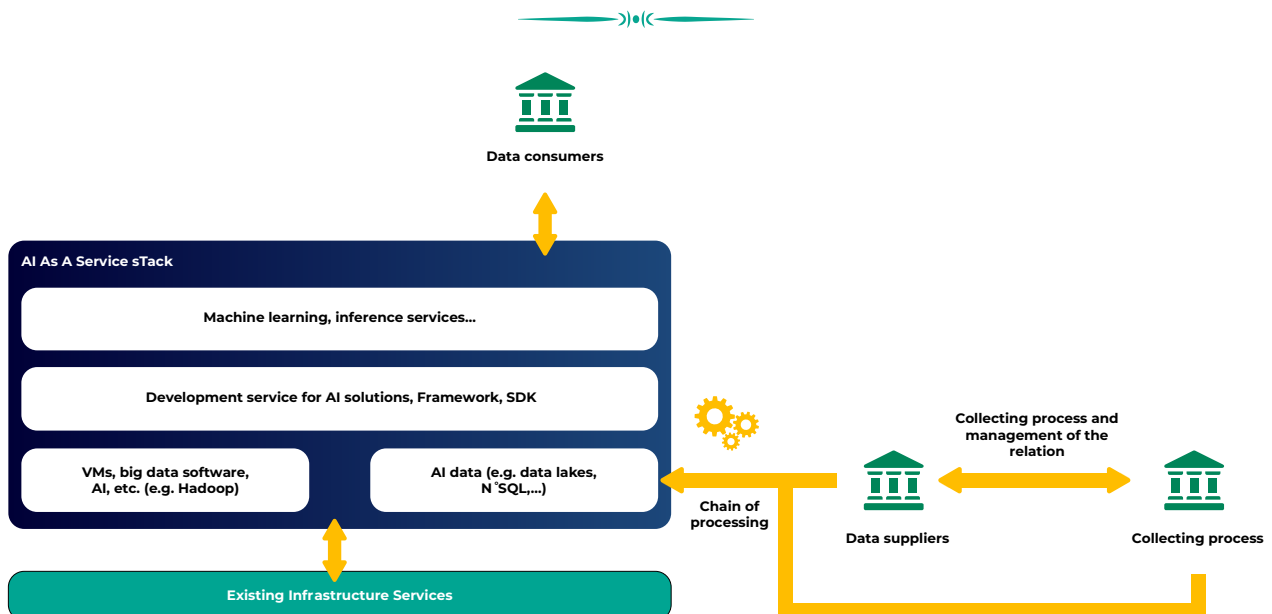
☑ Data **providers** are the entities that make data available :
• **Open Data Platform :** Will contribute to the provision of high-quality data, as the public service is required to improve the quality of its own data before making it public, by way of feedback mechanisms;
• **Agriculture :** the Ministry of Agriculture, the Institut de Recherche d'Agronomie Béninoise (INRAB), the Centres de Recherche Agricole (CRA);
• **Healthcare :** the Ministry of Health, the National Health Information Management System (DHIS2), a data warehouse producing indicators (AIDS, etc.), the National Malaria Control Program;
• **Transportation :** Centre National de Sécurité Routière (CNSR), Société des Infrastructures Routières du Bénin (SIRB), Compagnie de Transports, Port Autonome

de Cotonou, Société de contrôle technique, Société de délivrance de documents de transport;

• **Education :** e-results, EDUCMASTER, Baccalaureate Holders' Platform;

• **Economy and Finance database :** Economic statistics, INSTaD (formerly INSAE), Taxes (taxation, land registry, property tax), Direction Générale du Trésor et de la Comptabilité Publique, Direction Générale de la Douane et des Droits Indirects, Public Markets, Stock Exchanges, Chamber of Commerce, CAA (official development assistance), Agence Nationale des Domaines et du Foncier (ANDF);• **Civil status :** ANIP (RNPP database)

• **ARCEP :** provider of data related to the ICT sector;

• **Private sector data :** Network and Mobile Operators, Banks and Insurance, Microfinance, Electricity Supply Company (SBEE), Water Supply Company (SONEB), Internet Service Providers, Pay-TV/Radio channels, VOD Content.

• **Subregional and international data :** Stock exchanges, research network data;

• **Data aggregators :** search engines and social networks.

☑ The data **collector** is the entity that collects the data and manages the relationship with the data providers and the user;

☑ The data **processor** is the entity in charge of using the 'AI as a Service' infrastructure. This can be the same entity as the collector;

☑ The data **consumers** are the administrations (or any actor) using the data to build digital solutions, or for any other purpose.

Pré requis	Performance indicators	Duration
Availability of the AI service layer in the national data center or, if not possible, consider a cloud-based solution in the interim.	▶ Interoperability framework being updated in year 2 ▶ Processing chain being partly operational in year 3 ▶ Processing chain being finalized in year 4	3 years

3

MECHANISM FOR FUNDING AND MOBILIZATION OF RESOURCES

3.1. FUNDING MECHANISM

Over the 2023-2027 period, the funding required for the strategy is estimated to be approximately CFAF 4.68 billion.

The funding mechanism and the mobilization of financial resources are fundamental to the successful implementation of the Artificial Intelligence strategy.

As a significant amount of investment is required, the funding strategy revolves around the mobilization of both internal and external resources.

The main objective at hand is to provide adequate, sustainable financial mechanisms and resources to launch the Artificial Intelligence revolution in Benin.

The establishment of appropriate advisory structures and the development of strategies for each component will garner financial support from development partners on a vast scale.

Although external resources are certainly key to funding the implementation of the strategy, the mobilization of internal financial resources nonetheless remains necessary. The measures below will make a significant contribution to tackling the issue of funding:

- ☑ Call for national funding from both the state and the private sector;
- ☑ Call for bilateral and multilateral assistance from external sources;
- ☑ Call for foreign private capital within the framework of a Public-Private Partnership (PPP);
- ☑ Mobilization of national savings.

3.2. MOBILIZATION OF RESOURCES FOR THE IMPLEMENTATION OF THE STRATEGY

The development of AI requires a significant mobilization of both human and financial resources in order to establish the necessary technological infrastructure, develop the capacities of the players involved, and kickstart the ecosystem.

4

METHODS OF IMPLEMENTATION

4.1. IMPLEMENTATION MECHANISM

4.1.1. INSTITUTIONAL FRAMEWORK

The implementation mechanism has been established in accordance with Decree no. 2021 - 586 of November 10, 2021 and in view of the general framework for the management of public investment and Decree no. 2018 - 531 of November 14, 2018 on the organization of governing authorities for digital programs and projects in the Republic of Benin.

The cross-sectoral nature of this strategy will require an implementation mechanism at two different levels :

- ☑ **A cross-sectorial** level that will allow for the steering and coordination of the overall implementation of the strategy. The level will be the responsibility of the Ministry of Digital Affairs and Digitalization.
  This coordinating body will work by engaging with the Conference of Chief Information Officers and all stakeholders (universities, startups, AI partners, etc.) involved in the ecosystem.
- ☑ **A sector-specific** level which will allow for the ministries in question to steer the implementation of the AI projects (with each one handling their respective projects). The sectoral management framework will be implemented in accordance with Decree no. 2018 - 531 of November 14, 2018.
- ☑ In addition to these two levels, a public investment management framework will be established in accordance with Decree no. 2021 - 586 of November 10, 2021. According to this legislation, this framework is to be put in place if necessary, regardless of the level of operation.

4.1.2. RESPONSIBILITIES OF THE ACTORS

Actor	Responsibilities
Ministry of Digital Affairs and Digitalization	- Ensures the overall oversight and steering of the strategy. - A national governance approach was deployed to develop and validate this strategy, with the participation of representatives from both government and other key stakeholders in order to make sure that each sector's specific needs were identified, and ensuring that no key stakeholder group was excluded from the process. This approach will also help to improve the coordination of its implementation. - Decree no. 2018 - 531 of November 14, 2018

Actor	Responsibilities
Conference of Chief Information Officers	- Provides its opinion on the implementation of the strategy in the light of feedback from its sectoral implementation. - Represents an essential link in the change management and buy-in strategy to be put in place. - Represents an essential link in the data collection mechanism to be put in place. - Decree no. 2018 - 531 of November 14, 2018
Stakeholders in the ecosystem	These are all the actors, aside from the ministries, who are impacted by or beneficiaries of certain actions in the strategy. They are involved in the implementation of the actions. They express their needs and provide their opinions. These are public service users and actors in the field of innovation and entrepreneurship, such as Sèmè City, AI startups, universities, AFRIA, SMART AFRICA, etc.
Commission ministérielle des systèmes d'information et de la connectivité	Responsible for all the AI projects under its ministry, in accordance with Decree no. 2018 - 531 of November 14, 2018
Agence des Systèmes d'Information et du Numérique (ASIN)	Contributes to the implementation of AI projects
Steering Committee	Works on AI projects in accordance with Decree no. 2018 - 531 of November 14, 2018
Technical Committee	Works on AI projects in accordance with Decree no. 2018 - 531 of November 14, 2018
Sectoral Committee for the Monitoring of the Government Action Program	Works on AI projects in accordance with Decree no. 2021 - 586 of November 10, 2021
Program Support Units	Il travaille sur les projets d'IA conformément au Décret 2021 - 586 du 10 novembre 2021

4.2. EVALUATION MECHANISMS

The evaluation mechanism has been established in accordance with Decree no. 2021 - 586 of November 10, 2021 and in view of the general framework for the management of public investment and Decree no. 2018 - 531 of November 14, 2018 on the organization of governing authorities for digital programs and projects in the Republic of Benin.

In order to assess the performance achieved in the implementation of this strategy, and in accordance with the principle of accountability and the 'iterative and incremental' principle, an annual evaluation is required.

Specifically, this provision makes it possible to measure and evaluate the extent to which the objectives have been reached in order to:

☑ Support the steering of the strategy by promptly providing information on the progress made through the strategic initiatives (i.e. the programs, projects and actions implemented) and take corrective steps should said progress prove insufficient;

☑ Confirm and adjust the scopes of the work packages to be undertaken in the subsequent phase;

☑ Carry out periodic assessments to check whether the strategy is working effectively and to promote knowledge sharing and learning amongst the parties involved;

☑ Foster accountability and promote the obligation to report amongst the actors involved.

4.3. ACTIVITIES AND PERFORMANCE MEASUREMENT FRAMEWORK

This performance measurement framework establishes the targets to be achieved from one year to the next over the five-year course of the strategy.

When the SNIAM has been implemented, according to the Government AI Readiness Index, Benin should have improved its ranking (and risen to be on a par with Mauritius) in the following areas:

Field	Line of action
Governance	Vision
	Governance and ethics
	Digital capacity
	Adaptability
Data and infrastructure	Data presentation
	Availability of data
	AI infrastructure
Technological sector	Human capital
	Capacity for innovation
	Scale

4.4. SUPPORTING MEASURES

TABLE 14 : SUPPORTING MEASURES

N°	Measure	Potential to accelerate the implementation of the SNIAM	Potential impact on the sustainability of its effects
1	Incorporate AI training into the strategy for the educational sector in order to quintuple the current volumes (25x3)	Medium	High
2	Accelerate the adoption of the Startup Act to support the implementation of the strategy	High	High
3	Continue the implementation of the Fonds d'Appui à l'Entrepreneuriat Numérique (FAEN) by the Agence pour le Développement des PME	High	High
4	Continue to establish the interoperability framework in the field of healthcare, as part of the National e-Health Strategy	High	High

4.5. RISK ANALYSIS AND CONDITIONS FOR SUCCESS

The implementation of the SNIAM involves risks which need to be suitably managed and circumvented. The success of SNIAM depends on actors at every level controlling these risks.

The main risk factors that could hinder the achievement of the SNIAM's expected results are:

☑ **Failure of the management bodies to function and lack of engagement from the stakeholders:** the bodies charged with implementing the SNIAM failing to function would greatly hinder the implementation of the strategy. It is essential to ensure the optimal functioning of the implementing bodies, in terms of both the regularity of their meetings and the relevance and applicability of their deliberations, in order to guarantee the best chances of success for the SNIAM.

Recommendations: Organize a far-reaching information and awareness campaign on the SNIAM for the general public, the various administrations, and the development partners, with a view to encouraging rapid buy-in to the strategy.

☑ T**he inadequacies of the mechanism for mobilizing financial resources** expose the SNIAM to the risk of failing to secure the necessary funding.

Recommendations: develop PPPs, promote the development of SMEs/startups in AI, and mobilize financial resources from various international funding sources specializing in AI (see 'funding mechanism' p35, 3.1.).

5

CONCLUSION

Stratégie Nationale d'Intelligence Artificielle et des MégaData 2023 - 2027

Numerous governments around the world have rolled out strategies or targeted actions in order to encourage the adoption of artificial intelligence.

As the possible uses of artificial intelligence continue to proliferate, adopting a strategy to guide how it is implemented will enable the Beninese government to take full advantage of it and ensure the general public's confidence in its use.

Benin's National Artificial Intelligence and Big Data Strategy proposes a response to the issues faced by strategic sectors in line with the objectives of the NDP and the GAP, and aims to position Benin as a pioneer in the emergence of an AI ecosystem within the subregion.

This strategy sets out the principles for implementation, lines of action and objectives that will allow for the successful integration of artificial intelligence into the public administration, the private sector, and society in general.

As such, it sets out four (4) implementation programs and ten (10) objectives, grouped into four strategic lines of action, which will guide the overall implementation of artificial intelligence :

Strategic Objective 1 : Implement high-impact initiatives and use cases
Strategic Objective 2 : Strengthen capabilities and educate people on AI and big data management
Strategic Objective 4 : Provide better support for research, innovation, the private sector and cooperation in the field of AI
Strategic Objective 4 : Update the institutional and regulatory framework for AI and big data management

The establishment of an AI ecosystem is a long-term pursuit, and this strategy allows the country to lay the foundations that will make its emergence possible by addressing the major challenges involved, namely :

☑ Challenges linked to data, relating to the collection, preparation, access, storage and governance of the data required to operate artificial intelligence mechanisms;
☑ The legal and regulatory challenges associated with artificial intelligence, specifically its governance and regulation;
☑ Ethical challenges, specifically issues relating to data protection and the protection of fundamental rights.

The funding for this strategy will come from the national budget, the private sector, and TFPs. The strategy is designed to **make artificial intelligence a lever to raise Benin's profile and provide support for strategic sectors by means of a tailor-made local ecosystem.**

The integration of artificial intelligence into Benin's day-to-day operations will require the participation of all public agencies, the public sector, and the Beninese people, which will make it possible to achieve the intended effects of improving productivity and the quality of products and services in high-priority sectors and those which can offer promising opportunities for AI. This dynamic will contribute to the creation of a landmark AI ecosystem driven not only by Beninese companies, but also by the fruits of technology and knowledge transfer between research laboratories and the private sector.

6

APPENDICES

6.1. APPENDIX 1 : REFERENCES

1. **BCEAO.** *Rapport annuel sur la situation de l'inclusion financière dans l'UEMOA au titre de l'année 2019. P14.* 2019.

2. **ARCEP.** *Rapport annuel d'activité 2020 ARCEP. P.49.* 2020.

3. **BCEAO.** *Rapport annuel sur les services financiers numériques dans l'UEMOA au titre de l'année 2019. P17.* 2019.

4. **MicroSave Consulting.** *FinTech inclusives en Afrique francophone Rapport pays - Bénin.*

5. **Oxford, Insights.** *Government AI Readiness Index 2020.* 2020.

6. **Forum Economique Mondial.** *The Global Competitiveness Report 2019.* 2019.

7. **Institute, Portulans.** *THE NETWORK READINESS INDEX.* 2020.

8. **Nations Unies.** *E-GOVERNMENT SURVEY 2018.* 2018.

9. *AI Expo Africa.* **Africa, AI Expo.** 2020.

10. **Mondiale, Banque.** *Rapport Doing Business.* 2020.

11. **ARCEP.** *OBSERVATOIRE DE LA TELEPHONIE MOBILE.* 2021.

12. *Observatoire de l'internet.* 2021.

13. **Smart Africa.** *Plan directeur de l'IA.* 2021.

14. **Ministère du Plan.** *Plan National de Développement 2018 - 2025.* 2018.

15. **Gouvernement de la République du Kenya.** Digital Economy Blueprint: Powering Kenya's Transformation . *https://ca.go.ke/wp-content/uploads/2019/05/Kenyas-Digital-Economy-Blueprint.pdf.* [En ligne] (2019).

16. **Le Fonds d'Appui à l'Entrepreneuriat Numérique (FAEN).** https://faen.gouv.bj/a-propos/. [En ligne]

17. **BCEAO.** *Stratégie régionale d'inclusion financière dans l'UEMOA : avancées et perspectives.*

18. **Union Africaine.** *La stratégie de transformation numérique pour l'Afrique (2020-2030)* . [https://au.int/sites/default/files/documents/38507-doc-dtsenglish.pdf.]

19. **FMI.** *la transformation numérique en afrique subsaharienne ; avril 2020 ; FMI.* 2020.

20. *Objectifs de développement durable : en phase avec les priorités de l'Afrique.* **Renouveau, Afrique.** 3, 2015, Vol. 29.

21. **CNUCED.** *Le rapport de la CNUCED en 2017 sur l'économie de l'information* . [https://www.itu.int/net4/ITU-D/idi/2017/index.html] 2017 : s.n.

22. **NRI.** *Network Readiness Index 2020:.* [https://networkreadinessindex.org/countries/benin/] 2020.

23. **The World Bank.** *Benin Digital Solutions for Sustainable Development* . (P162599) P.5.

24. **Programme d'Action du Gouvernement (PAG).** *ORIENTATIONS STRATÉGIQUES 2021 DANS LE SECTEUR DE L'ÉCONOMIE NUMÉRIQUE.* 2016 - 2021.

25. **Banque Mondiale.** *Benin Overview.* (2019a).

6.2. APPENDIX 2 : LISTS OF USE CASES

SECTOR	USE CASE / ISSUE / INITIATIVE	DESCRIPTION AND OBJECTIVES	COMPLEXITY		BUSINESS IMPACT (HIGH, MEDIUM, LOW)
			TECHNOLOGICAL	DATA-RELATED	
Public Administration	Predictions regarding job applications	Managing job applications: suggesting suitable candidates, eliminating candidates who do not meet the minimum criteria, identifying incomplete applications (in order to contact these people again) ☑ **Objectives:** - Offer an automatic scoring of applicants in terms of the minimum requirements by identifying shortcomings a priori - Identify incomplete applications - Identify anomalies or cases of fraud ☑ **Metric:** - Detection rate of fraud or anomalies - Suitability of the proposed candidates ☑ **Data:** - Data on competitions, requirements, etc. - Other relevant data	Medium	High	Low
Public Administration	Automatic detection of administrative documents	Automatic validation of administrative documents and data extraction ☑ **Objectives:** - Automatically detect the nature of the administrative documents submitted - Verify their authenticity ☑ **Metric:** - Percentage of documents properly classified - Percentage of false documents successfully identified ☑ **Data:** - Data on the nature of the documents - Data on fraudulent documents - Other data	Medium	High	Low
Public Administration	Help with automatic document classification	Automatic sorting of documents ☑ **Objectives:** - Make it possible to identify the nature of documents and offer automatic filing ☑ **Metric:** - Percentage of documents properly filed ☑ **Data:** Data on documents - Other data	Low	Medium	High
Public Administration	Automatic reading	Automatic reading of checks and sorting of letters at the post office. ☑ **Objectives:** - Offer automatic routing of mail according to its destination - Extract names and amounts on checks ☑ **Metric:** - Check recognition rate - Percentage of letters properly classified ☑ **Data:** - Data relating to handwriting - Other data	Low	Low	High

SECTOR	USE CASE / ISSUE / INITIATIVE	DESCRIPTION AND OBJECTIVES	COMPLEXITY		BUSINESS IMPACT (HIGH, MEDIUM, LOW)
			TECHNOLOGICAL	DATA-RELATED	
Public Administration	Customer service	Ensure better customer management by analyzing data such as voice calls, comments, etc.	High	N/A	N/A
	Detection of fraudulent birth certificates	Establish a platform making it possible to detect fraudulent birth certificates. This occurs as some people falsify their birth certificates to change their age and apply for competitions that are not open to them. This system could be applied to any other document that could be falsified (diplomas, identity cards, driving licenses, etc.). ☑ **Objectives:** - Use a scan of the document to ascertain whether or not the document is likely to be fraudulent in order to trigger an inspection. This analysis will be done based on an image of the document alone - Use a scan of the document to extract the various fields, make an inference, and deduce whether or not the document is fraudulent in order to trigger an inspection. The inference will be made from the fields extracted ☑ **Metric:** Detection rate of fraudulent documents, or other relevant metric. ☑ **Data:** - Database of documents identified as fraudulent and non-fraudulent - Any other data relating to the documents	Low	Low	Medium
Agriculture	Predictions regarding resource availability (water, soil, feedstock, etc.) and production planning based on market prospects	Allow for better management and allocation of land, water and feedstock and better planning of production. ☑ **Objectives:** - Identify agricultural areas with good potential - Predict water consumption by area - Predict market demand for a given agricultural product ☑ **Metric:** - Prediction accuracy rate ☑ **Data:** - Weather-related data - Historical production and market demand data - Any other sector-specific data	Medium	High	Medium
	Detection of various diseases affecting production	This system will make it possible to detect the segment of the production affected by a disease in order to better manage resources and avoid applying pesticides to the entire production ☑ **Objectives:** - Use images captured by drone to identify the plants affected by a disease ☑ **Metric:** - Production yield ☑ **Data:** - Images captured by drone - Any other images of plants that can help train AI	Low	High	High

SECTOR	USE CASE / ISSUE / INITIATIVE	DESCRIPTION AND OBJECTIVES	COMPLEXITY		BUSINESS IMPACT (HIGH, MEDIUM, LOW)
			TECHNOLOGICAL	DATA-RELATED	
Agriculture	Prediction of sorghum yield using drones and machine learning	Tools integrating current and historical crop and weather data	High	N/A	High
	Rice disease detector	AI solution to help producers anticipate the treatments required to ensure production	High	N/A	High
Living conditions	Environmental monitoring	Installing AI on a drone in order to collect environmental information for inaccessible areas in the event of a disaster. ☑ **Objectives:** - Map out the disaster-affected areas - Guide rescue efforts - Identify people in distress in the rubble ☑ **Metric:** - Success rate of missions using the AI-enabled drone - Rate of identification of people in distress ☑ **Data:** - Map data - Image data to help the AI learn to recognize objects - Other relevant data	High	High	High
Agriculture	Food quality evaluation	Implement an application that detects spoilage and defects in edible food ☑ **Objectives:** - The ability to detect foods with anomalies at the point of consumption or sale and sort/classify them (in the case of use by a robot) ☑ **Metric:** - Number of anomalies correctly identified ☑ **Data:** - Images of foods with or without anomalies - Other relevant data	Low	Medium	Low
Living conditions	Management of the land registry map	Solution to improve the readability of the land registry map	Medium	N/A	N/A
	Monitoring of town planning and illegal construction	Identify illegal constructions through the analysis of satellite images.	Medium	N/A	N/A

SECTOR	USE CASE / ISSUE / INITIATIVE	DESCRIPTION AND OBJECTIVES	COMPLEXITY		BUSINESS IMPACT (HIGH, MEDIUM, LOW)
			TECHNOLOGICAL	DATA-RELATED	
Education	Suggested postings based on skills and preferences	By using a student's progress data, as well as data relating to the choices made by students following the same path, AI could make recommendations for career choices. ☑ **Objectif:** - Propose a complete list of possible careers, from most to least relevant ☑ **Metric:** - Assess student satisfaction with the choices made based on the recommendations made by the system - Assess the employability rate resulting from the choices made based on the recommendations - Assess the student's success in their chosen industry ☑ **Data:** - All data related to the student's career path - All data related to the career paths of other students who have completed their cycle - All data related to the job market - Any other necessary data	Medium	Medium	Medium
	Prediction of academic performance	AI solution to support academic staff in providing guidance to students			High
	Personalized academic paths	Personalized learning solutions, based on AI, could be of great assistance to teachers who wish to differentiate their teaching methods. ☑ **Objectives:** - Adapt the level of difficulty of the exercises to suit the student's individual level - Provide the teacher with a more helpful 'smart' dashboard based on data collected from students. ☑ **Metric:** - Success rates or an evaluation of the system by teachers and students ☑ **Data:** - Data related to learning and use of the platform - Other relevant data	High	High	Medium
	Prediction of student behavior	Understand the risk factors likely to cause a student to slip into absenteeism or drop out of school entirely and intervene before this can occur by alerting the educational community and reorganizing the student's human support system ☑ **Objectives:** - Predict, with a certain degree of probability, the risk of a student dropping out - Identify certain high-risk behaviors ☑ **Metric:** - Actual dropout rate based on the predictions of the system ☑ **Data:** - Data related to the student's learning path - Data regarding other students - All relevant data	High	High	Medium

SECTOR	USE CASE / ISSUE / INITIATIVE	DESCRIPTION AND OBJECTIVES	COMPLEXITY		BUSINESS IMPACT (HIGH, MEDIUM, LOW)
			TECHNOLOGICAL	DATA-RELATED	
Education	Natural language processing (e.g. translation from local languages into French), speech recognition	AI solution to facilitate the adoption of digital technologies by the segments of the population who do not speak or write French	Medium	High	High
	Fraud detection	Detection of cheating in online testing ☑ **Objectif:** - Detect whether or not a student is cheating and trigger an inspection ☑ **Data:** - Data related to the use of the computer equipment used for online exams - Other relevant data	High	High	High
Environment	Smart waste sorting	Smart waste sorting, potentially by embedding AI into a robot ☑ **Objectif:** - Make it possible for a robot to sort waste intelligently ☑ **Metric:** - Percentage of objects correctly identified ☑ **Data:** - Image data related to waste - Other relevant data	High	High	Medium
	Climate prediction	Prediction of the risk of storms or other climate-related hazards ☑ **Objectives:** - Predict, with a certain degree of probability, the risk of a storm - Predict which areas will be affected ☑ **Metric:** - Prediction accuracy rate ☑ **Data:** - Historical data concerning storms - Weather-related data - Other relevant data	Medium	High	Medium
	Combating coastal erosion	Identify coastal erosion through the analysis of drone or satellite images.	High	N/A	N/A
Finance & Economy	Smart tax audits	AI could analyze tax returns and tax credit claims to identify cases of tax fraud and trigger a tax audit. ☑ **Objectives:** - Identify suspicious tax returns ☑ **Metric:** - Percentage of suspect tax returns correctly identified ☑ **Data:** - Historical tax returns - Other data	Medium	Medium	High

SECTOR	USE CASE / ISSUE / INITIATIVE	DESCRIPTION AND OBJECTIVES	COMPLEXITY		BUSINESS IMPACT (HIGH, MEDIUM, LOW)
			TECHNOLOGICAL	DATA-RELATED	
Finance & Economy	Prioritization of services based on user journey and privileges	Offering personalized services for citizens who are often entitled to certain benefits, based on their use of public platforms and services ☑ **Objectif:** - Propose a list of services that could benefit the citizen ☑ **Metric:** - Evaluation of the service by citizens ☑ **Data:** - Historical data on the use of public services - Other relevant data	High	High	Medium
	Processing of tender documents	Automatic processing of data from tender documents in order to check their conformity, identify applications that meet the minimum criteria, and flag up incomplete applications ☑ **Objectives:** - Identify inconsistencies or false documents in a tender application - Identify incomplete applications - Identify applications that meet the minimum criteria ☑ **Metric:** - Percentage of applications correctly identified ☑ **Data:** - Historical application data from candidates - Other relevant data	High	High	Low
	Rationali-sation des dépenses publiques	Smart management of allocations in order to optimize budget portfolios (identify high-risk projects and streamline investment) ☑ **Objectif:** - Identify, in terms of probability, a given project's likelihood of success or failure ☑ **Metric:** - Yet to be analyzed: because how can one tell with any certainty that a project that was not funded would definitely have failed ? ☑ **Data:** - Financial data related to investments and the success of projects - Supplier data - Other financial data	High	High	High
	Identification of potential sources of tax revenue through analysis of port entries and exits, logging, or truck traffic on national highways	AI solution to help administrative staff to expand the tax base.	High	N/A	N/A

| SECTOR | USE CASE / ISSUE / INITIATIVE | DESCRIPTION AND OBJECTIVES | COMPLEXITY | | BUSINESS IMPACT (HIGH, MEDIUM, LOW) |
			TECHNOLOGICAL	DATA-RELATED	
Finance & Economy	Management of innovation patents	Analyze the database to identify similar patents that have already been registered.	N/A	N/A	High
Infrastructure & Transportation	Traffic jam prediction	Contribute to relieving road traffic by predicting traffic jams. The application would also make it possible to streamline other key traffic elements, potentially optimizing traffic lights and public transportation (if necessary). The implementation of AI in the field of public transportation will help transport technology to predict future demands in terms of both transport and learning, ultimately providing better and more efficient solutions. Predictions could also adapt quickly to account for disruptions such as traffic accidents and public emergencies, increasing the safety of cities and infrastructure. ☑ **Objectives:** - Predict congestion areas for a given route a few hours in advance - According to the user's route, identify congested areas and propose alternatives ☑ **Metric:** - Prediction accuracy rate - Accuracy rate of alternative routes ☑ **Prérequis** - Road traffic data - GPS data from vehicles - Data from cameras in specific locations - Other data	High	Low	Low
	Optimization of logistics flows	For example, decongesting ports or improving the safety of freight and passenger services to reduce the traffic density of certain segments ☑ **Objectives:** - Survey areas to identify and take an inventory of empty spaces - Predict the needs of the supply chain as a whole - Identify routes that slow down the unloading of a container from the port ☑ **Metric:** - Time saved - Reductions in costs - Average length of time spent by a container at the port ☑ **Data:** - Order and stock history - Journey history of a container - Other relevant data	High	High	Medium

SECTOR	USE CASE / ISSUE / INITIATIVE	DESCRIPTION AND OBJECTIVES	COMPLEXITY		BUSINESS IMPACT (HIGH, MEDIUM, LOW)
			TECHNOLOGICAL	DATA-RELATED	
Infrastructure & Transportation	Predictive management of incidents and maintenance of water, electricity and fiber optic networks, roads, DTT	Traffic analysis to identify or predict future incidents.	High	N/A	High
Justice	Automatic data extraction	Application assisting with automatic extraction of data on convictions, provision of statistics on the nature of offenses, and case law data. ☑ **Objectif:** - Offer a statistical dashboard of convictions with associated grounds ☑ **Metric:** - Accuracy rate of information ☑ **Data:** - Legal data related to trials (documents, exhibits, rulings, court transcripts, etc.)	Medium	Medium	High
	Prediction of civil protection measures	Application to help establish a citizen protection policy based on the analysis of common crimes and their circumstances ☑ **Objectives:** - Identify/predict areas with a high probability of criminal activity ☑ **Metric:** - Rate of potential offenses avoided - Change in the number of offenses and crimes ☑ **Data:** - Security data (offenses, transcripts, etc.)	Medium	Medium	Low
	Legal assistance applications	By exploiting case law, AI could offer a process to minimize government expenditure and, in doing so, help the judiciary by proposing a suitable course of action to speed up court rulings. ☑ **Objectif:** - In the context of a case, bring up information on similar cases and offer an approach to handling the case ☑ **Metric:** - Satisfaction rate of magistrates using the system - Rate of suitability of the proposed courses of action ☑ **Data:** - Legal data related to trials (documents, exhibits, rulings, etc.)	High	High	Medium
Media	Assistance with the use of media archives	Indexing of archives to facilitate information retrieval.	High	N/A	High

SECTOR	USE CASE / ISSUE / INITIATIVE	DESCRIPTION AND OBJECTIVES	COMPLEXITY		BUSINESS IMPACT (HIGH, MEDIUM, LOW)
			TECHNOLOGICAL	DATA-RELATED	
Port	Optimizing the unloading process and reducing dwell time of critical cargo containers	Using drones to identify available spaces and predict dwell time of containers.	High	N/A	High
	Hazard detection (rainfall for unloading cargo, temperature for storing hydrocarbons, etc.)	Predict weather conditions by analyzing sensor data to determine the best time to unload certain types of cargo.	High	N/A	High
	Prediction of import and export flows of cargo	Predict the volume of cargo expected over a given period in order to adjust the resources available, allowing for better management.	High	N/A	High
	Optimization of the flow of trucks	According to the space available at the port, the weather, and other information, propose a better approach to managing trucks at the port.	N/A	N/A	High
Healthcare	Assistance with diagnosis and treatment	Using data from the patient's file, along with the diagnoses of patients presenting with similar symptoms, propose a list of possible diagnoses from most to least probable. For example in medical imaging, cancer detection, radiology, e-health, etc. ☑ **Objectives:** - Provide doctors with a list of possible diagnoses based on the patient's symptoms - Analyze a medical image and use the data to provide a list of possible diagnoses ☑ **Metric:** - Correct diagnosis rate ☑ **Data:** - Data from the patient's file - Symptoms - Histories of patients with the same symptoms who have been diagnosed correctly - Any other medical data	Medium	Medium	High

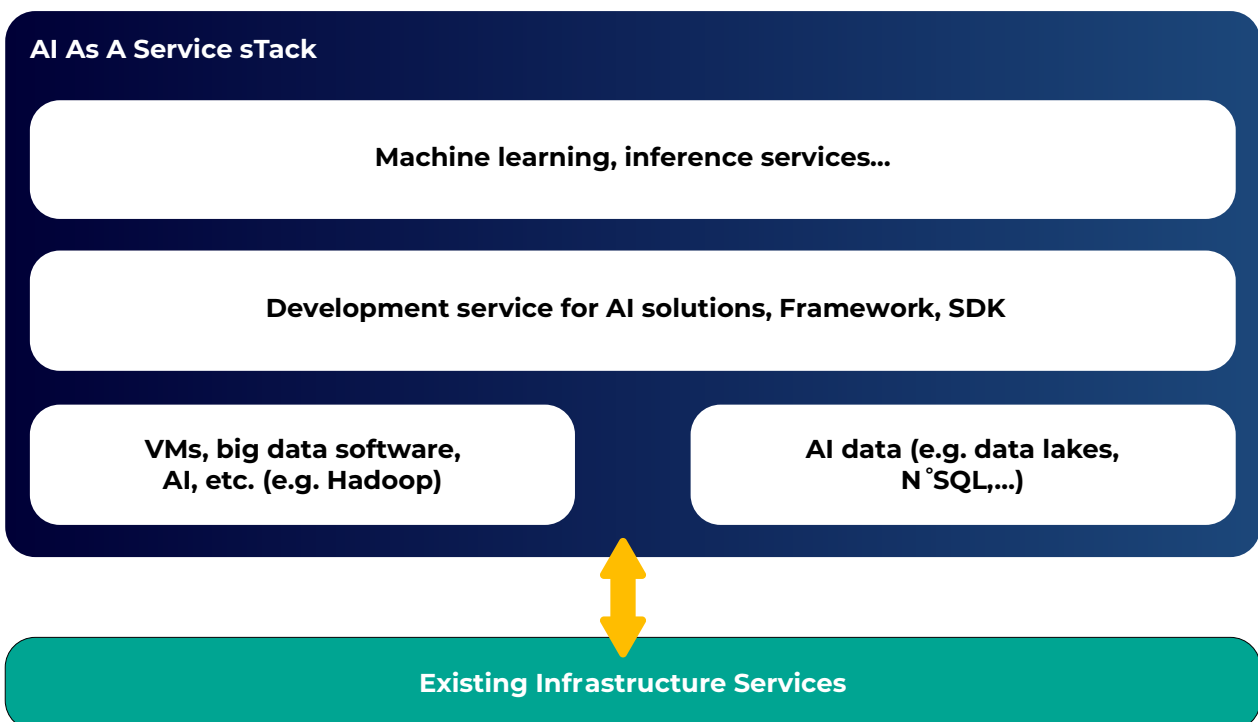| SECTOR	USE CASE / ISSUE / INITIATIVE	DESCRIPTION AND OBJECTIVES	COMPLEXITY		BUSINESS IMPACT (HIGH, MEDIUM, LOW)
			TECHNOLOGICAL	DATA-RELATED	
Healthcare	Production of disease prediction models	Based on the patient's file and the history of both the patient and other patients, identify diseases that the patient may develop. ☑ **Objectives:** - Propose a list of diseases that a patient, or anyone who requests to use the tool, could potentially develop ☑ **Metric:** - Prediction accuracy rate ☑ **Data:** - Data from the patient's file - Data from patients with similar files for whom predictions proved to be correct - All data in the field	High	High	Medium
	Sector governance assistance tool (Data Visualization)	Based on industry data, analyze a large volume of data (Big Data) in order to propose smart KPIs to facilitate better decision making ☑ **Objectives:** - Offer a dashboard with smarter metrics: prediction of bed occupancy rates, number of emergencies, shortages of certain medications, etc. ☑ **Metric:** - Assessment of the business impact of decisions taken based on the metrics proposed in the dashboard ☑ **Data:** - All data available in the sector - All data available in other associated sectors	Medium	High	Low
	Management of mass health campaigns (vaccination, raising awareness, infectious diseases, etc.)	AI could help with the better management of health campaigns by allowing for better distribution of vaccines. It can also help to run simulations of contagious diseases such as COVID, etc. ☑ **Objectives:** - Help to run simulations in the case of a contagious disease - In the event of a vaccination campaign, identify high-risk areas to target for better management of the campaign ☑ **Metric:** - Evaluate the decisions made based on the information produced by the system ☑ **Data:** - Patient-related data - Movement data (GPS) of infected individuals - Other data related to the sector	Medium	Medium	Medium
	Voice system in national language for pre-diagnosis of certain diseases	AI solution to assist with doctor-patient communication in remote populations with difficulty accessing areas served by major hospitals	High	N/A	High

SECTOR	USE CASE / ISSUE / INITIATIVE	DESCRIPTION AND OBJECTIVES	COMPLEXITY		BUSINESS IMPACT (HIGH, MEDIUM, LOW)
			TECHNOLOGICAL	DATA-RELATED	
Healthcare	Virtual reality surgical procedures	AI-enabled medical solution to assist surgeons with their work	High	N/A	High
	Cancer detection via medical image processing (e.g. liver cancer)	Build an AI that can analyze a medical image and detect spots or areas that could potentially be a cancerous tumor in order to help doctors to diagnose them ☑ **Objectif:** - Identify an area on a medical image that could potentially be a cancerous tumor ☑ **Metric:** - Correct diagnosis rate ☑ **Data:** - Medical imaging data	High	Low	High
	Drug monitoring prediction, detection of high-risk patients, detection of infections	Determine the side effects that a given patient is most likely to develop as a result of a treatment ☑ **Objectives:** - Predict the most likely side effects for a given patient - Depending on the severity of the side effects, offer an alternative, more suitable treatment ☑ **Metric:** - Rate of complaints related to side effects from treatments ☑ **Data:** - Patient history/file - Data related to the treatment in question - Other data related to the sector	High	High	High
	Support for healthcare worker decision-making	Propose smarter KPIs for decision making.	High	N/A	High
Security & Defense	Prediction of emergency vehicle response	System to predict response (or vehicle dispatch) based on historical response data ☑ **Objectives:** - Predict the likely number of responses per day or over a certain period of time ☑ **Metric:** - Prediction accuracy rate ☑ **Data:** - Historical response data - Other data	Low	High	Low

SECTOR	USE CASE / ISSUE / INITIATIVE	DESCRIPTION AND OBJECTIVES	COMPLEXITY		BUSINESS IMPACT (HIGH, MEDIUM, LOW)
			TECHNOLOGICAL	DATA-RELATED	
Security & Defense	Prediction of number of emergency calls	Prediction of number of emergency calls in order to suitably prepare the internal call center, predict the areas likely to require a response, and triage incoming calls by urgency (by analyzing tone of voice). ☑ **Objectives:** - Prediction of number of emergency calls - Prediction of areas likely to require a response - Classification of urgency of calls ☑ **Metric:** - Prediction accuracy rate ☑ **Data:** - Historical emergency call data - Historical data on areas requiring a response - Call recording data - Other data	Low	High	Low
	Prediction of offenses	Implementation of a burglary prediction system in order to pre-position defense forces ☑ **Objectives:** - Identify/predict areas with a high probability of criminal activity ☑ **Metric:** - Offense rate ☑ **Data:** - Offense-related data	High	High	Low
	Video filtering: Detection and removal of pornographic scenes	AI-based solution to help prevent posting of, and protect minors from uncontrolled access to, pornographic material	High	High	Medium
	Analysis of video streams from city CCTV sources	Use of video surveillance to identify certain behaviors.	High	N/A	N/A
	Combating poaching in nature reserves	Analysis of animal movement patterns to predict the trajectory of poachers.	High	N/A	High
	Prevention of security risks	Confidential	High	N/A	High
	Management of the movement of people in the event of an epidemic situation	Confidential	High	N/A	High

SECTOR	USE CASE / ISSUE / INITIATIVE	DESCRIPTION AND OBJECTIVES	COMPLEXITY		BUSINESS IMPACT (HIGH, MEDIUM, LOW)
			TECHNOLOGICAL	DATA-RELATED	
Security & Defense	Surveillance of borders and maritime coasts	Confidential	High	N/A	High
Cybersecurity	Automatic data analysis for the detection of suspicious behavior, prevention and detection of cyberattacks	Implementation of AI techniques to improve the ability to detect, prevent, and even deal with previously unknown cyberattacks. ☑ **Objectives:** - Identify suspicious behavior on the local network - Identify suspicious behavior on a computer - Identify suspicious emails ☑ **Metric:** - Percentage of threats correctly identified - Rate of improvement of security ☑ **Data:** - Data circulating on the network - Login history for programs on a computer - Emails - Data from the Internet - Other relevant data	Medium	High	Medium
Tourism	Augmented reality for tourism to Benin	Use AI solutions to assist visitors with their journey before their arrival in Benin, during their stay and after their return, in order to provide a richer, more immersive experience.	High	N/A	High

6.3. APPENDIX 3 : IA As A SERVICE

AI As A Service sTack

Machine learning, inference services...

Development service for AI solutions, Framework, SDK

VMs, big data software, AI, etc. (e.g. Hadoop)

AI data (e.g. data lakes, N°SQL,...)

Existing Infrastructure Services

Machine Learning as a Service (MLaaS)

Target users	Data Processor, Collector, Consumers
Description	The 'Machine Learning as a Service' solution is intended to provide a set of tools including as data pre-processing, training models, evaluation models, prediction models, etc.
Current situation	Capacities require development
Application components	☑ **ML tools**
Main operating requirements	☑ Availability of sufficient computing power

Data Lake as a Service (DLaaS)

Target users	Data Processor, Collector, Consumers
Description	The 'Data Lake as a Service' solution is intended to provide an infrastructure and middleware platform that makes it possible to manage the mass storage of raw and unstructured data.
Current situation	Capacities require development
Application components	☑ **Big Data databases**
Main operating requirements	☑ Provision of Big Data databases ☑ Selection of multiple service levels corresponding to varying availability commitments

Containers as a Service (CaaS)

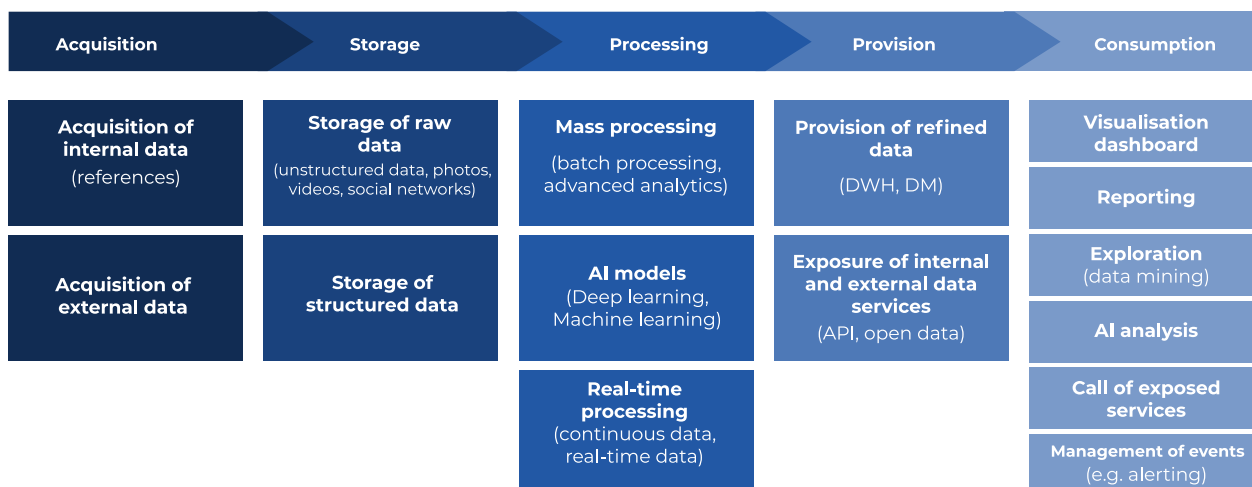|	
Target users	Data Processor, Collector, Consumers
Description	The 'Containers as a Service' solution is intended to provide a middleware platform for container orchestration.
Current situation	Capacities require development
Application components	☑ **Container orchestration solution (such as Kubernetes, Open Shift)**
Main operating requirements	☑ Hosting and orchestration of application containers

Integration Platform as a Service (iPaaS)

Target users	Data Processor, Collector, Consumers
Description	The 'Integration Platform as a Service' solution is intended to provide an environment for developing, deploying and executing inter-application data flows or data intended to populate data sinks.
Current situation	Capacities require development
Application components	☑ **Interoperability services**
Main operating requirements	☑ Data flow development environment ☑ Administration and management of the data flow lifecycle ☑ Data flow execution platform

Master Data Management as a Service (MDMaaS)

Target users	Data Processor, Collector, Consumers
Description	The 'MDM as a Service' solution is intended to provide government IS teams with a turnkey MDM solution to host and manage their repository data.
Current situation	Capacities require development
Application components	☑ **MDM solution**
Main operating requirements	☑ Storage and hosting of repository data ☑ Data lifecycle management process (record creation, updating, deletion)

6.4. APPENDIX 4 : COLLECTION AND PROCESSING CHAIN

Acquisition	Storage	Processing	Provision	Consumption
Acquisition of internal data (references)	**Storage of raw data** (unstructured data, photos, videos, social networks)	**Mass processing** (batch processing, advanced analytics)	**Provision of refined data** (DWH, DM)	**Visualisation dashboard**
				Reporting
Acquisition of external data	**Storage of structured data**	**AI models** (Deep learning, Machine learning)	**Exposure of internal and external data services** (API, open data)	**Exploration** (data mining)
				AI analysis
		Real-time processing (continuous data, real-time data)		**Call of exposed services**
				Management of events (e.g. alerting)

Data acquisition

Target users	IT teams of administrations / Data collector
Description	The aim of this service is to provide the mechanisms and data flows for data acquisition and integration in the architecture
Application components	☑ Batch data loading (i.e. ETL) ☑ Ongoing data loading (i.e. data streaming)
Main operating requirements	☑ Internal data acquisition ☑ External data acquisition ☑ Batch data acquisition and integration ☑ Ongoing data acquisition and integration ☑ Quality and data transformation controls ☑ Data loading

Data storage

Target users	IT teams of administrations / Data collector
Description	The purpose of this service is to make it possible to store data
Application components	☑ Relational databases ☑ Non-relational databases (Big Data)
Main operating requirements	☑ Storage of structured data in relational databases ☑ Storage of unstructured data in non-relational databases

Data processing

Target users	IT teams of administrations
Description	The purpose of this service is to make it possible to process stored data
Current situation	Capacities require development
Application components	☑ Data processing (ETL, data streaming)
Main operating requirements	☑ Mass (batch) processing ☑ Training and operation of artificial intelligence models (self-learning, machine learning, deep learning) ☑ Real-time processing (ongoing analysis of the data received, for example in order to trigger follow-up actions or issue notifications)

Provision of data

Target users	IT teams of administrations
Description	The purpose of this service is to make it possible to provide refined data at the points of consumption
Current situation	Capacities require development
Application components	☑ Data warehouse and data marts ☑ API Gateway
Main operating requirements	☑ Storage and structuring of data provided (DWH and DM) ☑ Data exposure (API, open data)

Data consumption

Target users	IT teams of administrations
Description	The purpose of this service is to provide the tools that make it possible for the clients of the platform to consume the data according to their needs
Current situation	Capacities require development
Application components	☑ Artificial intelligence model training studio Data visualization tools ☑ Data mining studio ☑ Business intelligence tools ☑ Report production services
Main operating requirements	☑ Data science studio (AI development and training) ☑ Exploration / data mining ☑ Display of dashboards ☑ Event management (e.g. alerts) ☑ Reporting

MINISTÈRE DU NUMÉRIQUE ET DE LA DIGITALISATION

RÉPUBLIQUE DU BÉNIN

The electronic version of the SNIAM is available at
🌐 **https://numerique.gouv.bj/**

If you have any questions or suggestions, please contact us
✉ **numerique@gouv.bj**

Follow us :
@numeriquebenin